Regional District of Central Kootenay

JOINT RESOURCE RECOVERY COMMITTEE

Open Meeting Agenda

Date: Wednesday, February 19, 2025

Time: 1:00 pm

Location: Hybrid Model - In-person and Remote

Directors will have the opportunity to participate in the meeting electronically. Proceedings are open to the public.

Pages

1. **ZOOM REMOTE MEETING INFO**

   To promote openness, transparency and provide accessibility to the public we provide the ability to attend all RDCK meetings in-person or remote.

   Meeting Time:

   1:00 p.m. PST

   2:00 .p.m. MST

   Join by Video:

   https://rdck-bc-ca.zoom.us/j/98572164791?pwd=plCY9gqLwVZtdzR2zmtuHXJOmq138L.1

   Join by Phone:

   833 955 1088 Canada Toll-free

   *6 to unmute or mute
   *9 to raise or lower your handthe

   Meeting ID: 985 7216 4791
   Passcode: 701014

2. **CALL TO ORDER & WELCOME**

   Chair Newell to call the meeting to order at _____ p.m. PST

2.1 TRADITIONAL LANDS ACKNOWLEDGEMENT STATEMENT

We acknowledge and respect the Indigenous peoples within whose traditional lands we are meeting today.

2.2 ADOPTION OF THE AGENDA

RECOMMENDATION:
The agenda for the February 19, 2025 Joint Resource Recovery meeting be adopted as circulated.

2.3 RECEIPT OF MINUTES

4 - 13

The January 15, 2025 Joint Resource Recovery minutes, have been received.

3. COMPACTION TRAILER CONTRACT AWARD [Central Sub-region]

14 - 24

The Committee Report from Larry Brown, Operations Supervisor seeking authorization to enter into a Purchase of Goods Agreement with Rollins Machinery for the purchase of a compacting trailer for the Central waste fleet, has been received.

RECOMMENDATION:
That the Board approve the RDCK enter into a Purchase of Goods Agreement with Rollins Machinery for the purchase of a Deloupe Model HS483 tridem axle Compaction Pushout Trailer to a maximum value of **$278,134 plus GST**, and that the Chair and Corporate Officer be authorized to sign the necessary documents.

AND FURTHER, that the costs be paid from S187 Refuse Disposal - Central Subregion.

4. HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT FOR CENTRAL LANDFILL AND HB MINE TAILINGS STORAGE FACILITY [Central Sub-region]

25 - 546

The Committee Report from Heidi Bench, Resource Recovery Projects Advisor presenting the findings of the Hydrogeology and Hydrology Characterization Report for the Central Landfill and HB Mine Tailings Storage Facility, has been received for information.

5. HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT FOR OOTISCHENIA LANDFILL [West Sub-region]

547 - 738

The Committee Report from Heidi Bench, Resource Recovery Projects Advisor presenting the findings of the Hydrogeology and Hydrology Characterization Report for the Ootischenia Landfill and providing an update of follow-up actions, has been received for information.

6. 2025-2029 DRAFT FINANCIAL PLANS
[All Areas]

The following draft 2025-2029 Financial Plans highlighting final adjustments for discussion, have been received:

6.1	Service S186: Refuse Disposal - East Subregion	739 - 746
6.2	Service A116: Recycling Program – East Subregion	747 - 749
6.3	Service A119: Organics Program – East Subregion	750 - 752
6.4	Service S187: Refuse Disposal - Central Subregion	753 - 766
6.5	Service A117: Recycling Program – Central Subregion	767 - 769
6.6	Service S188: Refuse Disposal - West Subregion	770 - 778
6.7	Service A118: Recycling Program – West Subregion	779 - 781
6.8	Service A120: Organics Program – Central & West Subregions	782 - 785

7. PUBLIC TIME

The Chair will call for questions from the public and members of the media at _____ p.m. PST.

8. ADJOURNMENT

RECOMMENDATION:
The Joint Resource Recovery Committee meeting adjourn at _____ p.m. PST.

Regional District of Central Kootenay

JOINT RESOURCE RECOVERY COMMITTEE MEETING

Open Meeting Minutes

A Joint Resource Recovery Committee meeting was held on Wednesday, January 15, 2025 1:00 pm PST / 2:00 pm MST through a hybrid meeting model.

ELECTED OFFICIALS PRESENT	Director G. Jackman	Electoral Area A	In-person
	Director R. Tierney	Electoral Area B	In-person
	Director K. Vandenberghe	Electoral Area C	In-person
	Director A. Watson	Electoral Area D	In-person
	Alt. Director J. Smienk	Electoral Area E	In-person
	Director T. Newell	Electoral Area F	In-person
	Director H. Cunningham	Electoral Area G	In-person
	Director W. Popoff	**Electoral Area H (Chair)**	**In-person**
	Director A. Davidoff	Electoral Area I	
	Director H. Hanegraaf	Electoral Area J	In-person
	Director T. Weatherhead	Electoral Area K	In-person
	Director M. McFaddin	City of Castlegar	In-person
	Director A. DeBoon	Town of Creston	
	Director S. Hewat	Village of Kaslo	In-person
	Director T. Zeleznik	Village of Nakusp	
	Director K. Page	City of Nelson	In-person
	Alt. Director Fyke	Village of New Denver	
	Director D. Lockwood	Village of Salmo	
	Director L. Main	Village of Silverton	In-person
	Director E. Buller	Village of Slocan	

STAFF PRESENT	S. Horn	Corporate Administrative Officer
	U. Wolf	General Manager – Environmental Services
	A. Wilson	Resource Recovery Manager
	A. Hamilton	Environmental Projects Lead
	H. Bench	Resource Recovery Projects Advisor
	T. Johnston	Environmental Coordinator
	M. Morrison	Organics Coordinator
	E. Clark	Meeting Coordinator
	N. Metz	Alt. Meeting Coordinator

1. ZOOM REMOTE MEETING INFO

Join Zoom Meeting
https://rdck-bc-ca.zoom.us/j/98572164791?pwd=plCY9gqLwVZtdzR2zmtuHXJOmq138L.1

Meeting ID: 985 7216 4791
Passcode: 701014

Dial by your location
833 955 1088 Canada Toll-free

In-Person Meeting Location for Hybrid Meeting Model
The following location was determined to hold the in-person meetings for the Joint Resource Recovery Committee:

Location Name: RDCK Board Room
Location Address: 202 Lakeside Drive, Nelson, BC

2. CALL TO ORDER & WELCOME

Chair Popoff called the meeting to order at 1:00 pm.

2.1 Traditional Lands Acknowledgement Statement

We acknowledge and respect the indigenous peoples within whose traditional lands we are meeting today.

2.2 Adoption of the Agenda

Moved and seconded,
And resolved:

The Agenda for the January 15, 2025 Joint Resource Recovery Committee meeting be adopted as circulated.

Carried

2.3 Receipt of Minutes

The December 11, 2024 Joint Resource Recovery Committee Minutes have been received with the following revision:

Addition of "on a 5-year schedule" to Item 3, paragraph 2, of the first motion.

DIRECTOR PRESENT Director Buller joined the meeting at 1:04 pm.

3. RESOURCE RECOVERY BYLAW NO. 2961, 2025 – REPEALING RESOURCE RECOVERY BYLAW NO. 2905, 2023

[All Areas]

The January 15, 2025 Committee Report from Todd Johnston, Environmental Coordinator presenting the proposed Resource Recovery Bylaw No.2961, 2025 (the Bylaw), to REPEAL Resource Recovery Facilities Regulatory Bylaw No. 2905, 2023 (2905); and to present the proposed Resource Recovery Amendment Bylaw No. 3011, 2025 (The Amendment Bylaw), has been received.

Director Hewat called Point of Order for clarity on whether recommendations were being voted on as a block or individually.

Moved and seconded, to be moved as a block.
And resolved that it be **recommended** to the Board:

That the *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025,* be read a first, second and third time by content to repeal and replace *Resource Recovery Facilities Regulatory Bylaw No. 2905, 2023*.

That the *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025,* be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

That the *Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025,* with updated tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 5-year schedule, be read a first, second and third time by content to amend *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025*.

That the *Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025,* with updated tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 5-year schedule, be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

That the Board direct staff to present tipping fee increases in January of 2026, 2027, 2028, and 2029 aligned with the proposed Tipping Fee Cost Recovery Objectives on a 5-year schedule, identified in the RESOURCE RECOVERY BYLAW NO. 2961, 2025 – REPEALING RESOURCE RECOVERY BYLAW NO. 2905, 2023 Committee Report brought to the January 15, 2025 Joint Resource Recovery Committee with adjustments for inflation, for subsequent amendments.

Defeated

Moved and seconded, for recommendations 1 – 4 to be moved as a block
And resolved that it be **recommended** to the Board:

That the *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025,* be read a first, second and third time by content to repeal and replace *Resource Recovery Facilities Regulatory Bylaw No. 2905, 2023*.

That the *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025,* be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

That the *Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025,* with updated

tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 3-year schedule, be read a first, second and third time by content to amend *Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025*.

That the *Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025,* with updated tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 3-year schedule, be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

Carried

Moved and seconded,
And resolved that it be **recommended** to the Board:

That the Board direct staff to present tipping fee increases in January of 2026 and 2027, aligned with the proposed Tipping Fee Cost Recovery Objectives on a 3-year schedule, identified in the RESOURCE RECOVERY BYLAW NO. 2961, 2025 – REPEALING RESOURCE RECOVERY BYLAW NO. 2905, 2023 Committee Report brought to the January 15, 2025 Joint Resource Recovery Committee with adjustments for inflation, for subsequent amendments.

Defeated

RECESS / RECONVENE The meeting recessed at 2:22 pm for a break and reconvened at 2:38 pm.

4. ENVIRONMENTAL MONITORING PROGRAM CONTRACT AWARD
[All Areas]
The January 15, 2025 Committee Report from Heidi Bench, Projects Advisor presenting a recommendation for the Environmental Monitoring RFP Contract Award, has been received.

Moved and seconded,
And resolved that it be **recommended** to the Board:

That the Board approve the RDCK entering into a Consulting Services Agreement with Masse Environmental Consultants for the Resource Recovery Environmental Monitoring Program for the period of January 31, 2025 to March 31, 2028, with the option for up to two (2) one (1) year extensions;

AND FURTHER, that as part of this agreement, Masse Environmental Consultants will sub-contract ALS Canada Ltd. to provide laboratory services for the duration of the Consulting Services Agreement for the Resource Recovery Environmental Monitoring Program;

AND FURTHER, that the total costs for the three-year contract period be paid from the following Services:

- S186 East Resource Recovery Waste Service, not to exceed $139,365.50
- S187 Central Resource Recovery Waste Service, not to exceed $212,880.71
- S188 West Resource Recovery Waste Service, not to exceed $95,966.27
- A119 East Resource Recovery Compost Service, not to exceed $18,009.55
- A120 Central-West Resource Recovery Compost Service, not to exceed $44,773.81

AND FURTHER, that the Chair and Corporate Officer be authorized to sign the necessary documents.

Carried

5. INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL ORGANICS COLLECTION PILOT PROGRAM SUPPORTS & DISPOSAL BAN INVESTIGATION

The December 3, 2024 Committee Report from Amy Wilson, Resource Recovery Manager requesting an authorization for a Municipal Finance Authority equipment financing for the 2024 Central Loader, has been received.

Moved and seconded,
MOTION ONLY

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Moved and seconded,
And Resolved:
AMENDMENT TO THE MOTION

That the foregoing motion being:

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Be amended to include *"or equipment for processing"*, thus reading:

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts or equipment for processing for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Defeated

DIRECTOR ABSENT Director DeBoon left the meeting at 3:25 pm.

Moved and seconded,
MOTION ONLY

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Moved and seconded,
And Resolved:
AMENDMENT TO THE MOTION

That the foregoing motion being:

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Be amended to increase the amount of $8,500 to $12,500 and to remove the last paragraph, thus reading:

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $12,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts.

Defeated

Director Davidoff called a Point of Order that the amended motion be clarified.

Moved and seconded,
And resolved that it be **recommended** to the Board:

That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.

d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

Carried

Moved and seconded,
And resolved that it be **recommended** to the Board:

That the Board direct staff to investigate the feasibility of implementing an Industrial, Commercial and Institutional organics disposal ban, and to return to the Committee in Q3 2025 with a framework for implementing a disposal ban for discussion.

Carried

6. CORRESPONDENCE FOR RECEIPT

6.1 Letter dated December 14, 2024 from the Village of Silverton regarding potential Tipping Fee Increases

6.2 Healthy Community Society of the North Slocan Valley – Organics Program Report for 2024 and 2025 Program Budget

7. PUBLIC TIME

The Chair called for questions from the public and members of the media at 3:54 pm.
No questions from the public.

8. ADJOURNMENT

Moved and seconded,
And resolved:

The Joint Resource Recovery Committee meeting adjourned at 3:55 pm.

Carried

CERTIFIED CORRECT

Director W. Popoff, Chair
January 15, 2025
Joint Resource Recovery Committee Meeting

BOARD RESOLUTIONS AS ADOPTED AT THE JANUARY 15, 2025 JOINT RESOURCE RECOVERY COMMITTEE MEETING

RECOMMENDATION #1
That the Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025, be read a first, second and third time by content to repeal and replace Resource Recovery Facilities Regulatory Bylaw No. 2905, 2023.

That the Resource Recovery Facilities Regulatory Bylaw No. 2961, 2025, be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

That the Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025, with updated tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 3-year schedule, be read a first, second and third time by content to amend Resource Recovery Facilities Regulatory Bylaw No. 2961, 2024.

That the Resource Recovery Facilities Regulatory Amendment Bylaw No. 3011, 2025, with updated tipping fees aligned with the proposed Tipping Fee Cost Recovery Objectives on a 3-year schedule, be ADOPTED and the Chair and Corporate Officer be authorized to sign the same.

RECOMMENDATION #2
That the Board approve the RDCK entering into a Consulting Services Agreement with Masse Environmental Consultants for the Resource Recovery Environmental Monitoring Program for the period of January 31, 2025 to March 31, 2028, with the option for up to two (2) one (1) year extensions;

AND FURTHER, that as part of this agreement, Masse Environmental Consultants will sub-contract ALS Canada Ltd. to provide laboratory services for the duration of the Consulting Services Agreement for the Resource Recovery Environmental Monitoring Program;

AND FURTHER, that the total costs for the three-year contract period be paid from the following Services:

- S186 East Resource Recovery Waste Service, not to exceed $139,365.50
- S187 Central Resource Recovery Waste Service, not to exceed $212,880.71
- S188 West Resource Recovery Waste Service, not to exceed $95,966.27
- A119 East Resource Recovery Compost Service, not to exceed $18,009.55
- A120 Central-West Resource Recovery Compost Service, not to exceed $44,773.81

AND FURTHER, that the Chair and Corporate Officer be authorized to sign the necessary documents.

RECOMMENDATION #3
That the Board approve the proposed subsidies and supports for the Industrial, Commercial and Institutional organics diversion pilot program within the City of Nelson, including:

a. A pilot reduction in commercial organics tipping fees from $96.75/tonne to $55/tonne.
b. Provision of education and training support for participating businesses.
c. Development of a communications program to promote and support the pilot.
d. Rebates for up to two organic waste carts for the first 25 participating businesses.

AND FURTHER that $8,500 be included in the draft 2025-2029 Financial Plan for Service S187 Central

Subregion Resource Recovery to fund portions of the communications program materials that are specific to the City of Nelson, and the rebates for the organic waste carts;

AND FURTHER that $4,000 be included in the draft 2025-2029 Financial Plan for Allocation Service A102 Resource Recovery to fund portions of the communications program materials that are more general and can be utilized for future pilot programs in other communities.

RECOMMENDATION #4
That the Board direct staff to investigate the feasibility of implementing an Industrial, Commercial and Institutional organics disposal ban, and to return to the Committee in Q3 2025 with a framework for implementing a disposal ban for discussion.

Central Resource Recovery - Purchase of Compaction Trailer – Contract Award

Author: Larry Brown, Operations Supervisor
File Reference: 2024-236-ENV
Electoral Area/Municipality: CENTRAL SUB-REGION
Services Impacted S187 Refuse Disposal – Central Subregion

1.0 STAFF RECOMMENDATION

That the Board approve the RDCK enter into a Purchase of Goods Agreement with Rollins Machinery for the purchase of a Deloupe Model HS483 tridem axle Compaction Pushout Trailer to a maximum value of **$278,134 plus GST**, and that the Chair and Corporate Officer be authorized to sign the necessary documents.

AND FURTHER, that the costs be paid from S187 Refuse Disposal - Central Subregion.

2.0 BACKGROUND/HISTORY

An Invitation to Quote was issued on BC Bid October 7, 2024 and closed on October 31, 2024.

The minimum criteria upon which the suppliers were to base their submissions on was as follows:

1. Power Take Off (PTO) power.
2. Top load c/w deflectors.
3. Rear swing door (No lift doors).
4. Designed for mixed waste.
5. Side door for safe access.
6. Tridem axle configuration.
7. Anti-Lock Braking System (ABS).
8. Volume: 90 cu. Yds. minimum.
9. Air ride suspension.
10. Compliant to BC weight laws.

Two submissions were received:

1. NexGen Municipal Inc., 4430 Mainway Drive, Burlington Ontario, L7L 5Y5. (HCP48 Compaction Trailer),
2. Rollins Machinery, 201 – 150 Campion Street, Kelowna, BC V1X 7S8. (Deloupe Compaction Pushout Trailer – Model #HS483).

The submissions were reviewed on the following criteria:

- Lowest overall cost to the RDCK
- Warranty coverage
- Delivery – lead time
- Operations/Service Manual
- Two (2) Customer References
- Conformance to RDCK's stated specifications
- Shipping fees
- Drawings showing trailer schematics
- Exceptions to the RDCK proposed agreement in Schedule B

The submissions and their criteria were then scored with values assigned as follows:

Rating	Details
100%	Outstanding Proposal that Substantially Exceed Requirements
85%	Above Average Fulfilling Requirements
70%	Fully Meets Requirements
50%	Meets Minimum Requirements
25%	Does Not Meet Minimum Requirements in All Areas
0%	Unsatisfactory

EVALUATION AND SCORING OF SUBMISSIONS

Evaluation Criteria	Weighting Factors	NEXGEN (HCP48)	ROLLINS (Deloupe HS483)
Conformance to RDCK's stated specification	30.00%	21.00	21.00
Warranty Coverage	10.00%	5.00	7.00
Delivery - lead time	10.00%	7.00	7.00
Drawings/Trailer Schematics & Operations/Service Manual	5.00%	3.50	3.50
Exceptions to RDCK's Proposed Agreement	5.00%	2.50	3.50
References	5.00%	1.75	1.75
Total Technical Score	65.00%	**40.75**	**43.75**
Vendor Price	35.00%	$331,194	$278,134
NORMALIZED PRICE SCORE		**83.98%**	**100.00%**
Total Price Score	35.00%	**29.39**	**35.00**
Total Technical Score	65.00%	**40.75**	**43.75**
OVERALL SCORE	100.00%	**70.14**	**78.75**
OVERALL RANKING		**2**	**1**

3.0 PROBLEM OR OPPORTUNITY DESCRIPTION

The RDCK currently owns and operates three compaction pushout trailers. They are:

- Unit 175 2014 Universal Compaction Pushout Trailer (Tandem axle, PTO Drive),
- Unit 176 2014 Universal Compaction Pushout Trailer (Tandem axle, Diesel Drive),
- Unit 178 2013 Spector Compaction Pushout Trailer (Tandem axle, PTO Drive).

The trailers are used primarily to support the movement of waste materials from Transtor bins located at the Grohman, Balfour, and Kaslo Transfer Stations to the Ootischenia Landfill.

The existing fleet of Compaction trailers is incurring higher maintenance and repairs costs due to age and condition.

The existing fleet are all tandem axle units and are restricted from some MOTI roads due to Seasonal Load Restrictions.

3.1 Alignment to Board Strategic Plan

The purchase of the new Compaction trailer aligns with the RDCK Strategic Plan focuses on developing more costs effective and practical approach to asset management.

3.2 Legislative Considerations

Board approval is required for this purchase.

3.3 What Are the Risks

Due to age and condition of the existing trailer fleet the efficient movement of waste materials may be impacted should mechanical failures occur prior to the delivery of the new trailer.

4.0 PROPOSED SOLUTION

The Deloupe Compaction trailer will integrate seamlessly with the existing tractor fleet and all sites currently being serviced by the existing fleet.

The Deloupe trailer is a tridem axle configuration which increases the load carrying capacity which will allow travel on some MOTI roads when Seasonal Load restrictions are in effect.

4.1 Financial Considerations of the Proposed Solution

The RDCK 2024 Financial Plan for Service S187 Central Waste included $250,000 for a Compaction Trailer. The Draft 2025 Financial Plan for S187 has $300,000 for a Compaction trailer. The Deloupe unit recommended by staff is $278,134.00 with provincial tax applied is $297,603, is within the proposed budget.

4.2 Risks with the Proposed Solution

All known procurement risks have been factored into the specifications and will be managed by the manufacturer.

4.3 Resource Allocation and Workplan Impact

With support from the Purchasing Agent, the Resource Recovery Operations Supervisor will lead the purchase of the selected Compaction trailer and oversee the deployment of the unit into operations.

4.4 Public Benefit and Stakeholder Engagement of Proposed Solution

The public will benefit with the purchase and use of the new compaction trailer as the upgraded fleet will be less prone to mechanical breakdowns and interruption to the servicing of sites.

4.5 Leveraging Technology

Not applicable

4.5 Measuring Success

Success will be measured by the delivery of the new trailer on time and within the identified budget.

5.0 ALTERNATIVE SOLUTION(S)

Due to the configuration of the Balfour, Kaslo, and Grohman sites, the Transtors currently in use, and the existing fleet of compaction trailers, no other type of compaction trailers were identified or considered.

6.0 OPTIONS CONSIDERED BUT NOT PRESENTED

That the Board direct staff to defer the purchase the Deloupe Compaction trailer from Rollins Machinery as it may result in additional suppliers leading to a lower overall purchase price. Staff feel that the tender process has resulted in good value for the RDCK and does not feel delaying the purchase is a reasonable option.

7.0 OPTIONS SUMMARY

Option 1:

Recommendation:

That the Board approve the RDCK enter into a Purchase of Goods Agreement with Rollins Machinery for the purchase of a Deloupe Model HS483 tridem axle Compaction Pushout Trailer to a maximum value of **$278,134 plus GST**, and that the Chair and Corporate Officer be authorized to sign the necessary documents.

AND FURTHER, that the costs be paid from S187 Refuse Disposal - Central Subregion.

8.0 RECOMMENDATION

That the Board approve the RDCK enter into a Purchase of Goods Agreement with Rollins Machinery for the purchase of a Deloupe Model HS483 tridem axle Compaction Pushout Trailer to a maximum value of **$278,134 plus GST**, and that the Chair and Corporate Officer be authorized to sign the necessary documents.

AND FURTHER, that the costs be paid from S187 Refuse Disposal - Central Subregion.

Respectfully submitted,
Larry Brown, Operations Supervisor

CONCURRENCE

Manager Resource Recovery – Amy Wilson,
General Manager of Environmental Services – Uli Wolf
General Manager of Finance – Yev Malloff
Chief Administrative Officer – Stuart Horn

ATTACHMENTS:

Attachment A – Draft Purchase of Goods Agreement

Purchase of Goods

Agreement

Contract #:2024-236-ENV
Project: Compaction Trailer Purchase for Central Subregion
GL Code: Add account & work order #
Board Resolution(s):

_____ day of _____, 2025
(Day) (Month) (Year)

BETWEEN

REGIONAL DISTRICT OF CENTRAL KOOTENAY
(hereinafter called the "RDCK")
at the following address:
Box 590, 202 Lakeside Drive
Nelson, BC V1L 5R4

Agreement Administrator: Larry Brown
Telephone: 250.551.0043
Email: LBrown@rdck.bc.ca

AND

ROLLINS MACHINERY
(hereinafter called the "Vendor")
at the following address:
201 – 150 Campion Street
Kelowna, BC V1X 7S*

Agreement Administrator: Add name
Telephone: Click here to add phone #
Email: Click here to add email

1 FOR GOOD AND VALUABLE CONSIDERATION, THE RECEIPT OF WHICH IS CONFIRMED, THE RDCK AND THE VENDOR AGREE AS FOLLOWS:

(a) **GOODS**: The Vendor shall provide the goods detailed in Schedule "A" of this Agreement (the "**Goods**").

(b) **TERM:** Notwithstanding the date of execution of this Agreement the Vendor shall provide the Goods described in Schedule A at the cost and terms described therein commencing on February 21, 2025 and ending on February 21, 2026 (the "**Term**").

(c) **LOCATION:** The location for delivery of the Goods shall be Grohman Transfer Station, 1201 Insight Driver, Nelson, BC V1L 5P5.

(d) **CONTRACT PRICE/RATE:** $278,134 (excluding GST) and on the terms set out in Schedule B.

(e) **BILLING DATE:** Upon completion of the Project.

(f) Schedules A and B are incorporated into, and form part of this Agreement.

(g) The following terms and conditions are incorporated into, and form part of this Agreement:

THE VENDOR'S OBLIGATIONS

2 The Vendor shall:

(a) Undertake all work and supply all materials necessary to supply the Goods, unless stipulated otherwise in Schedule A;

(b) Comply with all applicable municipal, provincial and federal legislation and regulations;

(c) At its own expense, obtain all permits and licenses necessary for the supply of the Goods, and on request provide the RDCK with proof of having obtained such licenses or permits;

(d) Not assign this Agreement, not subcontract any of its obligations under this Agreement, to any person, firm or corporation without the prior written consent of the RDCK;

(e) At all times, exercise the standard of care, skill and diligence normally exercised and observed by persons engaged in the supply of similar Goods;

(f) At all times, treat as confidential all information and material supplied to or obtained by the Vendor as a result of this Agreement and not permit the publication, release or disclosure of the same without the prior written consent of the RDCK;

(g) Notwithstanding the provision of any insurance coverage by the RDCK, indemnify and save harmless the RDCK, its successor(s), assign(s) and authorized representative(s) and each of them from and against losses, claims, damages, actions, and causes of action (collectively referred to as "**Claims**"), that the RDCK may sustain, incur, suffer or be put to at any time either before or after the expiration or termination of this Agreement, that arise out of errors, omissions or negligent acts of the Vendor or its servant(s), agent(s) or employee(s) under this Agreement, excepting always that this indemnity does not apply to the extent, if any, to which the Claims are caused by errors, omissions or the negligent acts of the RDCK its other Vendor(s), assign(s) and authorized representative(s) or any other persons;

(h) Use due care that no person or property is injured and no rights infringed in the supply of the Goods, and shall be solely responsible for all losses, damages, costs and expenses in respect to any damage or injury, including death, to persons or property incurred in providing the Goods or in any other respect whatsoever;

(i) Without limiting its obligations or liabilities under this Agreement, and at its own expense, the Vendor shall obtain and maintain in force through the duration of the this Agreement Commercial General Liability insurance in an amount necessary to cover the risks it has assumed or may encounter as a result of entering into this Agreement;

(j) The Vendor shall be solely responsible for determining and obtaining what additional insurance coverage, if any, is necessary or advisable for the protection of the Vendor or that is required by the Vendor to fulfill its obligations under this Agreement, with such additional insurance maintained and provided at the sole expense of the Vendor;

(k) Where samples of materials or supplies are requested by the RDCK, submit them to the RDCK for the RDCK's approval prior to their use in the Goods;

(l) The Vendor shall deliver the Goods to the shipping location designated by the RDCK in accordance with INCOTERM (2020) Duty Delivery Paid (DDP);

(m) For all shipments originating outside of Canada, the Vendor will ensure that properly executed customs documents are completed and must accompany each shipment, unless instructed otherwise by the RDCK; The Vendor will be responsible for paying any excise tax or other customs duties or levies in force at the time of shipment. The Vendor will clearly label and identify the RDCK's Agreement Administrator's contact information as indicated on the first page of this Agreement;

(n) The Vendor will supply Goods pursuant to Schedule A and to the place or places specified in this Agreement; If a method of shipping, carrier or route is specified, no deviation from those terms may be made without the RDCK's prior approval; The Vendor will be responsible for any additional costs, losses or damages resulting from an unauthorized deviation in method of shipping, carrier or route; The RDCK reserves the right to cancel any Goods not shipped as specified in this Agreement;

(o) No extra charges by Vendor will be allowed for tarping, special handling, packing boxing or crating, or for cases, packages, pallets, drums, reels or boxes, unless agreed to by the RDCK; The Vendor will mark all cases, packages, and bundles delivering the Goods with the contract number and RDCK Agreement Administrator's contact information as indicated on the first page of this Agreement; The Vendor will enclose a packing slip with each shipment showing the contract number, RDCK Agreement Administrator's contact information and full description of all Goods; The Vendor will be responsible for any damage to the Goods resulting from improper packing;

(p) No substitutions of Goods will be accepted unless they are authorized by the RDCK and, if authorized, must conform to specifications or other requirements and be equal or better in terms of value, functionality, performance, durability and availability;

(q) All Goods are subject to inspection and approval by the RDCK upon delivery; The RDCK may refuse acceptance of Goods that are damaged or defective, that do not conform to specifications or that otherwise fail to comply with this Agreement; The RDCK may inspect Goods at any time, but neither inspection nor non-inspection by the RDCK relieves the Vendor of its obligations hereunder; If the RDCK considers that any Goods are damaged or defective, fail to conform to specifications or fail to otherwise meet requirements herein, the Vendor at its sole expense will promptly make the necessary corrections, replacements or repairs; The Vendor will be responsible for all costs associated with the return and replacement of any damaged, defective or non-conforming Goods, including all freight and handling charges;

(r) Title to the Goods will pass to the RDCK upon the earlier of payment for such Goods by the RDCK or when the Goods are accepted by the RDCK, provided that risk of loss and damage will remain with the Vendor and will not transfer to the RDCK until the Goods are accepted by the RDCK;

(s) Without limiting any additional warranties provided by the Vendor, the Vendor warrants that all Goods will be new, of merchantable quality, free from defects in workmanship, design and materials and fit for their intended purpose, will strictly conform to applicable samples, specifications, drawings or other requirements furnished by the RDCK and will be transferred to the RDCK free and clear of liens, charges and encumbrances; Unless a longer period is specified in this Agreement, the Vendor will, without cost to the RDCK, correct, replace or repair any Goods which are defective or become defective, by reason of workmanship, design or material, or that otherwise fail to conform to the requirements of this Agreement, within one year from the date of acceptance by the RDCK; No express warranty or condition herein, nor any other term, will limit or exclude any warranty or condition otherwise imposed by statute; All warranties will remain in effect notwithstanding the expiry or earlier termination of this Agreement; The Vendor will assign to the RDCK or will enforce for the benefit of the RDCK any and all warranties granted by manufacturers, suppliers or sub-contractors;

(t) All electrical equipment must be Canadian Standards Association (CSA) approved or Province of British Columbia Electrical Energy Board approved, and must bear the appropriate sticker.

THE REGIONAL DISTRICT OF CENTRAL KOOTENAY'S OBLIGATIONS

3 The RDCK shall:

(a) Subject to the provisions of this Agreement, pay the Vendor, in full payment for the Goods which in the opinion of the RDCK at the times set out is Schedule B of this Agreement (herein called "**Contract Price**"), and the Vendor shall accept such payment as full payment for the Goods;

(b) Make available to the Vendor all available information considered by the RDCK to be pertinent to the supply of the Goods;

(c) Give the Vendor reasonable notice of anything the RDCK considers likely to materially affect the provision of the Goods.

TERMINATION OF AGREEMENT

4 In the event of a substantial failure of a party to perform in accordance with the terms and conditions of this Agreement, it may be terminated by the other party on five (5) days' written notice.

5 The RDCK may, at its sole discretion, terminate this Agreement on ten (10) days' notice, and the payment of funds required to be made pursuant to Section 6 shall discharge the RDCK of all of its liability to the Vendor under this Agreement.

6 Where this Agreement expires or is terminated before 100% completion of supply of Goods, the RDCK shall pay to the Vendor that portion of the Contract Price which is equal to the portion of Goods supplied to the satisfaction of the RDCK prior to expiration or termination.

7 Where the Vendor fails to perform or comply with the provisions of this Agreement the RDCK may, in addition to terminating this Agreement, pursue such remedies as it deems necessary.

GENERAL TERMS

8 The RDCK shall be the sole judge of the work, material and the standards of workmanship in respect of both quality and quantity of the Goods.

9 This Agreement shall be governed by the laws of the Province of British Columbia and the parties agree to attorn to the exclusive jurisdiction of the Courts of the Province of British Columbia.

10 Time shall be of the essence of this Agreement.

11 This Agreement shall be binding upon the parties and their respective successors, heirs and permitted assigns.

12 A waiver of any provision or breach by the Vendor of any provision of this Agreement shall be effective only if it is in writing and signed by the RDCK.

13 A waiver under Section 12 shall not be deemed to be a waiver of any subsequent breach of the same or any other provision of this Agreement.

14 The RDCK may, at its discretion, notify the Vendor that the terms, amounts and types of insurance required

to be obtained by the Vendor hereunder be changed.

15 Where the Vendor is a corporation, it does hereby covenant that the signatory hereto has been duly authorized by the requisite proceedings to enter into and execute this Agreement on behalf of the Vendor.

16 Where the Vendor is a partnership, all partners are to execute this Agreement.

17 Section 2 (g) of this Agreement will, notwithstanding the expiration or earlier termination of the Term, remain and continue in full force and effect.

18 Except as expressly set out in this Agreement, nothing herein shall prejudice or affect the rights and powers of the RDCK in the exercise of its powers, duties or functions under the *Community Charter* or the *Local Government Act* or any of its bylaws, all of which may be fully and effectively exercised as if this Agreement had not been executed and delivered.

IN WITNESS WHEREOF the parties hereto have duly executed this Agreement as of the day and year first above written.

REGIONAL DISTRICT OF CENTRAL KOOTENAY	**ROLLINS MACHINERY LTD.**
(Signature of Authorized Signatory)	(Signature of Authorized Signatory)
(Name and Title of Authorized Signatory)	(Name and Title of Authorized Signatory)
(Signature of Authorized Signatory)	(Signature of Authorized Signatory)
(Name and Title of Authorized Signatory)	(Name and Title of Authorized Signatory)

DRAFT

SCHEDULE A: GOODS

Supply of a Deloupe Model HS483 tridem axle Compaction Pushout Trailer with the following features:

1. Power Take Off (PTO) power.
2. Top load c/w deflectors.
3. Rear swing door (No lift doors).
4. Designed for mixed waste.
5. Side door for safe access.
6. Tridem axle configuration.
7. Anti-Lock Braking System (ABS).
8. Volume: 90 cu. Yds. minimum.
9. Air ride suspension.
10. Compliant to BC weight laws.

FOB Grohman Transfer Station 1201 Insight Drive, Nelson, BC

DRAFT

SCHEDULE B: CONTRACT PAYMENT TERMS

1 Total budget shall not exceed **$278,134** (excluding GST).

2 Invoices to be submitted upon completion of the Project, and must be submitted no later than January 15th of the following year.

3 The following contract number and GL code(s) **must** be quoted on the invoice(s):

Contract Number: **2024-236-ENV**

GL Code: **ACCOUNT # & WORK ORDER #**

4 Invoices must be emailed to ap@rdck.bc.ca, with the RDCK contract administrator identified on the first page of this contract in cc.

5 Invoices to be paid on net 30 day term.

6 The Vendor's GST number must be included on invoices where GST is applicable, in which case, GST shall also be listed as a separate line item.

7 The Vendor's name on the invoice must match the name identified in the first page of this contract.

DRAFT

Committee Report – For Information

February 19, 2025

Hydrogeology and Hydrology Characterization Report for Central Landfill and HB Mine Tailings Storage Facility

Author: Heidi Bench, Resource Recovery Projects Advisor
File Reference: 6300-CEN-30
Electoral Area/Municipality: Central Sub-region
Services Impacted S187

1.0 PURPOSE OF REPORT

The purpose of this report is to present the findings of the Hydrogeology and Hydrology Characterization Report for the Central Landfill and HB Mine Tailings Storage Facility.

2.0 BACKGROUND AND UDPATE

The Central landfill operated as a natural attenuation landfill, receiving approximately 333,755 tonnes of waste between 1983 and 2014. The landfill stopped receiving mixed waste in 2014 and final cover was completed in 2015. The landfill site still houses active septage pits, a transfer station area, and a compost facility. The HB Mine Tailings Storage Facility (TSF) related to former lead-zinc mining activity is located downgradient and immediately adjacent to the west side of the landfill. The TSF has been under the ownership of the RDCK since 1998, and is permitted under Mines Act permit M-218. Remediation and closure of the TSF were completed between June 2021 and September 2022.

Operational Certificate MR-16519 was issued for the Central landfill in 2000 and amended in 2011. The 2011 amendment requires that, in addition to an Annual Report, a Five Year Report that includes a detailed Hydrogeological Assessment be submitted to the Director of the Ministry of Environment and Parks (the Ministry) on or before April 30 on the five year anniversary of the last submission. Historical hydrogeological assessments were completed at the site in 2000, 2014, and 2019. In compliance with this requirement, this Hydrogeology and Hydrology Characterization Report (HHCR) will be submitted to the Ministry in early 2025 as part of the 2024 Annual and Five Year Report for Central landfill.

The site, as defined in the Operational Certificate, includes the landfill and the northern portion of the TSF (see Attachment A, Figure 2A). As the landfill and the TSF are hydraulically connected and a similar assessment was required in 2025 for the TSF as part of its 5-year reclamation report, the entirety of both sites were evaluated as part of this comprehensive HHCR. The Operational Certificate is due for an amendment to reflect the operational changes at the Central landfill and it is anticipated that the results and recommendations in this HHCR will guide the future environmental monitoring program for the site.

GHD Limited (GHD) was procured in March 2024 and conducted a site visit with RDCK Staff the following month. The HHCR was finalized and submitted to the RDCK in December 2024.

Summary of the 2024 HHCR

The HHCR characterized the physical hydrogeologic and hydrologic setting of the Central landfill and HB Mine TSF (the site), determined the applicable performance criteria, evaluated the environmental conditions and attenuation capacity of the site, and provided recommendations.

Similar to other RDCK landfills, the compliance criteria referenced in the Operational Certificate for the Central landfill are outdated and are not supported based on the setting and receptors at and in the vicinity of the site. Section 4.1 of the *Landfill Criteria for Municipal Solid Waste* (2016; the Criteria) states that a Qualified Professional must recommend the appropriate water quality criteria to ensure adequate protection of human health and environment. As the Qualified Professional, GHD evaluated the current and potential future land uses of groundwater and surface water within a one kilometer radius of the site and determined that the following water quality criteria were applicable:

Groundwater: *BC Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards for the protection of one or more of Freshwater Aquatic Life, Drinking Water, Irrigation, and Livestock*

Surface Water: *British Columbia Approved and Working Water Quality Guidelines (BC WQG) for Freshwater Aquatic Life, and BC Source Drinking Water Guidelines (SDWG) for the protection of one or more of Freshwater Aquatic Life, Irrigation, Livestock, and Drinking Water*

To maintain alignment with the landfill's Operational Certificate, GHD also compared groundwater results to the current specified compliance criteria (BC WQG); however, they noted that these water quality standards are designed to be protective of surface water, not groundwater.

Consistent with past hydrogeological assessments for the Central landfill, the HHCR identified a groundwater flow divide that separates the site into two distinct zones, historically classified as the North Contaminant Attenuation Zone (NCAZ) and the South Contaminant Attenuation Zone (SCAZ). To satisfy the requirements of the Operational Certificate, compliance is evaluated at the site boundary as defined in the Operational Certificate; however, to effectively and comprehensively assess the attenuation of impacts at the landfill and TSF, the scope of this HHCR was extended to also include the TSF Downgradient Area, located south of the SCAZ. Data from routine environmental monitoring programs for both the landfill and TSF were included in the assessment. Environmental impacts and compliance were assessed based on the groundwater flow zones. Groundwater (GW) and surface water (SW) assessments are summarized in Table 1 below.

Table 1: Summary of 2024 HHCR Results

Area	Matrix	Assessment Results
NCAZ	GW	• Groundwater quality in the NCAZ is affected by the migration of landfill leachate. • Impacts generally attenuate along the groundwater flow path; however arsenic and cobalt exceeded the CSR criteria, and pH, iron, nitrate, total organic carbon (TOC), and cadmium exceeded the BC WQG in samples collected near the northern site boundary. • Most of these exceedances are related to landfill leachate; elevated arsenic and cobalt may be naturally occurring.

Area	Matrix	Assessment Results
NCAZ	SW	• Surface water samples collected from two of the seeps located in the slopes downgradient of the landfill (south of Sheep Creek) were impacted by one or more landfill leachate parameters. • Surface water samples and benthic samples collected from Sheep Creek indicate that there is no evidence of leachate impacts to surface water or aquatic life downstream of the site.
SCAZ	GW	• Groundwater quality in the SCAZ is affected by the migration of leachate from one or more of the landfill, septage treatment facility, and/or tailings in the TSF. • Impacts generally attenuate along the groundwater flow path; however antimony, arsenic, ammonia, manganese, and tungsten exceeded CSR criteria, and iron, ammonia, and TOC exceeded BC WQG in samples collected at or near the southern site boundary. • Many of these exceedances are related to landfill or septage leachate; however, as there are currently no monitoring wells in the septage area, the source could not be differentiated. Elevated antimony and tungsten concentrations are likely related to tailings leachate.
	SW	• Elevated chloride concentrations identified in surface water samples collected from the on-site surface water management ditches may be due to discharge from seeps at the landfill site, the septage treatment facility, or the use of road salts in the area. • Surface water impacts are attenuated downstream along the flow path.
TSF down-gradient area	GW	• Groundwater quality in the TSF area downgradient of the SCAZ is affected by the migration of tailings leachate. • Ammonia, arsenic, iron, lithium, molybdenum, manganese exceeded the CSR criteria in samples in the TSF downstream area. • Most of these exceedances are related to migration of tailings leachate. The single ammonia exceedance in September 2022 may be related to the landfill or septage treatment facility; however it was likely anomalous based on distance from the contaminant sources and as all samples collected since have been below the applicable criteria.
	SW	• Concentrations of TOC, iron, lead, manganese, and uranium exceeded the BC WQG in several surface water samples collected from this area. • Elevated TOC and manganese are likely related to the discharge of impacted groundwater from the TSF. Exceedances of the other parameters were sporadic and may be related to seasonal variation in redox and background conditions. • There were no impacts to surface water at the farthest downstream monitoring locations, indicating that neither the landfill nor the TSF are impacting the Salmo River.

The attenuation capacity was assessed qualitatively and quantitatively for both the NCAZ and SCAZ, and GHD stated that the attenuation of leachate migration achieved across these zones is protective of downgradient receptors.

Upon conclusion of the assessment, GHD made the following recommendations:

1) Request from the Ministry Director to update the applicable groundwater compliance standards for the landfill to CSR criteria as part of the next Operational Certificate amendment.
2) Rehabilitate leachate seeps that were observed on the slopes of Cells 1 and 4 during the April 2024 site visit.
3) Consider the following modifications to the landfill environmental monitoring program:
    a. Add biological oxygen demand (BOD) analysis for groundwater samples as this is a useful indicator parameter for contaminant sources that contain large quantities of organic matter, such as landfills, septage treatment facilities, and compost facilities
    b. Add un-ionized sulphide (as H_2S) analysis for groundwater samples, as this is a CSR compliance parameter
    c. Add escherichia coli (e. coli) and fecal coliforms analysis for surface water samples from near the septage receiving facility (SW1-07), as these are compliance parameters for septage
4) Consider amending the TSF environmental monitoring program to discontinue analyzing total metals in groundwater samples, as these results may be biased by elevated turbidity.
5) Consider installing a groundwater monitoring well in the shallow overburden, immediately downgradient of the septage treatment facility to assess groundwater quality alteration from septage leachate.

3.0 NEXT STEPS AND TIMELINE

Staff plan to address the recommendations from the HHCR as follows:

1) Request from the Ministry Director to update the applicable groundwater compliance standards for the landfill to CSR criteria as part of the next Operational Certificate amendment

Staff plan to request this update as part of the next Operational Certificate amendment for this site. This is planned for once a septage strategy has been developed, as this will impact future site use and permitting.

2) Rehabilitate leachate seeps that were observed on the slopes of Cells 1 and 4 during the April 2024 site visit

The Environmental Technologist inspected the leachate breaks during site inspections and noted that they were not seeping during any subsequent site visits in 2024. The Environmental Engineer from WSP responsible for landfill design at this site indicated that these ephemeral leachate breaks pose very little risk to receptors at the site and no corrective action was required.

3) Consider modifications to the landfill environmental monitoring program

As part of the 2025 environmental monitoring program (EMP) contract, Masse Environmental Consultants (Masse) will update and streamline inconsistencies in the RDCK's landfill EMPs. These recommendations will be taken into account in this process.

4) Consider amending the TSF environmental monitoring program to discontinue analyzing total metals in groundwater samples, as these results may be biased by elevated turbidity

The TSF EMP is separate from the landfill EMP and is regulated by the Ministry of Mines, not the Ministry of Environment and Parks who oversees environmental compliance of landfill sites. The Water Quality Management and Monitoring Plan for the TSF requires analysis of both total and dissolved metal analysis due to upward hydraulic gradients and groundwater discharge at some locations (artesian wells). The Environmental Projects Lead is currently overseeing the completion of a water quality prediction model for the TSF to further evaluate this. If this model indicates that analysis of these parameters could be discontinued, the Environmental Projects Lead will apply to the Ministry of Mines and Teck (former owner of the TSF) to make this change.

5) **Consider installing a groundwater monitoring well in the shallow overburden, immediately downgradient of the septage treatment facility to assess groundwater quality alteration from septage leachate.**

Staff plan to include this recommendation as part of a drilling and well installation program that is scheduled for the TSF in 2025. $20,000 was included in the S187 Central Resource Recovery Financial Plan for this well installation as well as the decommissioning of a couple damaged wells at this site in 2025. Once installed, the new well will be added to the landfill EMP to help identify potential groundwater impacts related to the septage facility. Costs for sampling and laboratory analysis should be minimized by the removal of decommissioned wells from the EMP.

In addition to the above follow-up to GHD's recommendations, Staff plan to submit the 2024 HHCR to the Ministry as part of the 2024 Annual and Five Year Report for Central landfill before the deadline of April 30, 2025.

Respectfully submitted,
Heidi Bench – Resource Recovery Projects Advisor

CONCURRENCE

Resource Recovery Manager – Amy Wilson
General Manager of Environmental Services – Uli Wolf
Corporate Administrative Officer – Stuart Horn

ATTACHMENTS:

Attachment A – Hydrogeology and Hydrology Characterization Report for Central Landfill and HB Mine Tailings Storage Facility

Hydrogeology and Hydrology Characterization Report

Central Landfill and HB Mine Tailings Storage Facility

Regional District of Central Kootenay

19 December 2024

→ **The Power of Commitment**



David R. Barton, M.Sc., GIT
Hydrogeologist in Training

Allan Molenhuis, P.Geo. (ON and BC)
Hydrogeologist

Debra Tong, EIT
Engineer in Training

PERMIT TO PRACTICE
GHD LIMITED
RR SIGNATURE:
RR EGBC ID #: 141652
DATE: 2024-12-19
PERMIT NUMBER: 1002509
Engineers and Geoscientists British Columbia

Project name	RDCK - Central Landfill HHCR
Document title	Hydrogeology and Hydrology Characterization Report | Central Landfill and HB Mine Tailings Storage Facility
Project number	12630729
File name	12630729-RPT-01 - Central Landfill HHCR.docx

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	David R. Barton Debra Tong	Allan Molenhuis Michelle Uyeda	DRAFT	Deacon Liddy	DRAFT	August 6, 2024
S3	01	David R. Barton	Allan Molenhuis	DRAFT	Deacon Liddy	DRAFT	October 8, 2024
S4	00	David R. Barton	Allan Molenhuis		Deacon Liddy		December 4, 2024
S4	01	David R. Barton	Allan Molenhuis		Deacon Liddy		December 19, 2024

GHD
Contact: David R. Barton, Project Manager | GHD
138 East 7th Avenue, Suite 100
Vancouver, British Columbia V5T 1M6, Canada
T +1 604 214 0510 | **F** +1 604 214 0525 | **E** info-northamerica@ghd.com | **ghd.com**

© GHD 2024
This document is and shall remain the property of GHD. The document May only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

→ The Power of Commitment

Contents

1. Introduction **1**
1.1 Scope and Limitations 1
1.2 References 1
2. Location and Setting **3**
3. Site History **3**
3.1 Existing Site Conditions 6
4. Surrounding Land and Water Use **6**
4.1 Zoning and Adjacent Land Use 6
4.2 Groundwater Use 6
4.3 Surface Water Use 7
5. Site Physical Setting **8**
5.1 Climate 8
5.2 Topography 8
5.3 Hydrology and Drainage 9
5.3.1 Regional Drainage 9
5.3.2 Site Drainage 9
5.4 Geologic Setting 9
5.4.1 Regional Geology 9
5.4.2 Site Geology 10
5.4.2.1 Site Overburden Geology 10
5.4.2.2 Tailings 10
Tailings Composition 10
Metal Leaching and Acid Rock Drainage Characterization 11
5.4.2.3 Site Bedrock Geology 12
5.5 Hydrogeologic Setting 12
5.5.1 Regional Hydrogeology 12
5.5.2 Site Hydrogeology 12
5.5.2.1 Northern Flow Path/Northern Contaminant Attenuation Zone (NCAZ) 13
5.5.2.2 Southern Flow Path/Southern Contaminant Attenuation Zone (SCAZ) 13
5.5.2.3 TSF Downgradient Area 13
5.5.3 Groundwater Flow Directions 13
5.6 Hydraulic Properties 14
5.6.1 Vertical Hydraulic Gradients 15
5.6.2 Horizontal Groundwater Flow Velocities 17
5.6.3 Groundwater Flux Calculations 18
6. Leachate Quality **20**
6.1 Leachate Indicator Parameters 20
7. Groundwater Quality **22**
7.1 Background Groundwater Quality 26
Background Groundwater Quality Summary 27

Background Groundwater Quality Discussion 28
7.2 NCAZ 28
NCAZ Groundwater Quality Summary 28
7.3 SCAZ 32
SCAZ Groundwater Quality Summary 32
7.4 TSF Downgradient 40
7.5 Off-Site Residential Wells 42
8. Seep and Surface Water Quality 43
8.1 Seep and Sheep Creek 45
8.2 TSF Surface Water Monitoring Network 47
9. Attenuation Capacity Assessment 51
9.1 NCAZ Attenuation Capacity Assessment 52
9.2 SCAZ Attenuation Capacity Assessment 52
10. Regulatory Framework and Applicable Water Quality Criteria 53
Regulatory Guidance 53
Permit and OC Requirements 54
Groundwater Use Assessment 54
Surface Water Use Assessment 56
10.1 Site Applicable Criteria and Compliance Locations 56
11. Impact Assessment 57
11.1 Groundwater 57
11.2 Seeps 61
11.3 Surface Water 61
12. Conceptual Site Model 62
13. Conclusions 64
14. Recommendations 65
15. References 66

Table index

Table 4.1 Water Well Information 7
Table 5.1 Local Climate Data 8
Table 5.2 Hydraulic Conductivity Test Results 14
Table 5.3 Vertical Hydraulic Gradients (2019-2023) 15
Table 5.4 Vertical Hydraulic Gradients – TSF 2023 Seasonal Comparison 16
Table 5.5 Horizonal Groundwater Flow Velocity Estimates 18
Table 5.6 Groundwater Flux Estimates for NCAZ and SCAZ Areas 19
Table 6.1 Leachate Indicator Parameters 21
Table 7.1 Site Monitoring Well Network 23
Table 7.2 2019-2023 Background Groundwater Concentration Ranges 26

Table 7.3	2019-2023 NCAZ Groundwater Concentration Ranges (81-1, 81-3, 81-4, MW99-7D)	28
Table 7.4	2019-2023 NCAZ Groundwater Concentration Ranges (0200611, MW-09-02S, MW-09-02D)	29
Table 7.5	2019-2023 SCAZ Groundwater Concentration Ranges (MW99-6S, MW99-8, MW99-3S, MW99-3D, E207637)	32
Table 7.6	2019-2023 SCAZ Groundwater Concentration Ranges (S-MW-2, MW-06-01, MW-02-03, MW-02-03, MW-01A-03)	33
Table 7.7	2019-2023 SCAZ Groundwater Concentration Ranges (MW-01C-03, MW-03S-03, MW-05-05, MW-02-05)	33
Table 7.8	2019-2023 SCAZ Groundwater Concentration Ranges (MW-03S-05, MW-04S-05, MW99-2S)	34
Table 7.9	2019-2023 TSF Downgradient Overburden Wells Groundwater Concentration Ranges (MW-01-2004(S), MW99-1S, MW-02-2004(S))	40
Table 7.10	2019-2023 TSF Downgradient Bedrock Wells Groundwater Concentration Ranges (MW-01-2004(D), MW99-1D, MW-02-2004(D))	41
Table 7.11	2019-2023 Residential Wells Groundwater Concentration Ranges (110 Emerald Rd., 111 Emerald Rd., 1780 Airport Rd.)	42
Table 8.1	Site Surface Water Monitoring Locations	44
Table 8.2	2019-2023 Seep Concentration Ranges (Seep A, Seep E, Seep G, Seep I)	45
Table 8.3	2019-2023 Sheep Creek Surface Water Concentration Ranges (SW-A, SW-B, SW-C)	46
Table 8.4	2019-2023 On-Site Surface Water Concentration Ranges (SW3-07, SW5-19, SW1-07, SW2-07, SW4-07)	47
Table 8.5	2019-2023 On-Site Surface Water Concentration Ranges (Tailings Pond Outlet, Seepage Weir, Outlet Ditch, Spillway Inlet, Spillway Outlet)	48
Table 8.6	2019-2023 On-Site Surface Water Concentration Ranges (Salmo Upstream, Salmo Downstream)	48
Table 10.1	Applicable Water Quality Criteria – Protocol 21	54
Table 10.2	Property Boundary Well Applicable Groundwater Quality Criteria	56
Table 11.1	Groundwater Impact Assessment	58
Table 11.2	Seep Impact Assessment	61
Table 11.3	Surface Water Impact Assessment	61

Table index (following text)

Table 1	Monitoring Well Details and Hydraulic Elevation Monitoring Results – Landfill EMP
Table 2	Monitoring Well Details and Hydraulic Elevation Monitoring Results – TSF EMP
Table 3	Leachate and Tailings Source Monitoring Results - Landfill EMP
Table 4	Background Groundwater Quality Monitoring Results - Landfill EMP
Table 5	NCAZ Groundwater Quality Monitoring Results - Landfill EMP
Table 6	SCAZ Groundwater Quality Monitoring Results - Landfill EMP
Table 7	Residential Wells Groundwater Quality Monitoring Results - Landfill EMP
Table 8	Groundwater Quality Monitoring Results - TSF EMP
Table 9	Seep Water Quality Monitoring Results - Landfill EMP

Table 10 Sheep Creek Surface Water Quality Monitoring Results - Landfill EMP
Table 11 Surface Water Quality Monitoring Results - TSF EMP
Table 12 Analytical Table Notes

Figure index

Figure 1 Site Location Map
Figure 2A Site Plan and Site Works
Figure 2B Site Plan and Monitoring Locations
Figure 3 Surrounding Land Use and Zoning Map
Figure 4 Surrounding Water Use Map
Figure 5 Topography and Site Drainage
Figure 6 Active EMP Network
Figure 7 TSF Surface Water Monitoring Network
Figure 8 Overburden Groundwater Elevation Contours May 2023

Appendices

Appendix A1 Landfill OC
Appendix A2 TSF Permit
Appendix B Photolog
Appendix C Water Well Information
Appendix D Stratigraphic and Instrumentation Logs
Appendix E1 Bedrock Contours (CRA 2001)
Appendix E2 Geologic Cross Sections (CRA 2001)
Appendix E3 Geologic Cross Sections (AMEC 2014)
Appendix F Groundwater Elevation Hydrographs
Appendix G Piper Plots
Appendix H1 Landfill Historical Concentration Versus Time Plots (2004-2022)
Appendix H2 TSF Historical Concentration Versus Time plots (2004-2022)
Appendix I Concentration Versus Time Plots (2019-2023)
Appendix J Concentration Isopleth Figures
Appendix K1 Concentration Profile Figures (GHD 2024)
Appendix K2 Concentration Profile Figures (CRA 2005)

1. Introduction

GHD Limited (GHD) was retained by the Regional District of Central Kootenay (RDCK) to complete this Hydrogeology and Hydrology Characterization Report (HHCR) for the Central Landfill (Landfill) and the Horton and Benson (HB) Mine Tailings Storage Facility (TSF). The Landfill and TSF are located on RDCK owned lands southeast of the town of Salmo, BC. For the purposes of this report, the Landfill and TSF are collectively referred to as the "Site".

The Landfill operates under Operational Certificate MR-16519 (OC) issued by the British Columbia (BC) Ministry of Environment and Climate Change Strategy (Ministry or ENV) on November 27, 2000, and most recently amended on August 23, 2011. The TSF operates under Permit M-218 (Permit), issued by the BC Ministry of Energy and Mines on April 10, 2002, and most recently amended on May 18, 2021. Copies of the Landfill OC and TSF Permit are included in Appendices A1 and A2 respectively.

The Ministry requires a detailed review of monitoring data every five years as part of the OC. This is the fourth hydrogeological review for the Landfill and the third hydrogeological review for the TSF. This report incorporates data collected at the Site from 2019-2023. In support of this report, a Site visit was completed by GHD on April 19, 2024. A photolog documenting existing conditions at the Site is presented in Appendix B.

GHD completed this HHCR in accordance with the requirements outlined in Section 10.1 Hydrogeology and Hydrology Characterization Report of the BC Landfill Criteria for Municipal Solid Waste, Second Edition (Landfill Criteria) (BC Ministry of Environment, 2016). The information, data, and assumptions used in this report are from publicly available sources or were provided by or on behalf of the RDCK.

1.1 Scope and Limitations

This report: has been prepared by GHD for Regional District of Central Kootenay and may only be used and relied on by Regional District of Central Kootenay for the purpose agreed between GHD and Regional District of Central Kootenay as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Regional District of Central Kootenay arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.2 References

This report was prepared using reference documentation provided by the RDCK and publicly available information as described below:

RDCK and Masse Environmental. 2019 through 2023 Annual Operations and Monitoring Reports

The RDCK completes annual operations and monitoring reports for the Landfill. The annual reports summarize the Site operations and results of the groundwater and surface water monitoring programs over the previous calendar year. Groundwater and surface water monitoring data and analytical results reported in the 2019-2023 annual reports were assessed in this report.

RDCK. 2019 through 2023 Annual Reclamation Reports for the HB Mine Tailings Storage Facility

The RDCK completes annual reclamation reports for the TSF. The annual reports summarize reclamation work completed at the TSF and present the results of the groundwater and surface water monitoring programs over the

previous calendar year. Groundwater and surface water monitoring data and analytical results reported in the 2019-2023 annual reports were assessed in this report.

New Graph Environment. Sheep Creek Biological Impact Assessment 2019. July 8, 2020.

New Graph Environment was retained by the RDCK to conduct a biological impact assessment in Sheep Creek adjacent to the Central Landfill. As there are several groundwater seeps originating from the Landfill entering Sheep Creek, the Landfill's OC requires biological impact assessments every five years.

Wood Environment & Infrastructure Solutions. Central Landfill 5 Year Hydrogeologic Review. March 31, 2020.

Wood Environment & Infrastructure Solutions (Wood) was retained by the RDCK to complete a five-year hydrogeological review for the Landfill. The report included an assessment of hydrogeologic and water quality data collected at the Site between 2014 and 2019.

Conestoga-Rovers and Associates. Northern Groundwater Flow Path Contaminant Attenuation Zone, Central Landfill Site, Salmo, British Columbia. 2006.

Conestoga-Rovers & Associates (CRA) (now GHD) prepared a technical report detailing the establishment of the Northern Contaminant Attenuation Zone at the Landfill.

Conestoga-Rovers and Associates. Contaminant Attenuation Zone Evaluation, Southern Groundwater Flow Path, Central Landfill Site, Salmo, British Columbia. August 2005.

CRA completed an assessment of the plume of contaminated groundwater migrating from the Landfill to the tailings deposition area along the southern groundwater flow path. The assessment included a water balance model for the Landfill and an evaluation of potential impacts to water quality that could result from the proposed development.

BC Ministry of Environment. Detailed Site Investigation Technical Review, Canex Landfill, Salmo BC. November 4, 2002.

The BC Ministry of Environment, Contaminated Sites Unit completed a review of the CRA (2002) DSI report. The technical review report details the Ministry of Environment's assessment of the DSI findings.

Conestoga-Rovers and Associates. Detailed Site Investigation Summary Report, Cannex Landfill, Salmo, British Columbia. January 10, 2002.

CRA completed a detailed site investigation (DSI) for the Landfill to assess the hydrogeological conditions and evaluate the results of surface water and groundwater sampling to delineate and characterize the leachate contaminant plumes.

iMapBC

iMapBC is an interactive geospatial tool published by the Government of BC which allows users to view and analyze geographic datasets stored in the BC Geographic Warehouse. For the purposes of this report, iMapBC was used to identify and confirm physical Site features including surface water streams, groundwater wells, underlying aquifers, and surrounding land uses.

RDCK Web Map

The RDCK Web Map is a mapping site published by Geospatial Services at the RDCK. The web map was used to identify zoning within the Site and surrounding the Site.

2. Location and Setting

The Site is located approximately 7 kilometres (km) southeast of the Village of Salmo, BC, east of Highways 3 and 6. The Site location is presented on Figure 1. The Landfill boundary encompasses approximately 30.35 hectares (ha) and is defined by the boundary of Lot A, District Lot 1236, Sub-lot 36, Kootenay District Plan 14234. The TSF occupies an area of approximately 30 ha.

The outer property boundary of the Site is defined by Parcel "A" (Explanatory Plan 88745I) of Sub-lot 36 District Lot 1236 Kootenay District Plan X69 (Except (1) parts included in Plans 8646, 14234, and (2) part included in SRW Plan 14948), Parcel Identifier 6064655, Plan Number NEP69X.

A Site plan map is presented on Figures 2A and 2B. The Site consists of the following areas and Site works:

Landfill

– A scale house and transfer station which are located at the entrance to the Site at the northeast corner on Emerald Road
– Three closed landfill cells (Cell 1, Cell 2, and Cell 4)
– A former landfill cell (Cell 3) (waste was relocated to Cell 4)
– A compost facility
– Areas for the stockpiling of yard waste and wood waste
– A septage treatment facility with three septage drying beds and a biosolids pad
– Stormwater management works including surface water management ditches, culverts, a pre-settling basin, and a stormwater pond

TSF

– A tailings deposition area
– An earth dam
– A wood chip stockpile area
– Stormwater management works including lined surface water diversion channels and culverts
– A spillway which directs surface water flow off-Site

3. Site History

Central Landfill (Landfill)

The RDCK began landfilling at the Site in 1983. The first landfill cell (Cell 1) was developed along the northern boundary of the Site. Cell 1 was closed in 1989 and development of the second landfill cell (Cell 2) commenced to the southwest. The report entitled Landfill Operation Plan by UMA Environmental dated February 1995 (1995 Landfill Operation Plan) was prepared on behalf of the RDCK to address the requirements of the Landfill Criteria for Municipal Solid Waste. The 1995 Landfill Operation Plan provided details regarding the operating requirements; filling plan for the discharge of waste; and management plans for surface water, leachate, and landfill gas (UMA Environmental, 1995). Cell 2 was partially closed in 1998 and waste disposal was moved to Cell 3, directly east of Cell 1.

In 1998, the RDCK purchased the lands immediately west and south of the existing Landfill boundary, as recommended in the 1995 Landfill Operation Plan. The purpose of the acquisition was to provide buffer zones and to continue the operation of the Landfill as a natural attenuation site. The lands acquired in 1998 include the TSF.

A hydrogeological impact assessment of the Site commenced in 1999 and is documented in the report entitled “Canex Landfill, Hydrogeologic Impact Assessment” by Klohn-Crippen, dated July 2000 (Klohn-Crippen, 2000). This report qualified as a preliminary investigation and a more detailed investigation was required to confirm the hydrogeological conditions of the Site and delineate/characterize both leachate and tailing derived contaminant plumes (Klohn-Crippen, 2000). The investigation characterized a groundwater flow divide around the location of Cell 1, which separates groundwater flow into northern and southern paths.

In 2001, the RDCK retained CRA to undertake a Detailed Site Investigation (DSI) to further characterize the Site setting and existing hydrologic and hydrogeologic conditions, assess landfill and tailing derived impacts and to prepare a final cover design (Conestoga-Rovers and Associates, 2002a).

“Final Cover Design Cell 1, 2, and 3” (Closure Works) (Conestoga-Rovers and Associates, 2002b) presented the details for the in-place closure of Cells 1 and 2 and the relocation of the refuse from Cell 3 to Cell 2. A conceptual surface water management plan (SWMP) for the landfill footprint area was also prepared. Cell 4 was developed south of the closed Cell 1.

At the end of 2003, the RDCK retained CRA to prepare an updated “Design and Operation Plan” (2005 D&O Plan) based on the findings of the DSI. The 2005 D&O Plan also incorporated the “2004 Updated Environmental Monitoring Program (EMP)” (Conestoga-Rovers and Associates, 2004). The SWMP was updated in February 2007 to incorporate water addition to the wetland via controlled flow from the surface water management pre-settling basin. Two subsequent detailed studies were also conducted: “Contaminant Attenuation Zone: Southern Groundwater Flow Path” (Conestoga-Rovers and Associates, 2005), and “Northern Groundwater Flow Path Contaminant Attenuation Zone” (Conestoga-Rovers and Associates, 2006). The purpose of the attenuation zone evaluations was to determine contaminant attenuation zones (CAZs) along the southern and northern flow paths as a result of the updated landfill design.

In 2009, CRA designed and oversaw construction of a down slope containment berm between Cells 2 and 4. The intent was to create a waste filling zone in this area and operations were relocated there immediately following construction. During the fall and winter of 2009, this area was subsequently inundated with surface water resulting from rainfall, which resulted in a significant noncompliance event for the Landfill. The berm was eventually breached in the spring of 2010 due to freshet and leachate discharged directly into the surface water management system.

In July 2010, Amec Earth & Environmental (now Wood) was retained by the RDCK to review the existing surface water management system at the Landfill. The review provided an assessment of issues with the Landfill drainage system arising from rainfall events in the fall of 2009 that flooded the active face and resulted in a non-compliance of the Landfill OC. The review also provided recommendations for interim surface water management measures to address this issue. The recommended surface water management works were constructed in the fall of 2010 and included the reinstatement of surface water drainage between Cells 2 and 4, the construction of an upslope surface water interception ditch, and the installation of interim clay cover over exposed waste areas.

In November 2011, Wood prepared an Interim Operations Plan for the Site. Operational changes included relocating the waste placement area upslope of the previous fill area and infilling the valley between Cells 2 and 4 from the top down. Between then and eventual closure in July 2014, Wood provided operational inspection and oversight for the Site. In 2014, Amec prepared the first five-year hydrogeological assessment report for the RDCK (AMEC Environment and Infrastructure, 2014), and in 2015 Amec prepared a Landfill Closure Plan report (Amec Foster Wheeler, 2015).

Landfilling operations ceased in July 2014 and the Landfill cells were capped in 2015/2016. The final quantity of waste in the Landfill was estimated to be 357,766 tonnes (Amec Foster Wheeler, 2015). The Landfill currently operates as a Transfer station with composting and septage treatment facilities. At the Septage Treatment Facility, raw septage is mixed with wood chips and discharged to drying beds. Effluent from septage treatment flows through a constructed wetland facilitated by the addition of flow from the pre-settling basin. The objective of the Septage Treatment Facility design is to provide a passive treatment system to better manage the disposal and treatment of septage generated within the RDCK. Septage is imported to the Site by independent sewage haulage companies. In 2023, 787.05 m^3 of septage was processed in the septage disposal facility (RDCK, 2024).

In 2022/2023, a composting facility was constructed in a former clay till borrow area to the south of Cell 4. The composting facility has a design capacity of 8,000 tonnes per year (TPY) and processes feedstock materials including food waste, yard waste, garden waste, and biosolids. The composting facility operates under the BC Organic Matter Recycling Regulation (OMRR). An operations plan for the facility was developed and approved by the Ministry.

HB Mine Tailings Storage Facility (TSF)

The TSF stores tailings generated between 1955 and 1978 from historical operations at the former HB Mine under the management of Cominco Limited (now Teck Resources Limited [Teck]). The former HB Mine is located approximately 3.2 km northeast of the Site and was in operation intermittently from 1912 to 1978. Commodities produced included lead, zinc, silver, cadmium, copper, gold, and talc, which were mined from a lead-zinc sulphide ore deposit.

A tailings flume line was used to join the HB Mine to the TSF. An earthen dam was initially constructed in 1955 using borrow material placed behind a timber crib retaining wall to a height of approximately 12 m. Behind the dam, the tailings area occupied the middle to bottom of a hanging valley at the base of the west slope of Iron Mountain. A tailings pond formed behind the dam at the southern end of the tailings deposition area, the water level in the tailings pond was controlled by two decant structures and drains. In 1964, a portion of the timber crib wall failed and was reconstructed approximately 3 to 5 m downstream, resulting in the placement of drains and a toe berm to stabilize the slough. Dam raisings continued by the downstream method until operations were suspended permanently in 1978.

In 1978 the TSF and surrounding lands were purchased by David Minerals Ltd. (David Minerals). Between 1981 and 1997, ownership of the facility passed from David Minerals to Nor-Quest Resources, then to Nu-Dawn Resources (Nu-Dawn) and Raynerd Resources, and finally to the Seattle Corporation. During this time Teck continued to hold the permit for the TSF as all other parties failed to acquire a permit under the Mines Act. In 1997, the Ministry of Energy, Mines and Petroleum Resources (MEMPR) inspected the TSF and sent requests to Teck and Nu-Dawn for the TSF to be decommissioned. In 1998, the RDCK purchased the TSF and surrounding lands to provide an attenuation zone buffer for the Landfill (RDCK, 2020).

Mines Act permit M-218 was issued by the Deputy Chief Inspector of Mines on April 10, 2002 to the RDCK approving the HB Mine Tailings Pond and Dyke Decommissioning Plan (“Decommissioning Plan”) (BGC Engineering Inc., 2002). Decommissioning works were completed during the summer of 2005 in accordance with the Decommissioning Plan to bring the operation of the TSF to the standards at the time for a low consequence classification dam (i.e., no possibility of loss of life other than through unforeseeable misadventure in the event of failure). Decommissioning works included the placement of upstream erosion protection, closure of the decant drain located north of the east abutment, construction of an open channel spillway, and construction of a toe berm.

In July 2012, the TSF’s earthen dam suffered a large slough on the downstream slope due to heavy rainfall and the presence of sinkholes on the toe of the upstream face of the dam. The dam was repaired and an intensive monitoring program was developed. In 2014, a dam safety review was completed and the spillway design was no longer considered adequate to pass the requirements for flooding so the spillway size was increased.

In 2016, SRK Consulting (Canada) Inc. (SRK) completed a Remediation and Closure Preliminary Assessment to outline the options for future TSF management (SRK, 2016). From the options provided in the assessment, the RDCK elected to transition the TSF to passive closure, as defined by the Canadian Dam Association (CDA). In June 2018, SRK produced a Closure and Remediation Preliminary Design Report which summarized the general works required to complete the passive-closure of the dam (SRK Consulting, 2018). A remediation and closure plan (RCP) for the TSF, issued by SRK, was completed in 2020 (RDCK, 2020). In July 2019, the RDCK submitted a Mines Act permit amendment application in support of the planned closure works. The RDCK received the amended permit in May 2021.

In 2021, the RDCK started closure construction works, as outlined in the 2020 RCP and the amended permit. SRK’s 2021 Dam Safety Inspection Report (SRK Consulting, 2022a) summarized the construction activities that occurred on the Site between June and November 2021. The 2021 construction activities included the expansion of the earth dam toe berm, construction of an expanded spillway at the western abutment, de-watering and backfilling of the tailings pond, construction of a tailings cover, and importing tailing-affected soils from an off-Site property.

SRK's 2022 Dam Safety Inspection Report (SRK Consulting, 2023a) summarized the construction activities that occurred on the Site between July and September 2022 to complete the closure and remediation of the Site as described in the 2020 RCP. The 2022 construction activities included the completion of the tailings cover, construction of lined channels over the tailings cover to convey surface drainage to the spillway, decommissioning of the Site borrow areas, and revegetation of all disturbed areas. Construction activities were completed on September 14, 2022. Additional details can be found in the 2022 Dam Safety Inspection Report (SRK Consulting, 2023a).

3.1 Existing Site Conditions

Appendix B presents a photo log which documents existing conditions at the Site observed by GHD on April 19, 2024. As shown in Appendix B, Photos 3 and 4, two leachate seeps were observed on the side slopes of Cells 2 and 4. Discharge from the two leachate seeps was observed to flow into the surface water management ditches adjacent to the Landfill cells.

4. Surrounding Land and Water Use

4.1 Zoning and Adjacent Land Use

Zoning and land use of the Site and adjacent lands is presented on Figure 3. The Site is zoned as M3 (Heavy Industrial), as defined in the Salmo River Valley Electoral Area 'G' Land Use Bylaw No. 2452, 2018. This zoning type is for waste management facilities, asphalt and concrete manufacturing, auto wrecking, renewable energy facilities, and junk yards, as well as all uses permitted in M1 (Light Industrial) and M2 (Medium Industrial) sites. In the southwest corner of the RDCK property, there is a small area of land zoned as agricultural.

The lands surrounding the Site to the north, east, and south are zoned RA (resource area). Lands to the west of the Site are zoned RC (country residential). Properties to the southwest of the Site are zoned as agriculture.

A gravel pit, Emerald Pit, is located adjacent to the Site on the north side of Emerald Mine Road and is owned by the Crown. Lands immediately surrounding the Site in all directions are undeveloped, mountainous, and forested land, with some areas used for forestry. Several rural residential properties are located to the west and southwest of the Site, separated by a bedrock ridge oriented in a north/south direction along Airport Road. Lands to the southwest of the Site are used for agriculture.

4.2 Groundwater Use

There are 26 water wells located within a 1 km radius of the Site (iMap BC, accessed on April 16, 2024). All 26 of the water wells are unlicensed with water uses listed as private domestic, other, not applicable, water supply system, and commercial and industrial. The locations of the wells are presented on Figure 4. Available well information, including well ID, water use, and construction date are included in Table 4.1 below. The well details and well completion logs are included in Appendix C.

Two private water wells not listed in the water well database are located at the agricultural property located approximately 700 m south and southwest of the Site ("Ross Property"). The wells are noted to service the residence and the barn at the Ross Property (SNC, 2013).

Table 4.1 Water Well Information

Well ID	Water Use	Construction Date
128168	Commercial and Industrial	2022
53599	Other	1984
53600	Other	1984
53601	Not Applicable	1984
75273	Not Applicable	1984
53590	Other	1984
53589	Other	1984
45453	Private Domestic	1980
92070	Private Domestic	2000
82182	Private Domestic	N/A
106649	Water Supply System	N/A
66332	Private Domestic	1996
88493	Private Domestic	2004
112671	Private Domestic	2016
112349	Private Domestic	2016
112348	Private Domestic	2016
124264	Private Domestic	2021
66186	Private Domestic	1989
91556	Private Domestic	1998
88642	Private Domestic	2004
107737	Private Domestic	2013
107736	Private Domestic	2013
107738	Private Domestic	2013
107739	Private Domestic	2013
82185	Commercial and Industrial	2001
105004	Private Domestic	2011
N/A – Not available		

4.3 Surface Water Use

A search of BC Water Rights Licences (accessed September 12, 2024) indicated that there is one surface water point of diversion located within a 1 km radius of the Site. Licence number C116400 is located on Woodchuck Creek, approximately 500 m north of the Site.

5. Site Physical Setting

5.1 Climate

The climate of the Central Kootenay is characterized by hot, dry summers, and cool winters. Climate data for the Site is based on Environment Canada's 1981-2010 Climate Normals for the Castlegar Airport climate station (Climate ID 1141455). The Castlegar Airport climate station is located at the West Kootenay Regional Airport, approximately 33 km from the Site. The average annual temperature at the Castlegar Airport climate station is 8.7 degrees Celsius (°C). Average annual precipitation is 750.9 millimetres (mm), with most precipitation occurring as rainfall during the months of May and June. On average 200.6 centimetres (cm) of snowfall is recorded per year. Most of the snowfall occurs between November and February. The average monthly precipitation and average daily temperatures for the Castlegar Airport climate station are presented in Table 5.1, below.

Table 5.1 Local Climate Data

Month	Daily Average Temperature (°C)	Average Precipitation (mm)
January	-1.6	75.5
February	-0.1	51.2
March	4.4	62.9
April	8.8	59.3
May	13.3	70.3
June	16.8	72.3
July	20.2	48.1
August	20	30.4
September	14.7	42.4
October	8	51.3
November	2.1	96.7
December	-2.1	90.3
Annual	**8.7 (average)**	**750.9 (total)**
Source: Environment Canada Canadian Climate Normals 1981-2010. Castlegar A Climate Station (Climate ID 1141455)		

5.2 Topography

The Site is located in the Columbia Mountain System between the Rocky Mountain Trench and the Interior Plateau, between the Nelson Range and the Bonnington Range of the Selkirk Mountains. The Site is located at the base of the west slope of Iron Mountain.

Site topography is presented on Figure 5. Topography of the Site generally slopes from east to west from an elevation of approximately 800 m above mean sea level (AMSL) at the eastern boundary to approximately 720 m AMSL at the western boundary and 700 m AMSL at the southwestern boundary. Topography at the north of the Site slopes northward toward Sheep Creek from approximately 720 m AMSL to 680 m AMSL.

Topography of the TSF is generally flat at an elevation of approximately 720 m AMSL, with a bedrock ridge to the west rising to an elevation of approximately 800 m AMSL.

To the west and south of the Site, topography slopes to the southwest to the floodplain of the Salmo River at an elevation of approximately 640 m AMSL.

5.3 Hydrology and Drainage

5.3.1 Regional Drainage

The Site is located within the Salmo River Watershed, which covers an area of approximately 1,220 km^2 in the Salmo River Valley. The Salmo River flows to the south where it discharges into the Pend-d'Oreille River. The Salmo River Watershed contains several smaller surface water catchment areas and creeks, including Sheep Creek, which are generally oriented east-west and discharge into the Salmo River. Sheep Creek is located immediately north of the Site and is a potential receptor for Site drainage.

The major drainage in the area of the Site is the southward flowing Salmo River, which occupies a floodplain to the west of the Site. The Salmo River is separated from the Site by the north-south trending bedrock ridge. Immediately north of the Site, down a steeply incised bank, is Sheep Creek. The creek flows westward and discharges into the Salmo River.

5.3.2 Site Drainage

Surface water at the Site is managed using a series of surface water management ditches and culverts which divert water from the Landfill cells toward the stormwater pond located between the Landfill and TSF. Surface water collected at the stormwater pond is directed to the southwest towards the TSF, where it is conveyed by the main channel of the lined surface water management ditches. The other two lined surface water conveyance channels (north spur and south spur) drain water from the area southeast of the Landfill (specifically the ditches in the till borrow/compost facility area) as well as overland flow from a forested area directly east of the TSF. The three lined surface water conveyance channels direct water to the spillway located west of the dam at the southwest corner of the tailings deposition area. The spillway discharges toward the south in a narrow valley, where it flows downhill before crossing beneath Highway 3 through a culvert. After crossing beneath Highway 3, water flows through a ditch and discharges to the Salmo River. Site drainage is presented on Figure 5.

Prior to 2022, surface water at the Site drained to a pond at the south end of the tailings deposition area (the tailings pond). In 2021-2022, the pond was de-watered and lined surface water conveyance channels were constructed in the tailings deposition area to direct surface runoff from the tailings to the spillway in a manner that prevents erosion and migration of tailings.

The channels are lined with a smooth 40 mil[1] low density polyethylene (LDPE) geosynthetic liner (Megaplast 40 mils) with panel seaming, which was then covered with a 30 cm thick sand protection layer that is overlain by turf-reinforcement matting. A portion of the channel, approximately 77 m in length at the upstream end, is lined with a layer of Combigrid (Combigrid 40/40 Q1 GRK 4c produced by Naue America). The substitution was made due to the large excavation depths within this zone as there was a risk of liner uplift due to potential buoyancy forces caused by groundwater. Following construction, the channels were hydroseeded.

5.4 Geologic Setting

5.4.1 Regional Geology

The regional geology in the Site area consists of lower Cretaceous intrusive, sedimentary and metamorphosed sedimentary rocks, and a varied sequence of glacial and post-glacial surficial deposits (Natural Resources Canada, 2009). The oldest geologic formation, the Upper Laib Formation, underlies the majority of the region. Geology of the Upper Laib Formation includes phyllite, schist, micaceous quartzite, and minor limestone. Phyllite is the predominant rock type encountered at the Site, with minor quartzite also present.

[1] A mil = 1/1,000 of an inch or 0.025 mm. 40 mil = 1 mm

Overlying the Upper Laib, in fault contact, is the Ymir group (Natural Resources Canada, 2009). This group forms the northern portion of the north-south ridge between the Site and the Salmo River floodplain. The rock types of the Ymir group include argillite, slate, argillaceous quartzite, and hornfels. A granitic phase of the Nelson batholith forms an outcrop at the southern end of the bedrock ridge.

Two mapped faults are present in the area: the Waneta fault, which cuts across the north-south bedrock ridge, and an unnamed fault that trends north-south under the TSF.

Surficial geologic deposits in the area include glacial till, glaciofluvial sand and gravel, and alluvium. A thin layer of glacial till has been reported on the upper slopes of Iron Mountain and in the southern portion of the Site. The glaciofluvial deposits occur throughout much of the northern portion of the Site. The alluvium occupies the valley below the Site and was deposited by the Salmo River.

5.4.2 Site Geology

The Site-specific geology presented in the following sections is based on reports of subsurface investigations completed at the Site that have been reviewed by GHD. Documents reviewed include borehole logs, hydraulic monitoring and testing results, geologic maps, and geologic cross sections.

5.4.2.1 Site Overburden Geology

The native geologic sequence encountered at the Site generally consists of overburden sediments (glacial and post-glacial deposits), ranging in thickness from 0 to 28.7 m overlying bedrock. In some areas of the Site, the overburden is absent and the bedrock surface is exposed as bedrock outcrops. The overburden at the Site generally consists of relatively permeable sands and sandy gravels, with the coarser materials located at the north end of the Site and medium grained materials located along the western buffer zone. Discontinuous layers of low-permeability silts and silty clays are also evident but occur in greater thickness and more frequency along the northern half of the western boundary of the Site. Occasional discontinuous lenses/layers of silt and/or silty clay exist within the sands and gravels.

A bedrock topography map and two geologic cross sections presented in CRA's Detailed Site Investigation Summary Report (CRA, 2001) depicting overburden geology in the northern portion of the Site are presented in Appendix E1. A geologic cross section presented in AMEC's Five Year Hydrological Review (AMEC, 2014) depicting overburden geology along a northeast-southwest section from Sheep Creek through the TSF is presented in Appendix E2.

The thickest overburden sequence was encountered at MW09-01 (28.7 m) and MW99-02D (24.7 m). MW09-01 and MW99-02D are located northwest of the landfill footprint on the bank above Sheep Creek. The increased depth to bedrock at this location is attributed to the presence of a bedrock trough as shown in Appendix E1.

The overburden is thinner along the western boundary of the Landfill, ranging from 10 m (MW99-3) to 16 m (MW-08-01). The overburden thickness generally continues to decrease across the Site to the east to a depth of 3.4 m at monitoring well E221702. The furthest westerly well nest, along the western edge of the tailings deposition area, has a depth to bedrock of 2.1 m (MW99-2). Approximately 1.5 m of tailings were identified at this location, overlying 0.6 m of silty gravel.

5.4.2.2 Tailings

Tailings Composition

The tailings are generally composed of fine silty sand to medium sand. In 2016, SRK completed a tailings characterization program to support the TSF closure and remediation plan, and to determine the potential effects of lowering the water table within the TSF on the local water quality. The program included a subsurface drilling investigation and collection of tailings samples for geochemical analysis. The main conclusions of the program are summarized below:

– The tailings deposition area contains approximately 6.3×10^6 tonnes of mine tailings inside an impoundment area of 26 ha (SRK, 2019)

– The tailings are approximately 20 meters (m) thick immediately upstream of the dam (SRK, 2019)
– The tailings were spigotted from the north end of the impoundment area, which resulted in grain size segregation. Coarse sand tailings are located near the spigotting area and become finer in composition to the south with fine silt tailings at the end of the facility near the dam (SRK, 2019)

Metal Leaching and Acid Rock Drainage Characterization

Several investigations have been completed at the Site to assess the metal leaching (ML) and acid rock drainage (ARD) potential of the tailings. All of the investigations have concluded that the tailings have low potential for ML and ARD due to the presence of abundant carbonate minerals which provide a high acid neutralization potential. The following summary of the ML/ARD investigations has been adapted from the 2023 Annual Reclamation Report for the TSF (RDCK, 2024).

Historical tailings sample results collected in May 1999 on behalf of Teck demonstrated negligible potential for acid rock drainage concerns based on neutralization potential ratios and net neutralization potential greater than 4.8 and 514 kg $CaCO_3$/tonne respectively (Teck Cominco Ltd., 1999). Material with a neutralization potential ratio (Neuralization Potential / Acid Production Potential) (NP/AP) ratio less than 2 is generally considered as potentially acid-generating (PAG), whereas rock with a NP/AP greater than 2 is generally considered non-PAG. The majority of the neutralization potential was linked to carbonates. Metals of environmental interest reported for tailings solids samples included lead (1,228 to 2,344 ppm), zinc (1,945 to 4,057 ppm), arsenic (45 to 135 ppm), copper (9 to 73 ppm), and cadmium (15 to 38 ppm) (Teck Cominco Ltd., 1999).

In 2016, SRK was retained to complete a geochemical characterization of the tailings, as part of the closure design assessment. Tailings samples were collected by SRK on December 14 and 16, 2016. Geochemical characterization again indicated negligible potential for ARD based on neutralization potential ratios and net neutralization potential greater than 4.1 and 800 kg CaCO3/tonne respectively (SRK, 2017). Metals of environmental interest reported for tailings solids samples included lead (1200 to 2400 ppm), zinc (2400 to 4600 ppm), and cadmium (26 to 50 ppm) (SRK, 2017). Cadmium does not occur as a discrete sulphide mineral but is a trace component of sphalerite. Abundant calcium and magnesium carbonate minerals (calcite and dolomite, respectively) are also present. The tailings are thought to be non-acid generating in perpetuity because carbonate content far exceeds sulphide content (RDCK, 2020).

As a requirement of the TSF Permit condition C.3, as part of the approved construction works, in 2021 SRK completed an ML/ARD monitoring and sampling program during construction activities. The ML/ARD monitoring program included:

– Verification sampling of proposed construction materials to confirm geochemical suitability in advance of the construction season, and;
– Operational monitoring of construction materials with ongoing sampling throughout the progression of construction and development of construction material sources.

SRK prepared a technical memo in 2022 (SRK, 2022b) that summarized the results from the verification and operational monitoring of construction materials for the HB closure and remediation project that show the following:

– All samples are classified as non-potentially acid generating (PAG).
– All samples have low solid phase elemental enrichment by comparison to the average crustal abundances.
– Parameters from the Shake Flask Extraction test results that exceeded the water quality objectives of the British Columbia Water Quality Guidelines for Freshwater Aquatic Life (BCWQ FWAL) and toxicity reference values (TRV) had concentrations only slightly above the criteria.

The 2021 sampling program showed that the construction materials used as part of the 2021 construction season at the facility as part of closure works have low potential for ML/ARD (SRK, 2022b).

5.4.2.3 Site Bedrock Geology

Bedrock topography underlying the Site is irregular, with highs and lows that are not clearly reflected in ground surface topography. As presented on the bedrock topography map in Appendix E1, a bedrock trough is present in the north of the Site, oriented in a north-west to south-east direction between Cell 1 and the ridge located west of Cell 1. Bedrock topographic highs exist beneath Cell 1 and at MW99-5 and MW-04-01. The trough may continue to the south; however, bedrock surface data is limited in the southern extent of the TSF and further south.

The northern half of the Site is predominantly underlain by schist belonging to the Laib formation. The southwestern portion is underlain by intrusive granodioritic rock. Graphite has also been reported in the bedrock outcrop areas observed east of Cell 1.

5.4.2.3.1 Potentially Acid Generating Bedrock

In 2021 and 2022, the borrow area located east of the Landfill (Figure 2A) was further developed by Teck to supply clean fill material for a downstream remediation project. As borrow material was depleted, bedrock was exposed. The bedrock was not covered and vegetated as part of final borrow reclamation.

As a result of the unexpected exposure of bedrock and known units in the area that can be potentially acid generating, in October 2022, a geochemist from SRK completed a ML/ARD assessment which included mapping and sampling of the rock exposure in the Landfill borrow area. SRK (SRK, 2023b) outlined that the geological and geochemical characterization of the exposed bedrock indicated the following:

– A narrow horizon of gossanous phyllite was identified at the contact of phyllite and granite. Samples collected from this horizon were classified as PAG though generally had low sulphide content (up to 0.17%).
– Shake flask extraction test results of the gossanous phyllite show this material had acidic pH and have potential to leach constituents including sulphate, cadmium, cobalt, copper, iron, lead, manganese, nickel, and zinc.

Overall, most of the outcropping bedrock in the borrow area were characterized as having low risk for ML/ARD except for the narrow horizon of gossanous phyllite (SRK, 2023b). As a result of the small exposure of the gossanous phyllite unit, SRK recommended that the RDCK implement a spring and fall monitoring program. The RDCK initiated the spring and fall sampling program starting in the fall 2023 which was based on a sampling program developed by SRK. However, no water was observed in the borrow during any of the fall water quality sampling Site visits.

5.5 Hydrogeologic Setting

5.5.1 Regional Hydrogeology

As presented on Figure 4, one regional aquifer is located in the Site vicinity as identified in iMapBC (accessed on April 30, 2024). Aquifer 496 is an unconfined sand and gravel aquifer located within the Salmo River valley to the west of the Site. Aquifer 496 is classified as having moderate productivity and high vulnerability (Lengyel, Verma, & Hinnell, 2022).

Based on the available geological information and the mountainous topography of the area, regional groundwater flow is interpreted to take place within permeable overburden sediments and fractured bedrock flow zones. Regional groundwater flow directions likely reflect topography, with flow directed downslope where it discharges into creeks and rivers.

5.5.2 Site Hydrogeology

Hydrogeology at the Site has been characterized based on historical groundwater elevation monitoring of the Landfill and TSF monitoring well networks. Based on historical groundwater elevation monitoring, a groundwater flow divide has been identified in the north of the Site. The flow divide separates groundwater flow into a northern flow path directed towards Sheep Creek, and a south-southwestern flow path directed toward the TSF and the earth dam. CRA's report titled "Contamination Attenuation Zone Evaluation, Southern Groundwater Flow Path" (CRA, 2005)

identified two areas, in the east and west of the Site, where the overburden is expected to generally be unsaturated. These areas are characterized by steeply sloping bedrock ridges with only a thin layer of overburden sediments.

Site hydrogeologic conditions have been assessed for three areas (one in the northern flow path and two in the southern) which are described in the sections below.

5.5.2.1 Northern Flow Path/Northern Contaminant Attenuation Zone (NCAZ)

Groundwater in the northern portion of the Site, in the vicinity of Cell 1, flows in a north to northwest direction towards Sheep Creek. This area, which occupies the northern half of the Cell 1 and the area to the north of the Landfill up to the bank of Sheep Creek is referred to as the northern flow path or the Northern Contaminant Attenuation Zone (NCAZ). Four groundwater seeps are present on the southern bank of Sheep Creek downgradient of the Landfill to the north of the Landfill footprint. Based on historical monitoring, the seeps have been characterized as both perennial and ephemeral and discharge at various rates depending on the season. The locations of the groundwater seeps are presented on Figure 2. A geologic cross-section presented in CRA's Detailed Site Investigation Summary Report (CRA, 2001) depicting the stratigraphy of the NCAZ is presented in Appendix E1.

5.5.2.2 Southern Flow Path/Southern Contaminant Attenuation Zone (SCAZ)

The southern flow path, which is also referred to in this report as the Southern Contaminant Attenuation Zone (SCAZ), originates in the north of the Site within the southern portion of Cell 1. Groundwater south of the groundwater flow divide flows to the west and southwest, through the tailings deposition area towards the earth dam. The north-south bedrock ridge borders the western side of the tailings deposition area and acts as a barrier that directs groundwater southward. The SCAZ occupies most of the area within the southern Landfill footprint and the TSF.

5.5.2.3 TSF Downgradient Area

The TSF Downgradient Area refers to the area to the south of the earth dam, downgradient of the SCAZ. This area is characterized by steep topography which slopes toward the valley bottom. Stratigraphy of this area consists of a thin layer of overburden sediments overlying bedrock.

5.5.3 Groundwater Flow Directions

Groundwater levels at the Landfill monitoring wells are measured on an annual basis as part of the Landfill EMP. Groundwater elevations at the TSF monitoring wells were measured on an annual basis until 2021, and on a quarterly basis in 2022-2023 as part of the TSF EMP. Groundwater elevations for the Landfill and TSF monitoring wells from 2019 to 2023 are presented in Tables 1 and 2 respectively. Hydrographs showing groundwater elevations across the Site from 2019 to 2023 are presented in Appendix F.

Groundwater elevations are highest in the northeastern portion of the Site at well MW-07-01 and decrease following the sloping topography of the Site to the west and south.

Based on the 2019 to 2023 data, the measured depth to water at the Site is deepest in the NCAZ area of the Site at wells MW-09-02S/D, MW99-7D, and 81-1, where groundwater is generally encountered at approximately 10 to 19 metres below ground surface (m BGS). The water table is shallowest in the SCAZ area, where artesian conditions have been reported at wells MW-01C-03, MW-03S-03, MW-01A-03, and to the northeast of the Site at background well MW-03A-01, where artesian conditions were reported during all five monitoring events between 2019 and 2023.

Some seasonal variation is apparent at the TSF wells, with the highest groundwater elevations observed in the spring and the lowest groundwater elevations observed in the fall and winter. The strongest seasonal variation is observed at MW-02-2004S, where groundwater elevation ranged from 634.70 m AMSL in March 2023 to 630.07 m AMSL in September 2023, a difference of 4.64 m across seasons. Seasonal variation can not be assessed at the Landfill wells as monitoring is performed on an annual basis.

Groundwater elevation contours representing groundwater elevation in the shallow overburden and tailings for May 2023 are presented on Figure 8. Figure 8 presents two areas, in the west and east of the Site, where the

overburden is expected to generally be dry due to elevated bedrock surfaces. Groundwater elevations adjacent to these areas are generally below the interpreted bedrock surfaces, thus, the overburden in these areas is unlikely to be saturated under typical conditions. These areas are steeply sloping bedrock ridges with a thin layer of overburden sediments. The areas were delineated by CRA (2005) (Conestoga-Rovers and Associates, 2005). During high precipitation events or snow melt, saturated overburden May be present temporarily; however, this groundwater would flow to areas of lower bedrock topography and join the primary groundwater flow paths.

The May 2023 contours show the inferred groundwater flow directions across the Site. As shown on Figure 8, a groundwater flow divide is present in the northern area of the Site near Cell 1. The groundwater flow divide separates the NCAZ, where groundwater flows north toward Sheep Creek, and SCAZ, where groundwater flows west toward the TSF, and is consistent with historical flow observations at the Site.

5.6 Hydraulic Properties

Hydraulic Conductivity Testing Data

Hydraulic conductivity testing was completed by CRA (2001) and Klohn Krippen (2000). Single well response tests were performed at fifteen Site monitoring wells. The results of the analyses are presented in Table 5.2.

Table 5.2 Hydraulic Conductivity Test Results

Well ID	Unit	Overburden Stratigraphy	Average Hydraulic Conductivity (m/s)	Source
200583 (81-1)	Overburden	Sand and silty sand	4.8×10^{-8}	Klohn Crippen (2000)
200585	Overburden	Sandy Clay	1.8×10^{-6}	CRA (2001)
0200611	Overburden	Unknown	4.6×10^{-6}	Klohn Crippen (2000)
MW99-7D	Overburden	Silty Gravel	3.0×10^{-6}	CRA (2001)
MW-09-01	Overburden	Gravel	1.0×10^{-6}	CRA (2001)
207637	Overburden	Unknown	2.11×10^{-5}	Klohn Crippen (2000)
221702 (S-MW-1)	Overburden	Gravely sand, sand, and gravel	2.0×10^{-7}	Klohn Crippen (2000)
221703 (S-MW-2)	Overburden	Gravely sand and gravely, silty sand	2.7×10^{-7}	Klohn Crippen (2000
221704 (S-MW-3)	Overburden	Gravely silty sand	1.6×10^{-5}	Klohn Crippen (2000)
MW99-3S	Overburden	Unknown	5.0×10^{-5}	Klohn Crippen (2000)
MW-01-04S (MW-01-2004S)	Overburden	Unknown	2.1×10^{-6}	CRA (2001)
MW-02-04S[1] (MW-02-2004S)	Overburden	Unknown	1.2×10^{-4}	CRA (2001)
MW99-1S	Overburden	Silty Sand Gravel	5.0×10^{-6}	CRA (2001)
MW99-1D	Bedrock	Phyllite	1.47×10^{-7}	CRA (2001)
MW-02-04D (MW-02-2004D)	Bedrock	Unknown	4.43×10^{-7}	CRA (2001)

Notes:

[1] – It has been noted is previous reports that the hydraulic conductivity value for MW-02-04S (MW-02-2004S) was incorrectly reported as 1.2×10^{-5} m/s. Review of the slug test data indicates that the hydraulic conductivity was actually estimated to be 1.2×10^{-4} m/s (AMEC Environment and Infrastructure, 2014).

5.6.1 Vertical Hydraulic Gradients

Vertical hydraulic gradients were calculated for the nested well pairs located at the Site. Each of the nested well pairs consist of a shallow well (S) and a deep well (D).

– MW-09-02S (S) and MW-09-02D (D) (NCAZ)
– MW-02S-03 (S) and MW-02D-03 (D) (SCAZ)
– MW99-3S (S) and MW99-3D (D) (SCAZ)
– MW99-2S (S) and MW99-2D (D) (TSF)
– MW99-1S (S) and MW99-1D (D) (TSF Downgradient)
– MW-01-2004 (S) and MW-01-2004 (D) (TSF Downgradient)
– MW-02-2004 (S) and MW-02-2004 (D) (TSF Downgradient)

Vertical hydraulic gradients were calculated as the difference in groundwater elevation between the shallow and deep wells divided by the vertical distance between the midpoint of the well screens. The vertical hydraulic gradients for the May/April (2019-2023) monitoring events are presented in Table 5.3.

For the TSF wells that were monitored quarterly in 2023, hydraulic gradients for each monitoring event were calculated to assess seasonal variations. The vertical hydraulic gradients for the winter, spring, summer, and fall 2023 monitoring events are presented in Table 5.4.

Table 5.3 Vertical Hydraulic Gradients (2019-2023)

Well Pair	Vertical Distance Between Midpoint of Well Screens (m)	Hydro-geologic Units	Vertical Hydraulic Gradient (m/m)				
			April/May 2019	April/May 2020	May 2021	May 2022	May 2023
MW-09-02S MW-09-02D	12.0	Overburden / Overburden	0.61 (downward)	0.62 (downward)	0.60 (downward)	0.59 (downward)	0.62 (downward)
MW99-3S MW99-3D	3.75	Overburden / Bedrock	0.47 (downward)	0.045 (upward)	0.067 (upward)	0.067 (upward)	0.20 (downward)
MW-02S-03 MW-02D-03	7.32	Overburden / Overburden	0.023 (downward)	0.033 (downward)	0.024 (downward)	0.031 (downward)	0.0301 (downward)
MW-01C-03 MW-01A-03	11.1	Overburden / Bedrock	0.010 (upward)	0.006 (upward)	0.012 (upward)	0.003 (downward)	0.003 (downward)
MW99-2S MW99-2D	18.9	Overburden / Bedrock	0.013 (upward)	0.027 (upward)	0.029 (upward)	0.0048 (upward)	0.0011 (upward)
MW-01-2004 (S) MW-01-2004 (D)	13.6	Overburden / Bedrock	0.030 (upward)	0.017 (upward)	0.033 (upward)	0.025 (upward)	0.013 (upward)
MW99-1S MW99-1D	12.6	Overburden / Bedrock	0.27 (upward)	0.27 (upward)	0.31 (upward)	0.36 (upward)	0.30 (upward)
MW-02-2004(S) MW-02-2004(D)	43.5	Overburden / Bedrock	0.054 (downward)	0.046 (downward)	0.037 (downward)	0.022 (downward)	0.033 (downward)

Table 5.4 Vertical Hydraulic Gradients – TSF 2023 Seasonal Comparison

Well Pair	Vertical Distance Between Midpoint of Well Screens (m)	Vertical Hydraulic Gradient (m/m)			
		March 2023	May 2023	September 2023	November 2023
MW99-2S MW99-2D	18.9	0.0053 (upward)	0.0011 (upward)	0.024 (upward)	0.012 (upward)
MW-01-2004 (S) MW-01-2004 (D)	13.6	0.022 (upward)	0.013 (upward)	0.028 (upward)	0.018 (upward)
MW99-1S MW99-1D	12.6	0.29 (upward)	0.30 (upward)	0.33 (upward)	0.32 (upward)
MW-02-2004(S) MW-02-2004(D)	43.5	0.087 (downward)	0.033 (downward)	0.012 (upward)	0.024 (downward)

The strongest vertical hydraulic gradients at the Site are at well pairs MW-09-02S/MW-09-02D (located in the NCAZ) and MW99-1S/MW99-1D (located in the TSF Downgradient Area), where gradients of 0.59 to 0.62 (downward) and 0.27 to 0.36 (upward) m/m respectively were observed. Based on the borehole logs for these wells, a 3.6 m thick layer of clay is present between MW-09-02S and MW-09-02D, and a 5.1 m thick layer of clay is present between MW99-1S and MW99-1D. Based on the strong vertical hydraulic gradients at these locations and less permeable nature of clay deposits, the clay acts as an effective confining unit, limiting the vertical flow of groundwater.

Strong hydraulic gradients of 0.47 and 0.20 m/m (downward) were reported at MW99-3S/MW99-3D in 2019 and 2023. During 2020-2022, relatively weak upward gradients were reported at this well pair. Based on the borehole log, a layer of clayey gravel, approximately 0.9 m thick is present between MW99-3S, which is screened in the overburden, and MW99-3D, which is screened in bedrock. It is unclear what caused the year-to-year variation in hydraulic gradient at this well pair.

Within the SCAZ, downward gradients were reported at upgradient location MW-02S-03/MW-02D-03, which is located in the northeast of the tailings deposition area, while upward gradients were reported at MW99-2S/MW99-2D in the northwest of the tailings deposition area, and both upward and weak downward gradients were reported at MW-01C-03/MW-01A-03.

Within the TSF Downgradient Area, upward gradients were reported at MW-01-2004(S)/MW-01-2004(D) and MW99-1S/MW99-1D, while downward gradients were reported at MW-02-2004(S)/MW-02-2004(D). The vertical hydraulic gradients in the TSF Downgradient Area likely reflect the steeply sloping topography of the area. Groundwater mounding at the base of the slope May be the cause of the downward gradient from the overburden to bedrock at MW-02-2004(S)/MW-02-2004(D).

5.6.2 Horizontal Groundwater Flow Velocities

Horizontal groundwater flow velocities were calculated for the NCAZ, the SCAZ (Landfill area), the SCAZ (TSF area), and the TSF Downgradient Area. The hydraulic gradients were calculated using groundwater elevation data from April/May 2023 for well pairs at upgradient and downgradient locations within each area. The horizontal hydraulic gradients were calculated to estimate the rate of groundwater flow within the overburden flow zone, and the bedrock flow zone for the TSF Downgradient Area.

The horizontal flow velocities for each zone were calculated using Darcy's equation:

$$V_x = \frac{K\,i}{\eta} \qquad \text{Equation 5-1}$$

Where:

V_x = average horizontal groundwater velocity (m/s)

K = hydraulic conductivity (m/s)

i = horizontal hydraulic gradient in the direction of groundwater flow (m/m)

η = effective porosity (%)

The well pairs selected for each area and the hydraulic properties used as input values for the calculations are presented in the sections below. The results are presented in Table 5.5.

NCAZ

For the NCAZ area, the following inputs were used for Equation 5-1:

– Well Pair: 0200585/81-4 (upgradient) and MW-09-02D (downgradient)
– Effective porosity of 25% (representative of sand (Spitz & Moreno, 1996))
– Hydraulic conductivity of 2.2 x 10^{-6} m/s (representing the geometric mean estimated hydraulic conductivity reported for wells 200585, 0200611, MW99-7D, and MW-09-01, which are located in the NCAZ)
– Hydraulic gradient of 0.17 m/m (May 2023)

SCAZ (Landfill area)

For the SCAZ Landfill area, the following inputs were used for Equation 5-1:

– Well Pair: MW99-3S (upgradient) and MW-02S-03 (downgradient)
– Effective porosity of 25% (representative of sand (Spitz & Moreno, 1996)
– Hydraulic conductivity of 2.6 x 10^{-5} m/s (representing the mean estimated hydraulic conductivity reported for wells 207637, 221704, and MW99-3S, which are located in the SCAZ. No hydraulic conductivity estimates are available for wells in the Tailings Deposition Area.
– Hydraulic gradient of 0.03 m/m (May 2023)

SCAZ (TSF area)

For the SCAZ TSF area, the following inputs were used for Equation 5-1:

– Well Pair: MW-02S-03 (upgradient) and MW-03S-05 (downgradient)
– Effective porosity of 25% (representative of sand (Spitz & Moreno, 1996)
– Hydraulic conductivity of 2.6 x 10^{-5} m/s (representing the mean estimated hydraulic conductivity reported for wells 207637, 221704, and MW99-3S, which are located in the SCAZ. No tailings hydraulic conductivity estimates for the tailings are available.
– Hydraulic gradient of 0.002 m/m (May 2023)

TSF Downgradient

For the TSF Downgradient area overburden wells, the following inputs were used for Equation 5-1:

– Well Pair: MW-01-2004(S) (upgradient) and MW-02-2004(S) (downgradient)
– Effective porosity of 30% (representative of sandy gravel (Spitz & Moreno, 1996))
– Hydraulic conductivity of 5.0 x 10^{-6} m/s (representing the mean estimated hydraulic conductivity reported for wells MW01-2004(S), MW99-1S, and MW-02-2004(S))
– Hydraulic gradient of 0.12 m/m (May 2023)

For the TSF Downgradient Area bedrock wells, the following inputs were used for Equation 5-1:

– Well Pair: MW-01-2004(D) (upgradient) and MW-02-2004(D) (downgradient)
– Effective porosity of 10% (representative of weathered bedrock (Spitz & Moreno, 1996))
– Hydraulic conductivity of 2.6 x 10^{-7} m/s (representing the mean estimated hydraulic conductivity reported for wells MW99-1D, and MW02-2004(D))
– Hydraulic gradient of 0.13 m/m (May 2023)

Table 5.5 Horizonal Groundwater Flow Velocity Estimates

Area	Well Pair	Horizontal Flow Velocity (April/May 2023)
NCAZ	81-4 and MW09-02D	48 m/year
SCAZ (Landfill area)	MW99-3S and MW-02S-03	94 m/year
SCAZ (TSF area)	MW02S-03 and MW03S-05	5.4 m/year
TSF Downgradient (Overburden)	MW-01-2004(S) and MW-02-2004(S)	65 m/year
TSF Downgradient (Bedrock)	MW-01-2004(D) and MW-02-2004(D)	10 m/year

CRA (2005) estimated the horizontal groundwater flow velocity for the NCAZ to be between 6.3 to 14 m/year between the Cell 1 and Sheep Creek (Conestoga-Rovers and Associates, 2005). Using the same data set, BC MOE (2002) calculated the flow velocity in the NCAZ to be between 10 and 30 m/year (BC Ministry of Environment, 2002).

BC MOE (2002) estimated the horizontal flow velocity for the SCAZ (Landfill area) to be between 180 and 290 m/year and a velocity of 5 to 10 m/year for the SCAZ (TSF area). CRA (2005) estimated the flow velocity in the SCAZ adjacent to the Landfill footprint to be 190 m/year, and the velocity in the TSF area to be 20-30 m/year.

The flow velocity estimates for the TSF downgradient area indicate a faster groundwater flow rate in the overburden sediments (65 m/year) compared to the underlying bedrock (10 m/year). This result reflects the similar hydraulic gradient in both flow zones and the higher hydraulic conductivity in the overburden.

Due to the high degree of uncertainty in groundwater flow estimates (i.e., uncertainty in hydraulic conductivity and porosity, seasonal variation in hydraulic gradients), these results are considered “order of magnitude” estimates. As such, the horizontal flow velocities of 48 m/year calculated for the NCAZ, 94 m/year calculated for the SCAZ (Landfill area) and 5.4 m/year for the SCAZ (TSF area) compare reasonably well to the previous estimates referred above.

5.6.3 Groundwater Flux Calculations

Groundwater flow rates for the NCAZ and SCAZ (Landfill area), were calculated using groundwater elevation data from April/May 2023 and the hydrogeologic properties discussed in section 5.6. The groundwater flow rates provide an estimate of the volumes of groundwater flowing into the NCAZ and SCAZ areas from the Landfill on an annual basis. Groundwater flux in the TSF downgradient area was not assessed as insufficient geologic data is available to estimate a cross-sectional saturated thickness of the overburden.

Groundwater flux entering the NCAZ and SCAZ (Landfill area) was calculated using Darcy's Law as described in Equation 5-2 below:

$$Q_{in} = K \times i \times A \qquad \text{Equation 5-2}$$

Where:

Q_{in} = flow from the Landfill area (m^3/day)

K = hydraulic conductivity (m/s)

A = cross-sectional area perpendicular to flow (m^2)

i = horizontal hydraulic gradient or change in hydraulic head over a distance (m/m)

The hydraulic properties used as input values for the calculations for the two areas are presented in the sections below. The results are presented in Table 5.6.

NCAZ

The following inputs were used to populate equation 5-2 for the NCAZ:

– An average hydraulic conductivity of 2.2 x 10^{-6} m/s
– A horizontal hydraulic gradient of 0.17 m/m (81-4 and MW-09-02D, May 2023)
– A cross-sectional area of 480 m^2 (representing the estimated saturated thickness of the overburden flow zone along a cross-section from 81-3 to 81-4), where the cross-sectional height is based on the average height of the water table above bedrock at 81-3 and 81-4 using groundwater elevation data from May 2023.

SCAZ (Landfill area)

The following inputs were used to populate equation 5-1 for the SCAZ Landfill area:

– An average hydraulic conductivity of 2.6 x 10^{-5} m/s
– A horizontal hydraulic gradient of 0.03 m/m (MW99-3S and MW-02S-03, May 2023)
– A cross-sectional area of 705 m^2 (representing the estimated saturated thickness of the overburden flow zone along a cross-section from MW99-3S and S-MW-2), where the cross-sectional height is based on the average height of the water table above bedrock at MW99-3S and S-MW-2 using groundwater elevation data from May 2023.

Table 5.6 Groundwater Flux Estimates for NCAZ and SCAZ Areas

Area	Estimated Groundwater Flux
NCAZ (Landfill area)	23,300 m^3/year
SCAZ	66,500 m^3/year

CRA (2005) estimated a flow rate of 89,310 m^3/year entering the SCAZ from the Landfill (Conestoga-Rovers and Associates, 2005), Wood (2020) estimated flow rates of 47,085 m^3/year (129 m^3/day) and 14,235 m^3/year (39 m^3/day) respectively for the NCAZ and SCAZ (Wood Environment & Infrastructure Solutions, 2020), and Klohn Krippen (2000) estimated flow rates of 39,000 m^3/year and 15,000 m^3/year respectively for the NCAZ and SCAZ) (Klohn-Crippen, 2000).

It is noted that the previously reported groundwater flow rates referred above were estimated using slightly different methodologies and using the data sets available at the time. The 2023 flow rate estimates of 23,300 m^3/year for the NCAZ and 66,500 m^3/year for the SCAZ fall within the same order of magnitude as the previous estimates and are considered to compare reasonably well.

6. Leachate Quality

There are three potential sources of groundwater contamination at the Site:

– Landfill leachate derived from the MSW waste buried at the Landfill (referred to as Landfill Leachate)
– Septage leachate derived from the raw liquid septage discharged in the Septage Treatment Facility (referred to as Septage Leachate)
– Tailings leachate derived from the mine tailings in the TSF (referred to as Tailings Leachate)

Landfill leachate quality at the Site is assessed using water quality samples collected from leachate well LW-03-01, which is located at the northwest corner of Cell 1 and is screened within the waste and underlying sand and gravel. From 2006 to 2015, leachate quality in Cell 2 was assessed using water quality samples collected from LW-02A-01, which was screened within waste and underlying sediments. LW-02A-01 was damaged during closure works and was decommissioned. Leachate strength is expected to decrease over the long term as the waste ages.

Based on the known hydrogeologic conditions, no monitoring location exists at the Site that can be used to directly characterize septage leachate quality. Monitoring well MW99-6S is located within the Septage Treatment Facility and is screened in sand and gravel at the base of the overburden. MW99-6S is located hydraulically upgradient of the raw septage discharge locations in the Septage Treatment Facility. Groundwater quality at MW99-6S is therefore not representative of potential septage leachate impacts. Monitoring wells MW-06-01 and MW02S-03 are both located hydraulically downgradient of the Septage Treatment Facility, however both wells are screened within tailings. Water quality in these wells is more likely to be altered by tailings leachate rather than septage leachate.

Tailings leachate at the Site is assessed using samples collected from MW-06-01, which is located in the northern portion of the TSF tailings deposition area and is screened in tailings. MW-06-01 is located hydraulically cross-gradient to the SCAZ groundwater flow path from the Landfill, but hydraulically downgradient from the Septage Treatment Facility, and is located adjacent to the wood chip stockpile area. Due to its hydraulic position and low chloride concentrations (discussed in Section 6.1), groundwater at MW-06-01 is considered to be representative of groundwater that has been affected by tailings but is likely unaffected by Landfill leachate. Groundwater quality at MW-06-01 may also be affected by Septage Leachate migration from the Septage Treatment Facility and potential impacts from the woodchip stockpile area.

6.1 Leachate Indicator Parameters

A set of leachate indicator parameters has been selected for the Site based on available groundwater and leachate quality as well as parameters associated with the types of waste discharged at the Site (i.e., MSW, liquid septage, and mine tailings). The indicator parameters were selected with regard to the guidance presented in the BC Guidelines for Environmental Monitoring at MSW Landfills. The BC Guidelines for Environmental Monitoring at MSW Landfills state that leachate indicator parameters used to assess the impact of leachate on surrounding water quality should have the following characteristics:

– Substances not subject to decomposition
– Commonly present in waste materials and leachate
– Present at concentrations well above analytical detection limits
– Present at higher concentrations in groundwater downgradient of the landfill footprint compared to local background groundwater.

Based on Landfill leachate quality data from LW-03-01 and former well LW-02A-01, groundwater quality at MW-06-01, and a comparison of Site groundwater quality to background groundwater, a set of eight leachate indicator parameters was selected for the Site. The leachate indicator parameters, along with median concentrations reported at LW-03-01 and MW-06-01 from 2019-2023, and Site-specific rationale are presented in Table 6.1, below.

Concentration trends of the leachate indicator parameters at LW-03-01 and MW-06-01 from 2019-2023 were assessed based on the concentration versus time plots presented in Appendix I (Figures I-1 and I-2). Concentrations of all leachate indicator parameters at LW-03-01 were variable over time from 2019-2023. Concentrations of chloride, sulfate, and manganese at MW-06-01 were generally stable over time. Ammonia, arsenic, and TOC concentrations at MW-06-01 increased since 2020, while zinc concentrations decreased.

Historical tailings chemistry results indicate that the tailings solids are characterized by elevated levels of arsenic, cadmium, copper, lead, and zinc (AMEC Environment and Infrastructure, 2014). More recent sampling confirmed high concentrations of iron, lead, and zinc sulphide with trace amounts of cadmium and abundant calcium and magnesium (Wood Environment & Infrastructure Solutions, 2020).

The leachate indicator parameters were used in this report to assess the extent and magnitude of impacts to groundwater resulting from migration of leachate from the Landfill, Septage Treatment Facility, and TSF tailings deposition area.

Table 6.1 Leachate Indicator Parameters

Indicator Parameter	Median Leachate Concentration (LW-03-01) (2019-2023)	Median Concentration (MW-06-01) (2019-2023)	Rationale
Chloride	24.1 mg/L	< 10 mg/L	Chloride is generally abundant in MSW and is released in part by the degradation of various wastes. Chloride is a very useful leachate indicator parameter as it is not subject to retardation processes and acts as a conservative tracer migrating with groundwater flow. The use of calcium chloride road salt and dust suppressant at the Site and on Emerald Road May result in elevated background chloride concentrations. Elevated concentrations of chloride have been reported in Landfill leachate at the Site. Chloride concentrations reported at LW-03-01 are variable and have consistently been below 100 mg/L since 2006. Chloride concentrations at LW-02A-01, which monitored leachate in Cell 2 until 2015, were generally between 500 – 1,000 mg/L, indicating that chloride concentrations in leachate at the Landfill are variable and May be higher than the range reported at LW-03-01. Chloride concentrations were below applicable water quality criteria in all samples collected from LW-03-01 and MW-06-01 between 2019 and 2023. Chloride concentrations reported at monitoring wells located downgradient of the Landfill footprint are above the Site background levels and have been reported to exceed certain water quality criteria. Chloride is not a parameter typically associated with mine tailings and May be used to differentiate between Landfill leachate and Tailings Leachate impacts.
Ammonia (as N)	0.53 mg/L	0.63 mg/L	High concentrations of ammonia are typically observed in leachate when MSW landfills enter the anaerobic decomposition stage. In this stage, anaerobic decomposition of organic matter dominates, and the Landfill is in a chemically reducing state that produces more ammonia than nitrate or nitrite. Elevated concentrations of ammonia have been reported in Landfill leachate at the Site. Ammonia concentrations reported at monitoring wells located downgradient of the Landfill footprint are above the Site background levels and have been reported to exceed the applicable water quality criteria. Ammonia concentrations were below applicable water quality criteria in all samples collected from LW-03-01 and MW-06-01 between 2019 and 2023. Ammonia is not a parameter typically associated with mine tailings and May be used to differentiate between Landfill/Septage Leachate and Tailings leachate impacts.

Indicator Parameter	Median Leachate Concentration (LW-03-01) (2019-2023)	Median Concentration (MW-06-01) (2019-2023)	Rationale
Sulfate	2.4 mg/L	1,570 mg/L	Elevated sulfate concentrations have been reported in groundwater at the Site. Sulfate concentrations at monitoring wells throughout the Site have been reported at levels above the Site background levels and have been reported to exceed water quality criteria. Sulfate concentrations were below applicable water quality criteria in all leachate samples from LW-03-01 between 2019 and 2023, while concentrations at MW-06-01 exceeded criteria in all samples from that time frame. The source of sulfate at the Site is likely related to Septage and/or Tailings, and not Landfill leachate.
Total Organic Carbon (TOC)	3.5 mg/L	6.9 mg/L	MSW leachate and septage are rich in dissolved organic compounds. Elevated TOC concentrations have been reported in Landfill leachate at the Site. TOC concentrations reported at monitoring wells located downgradient of the Landfill footprint and Septage Treatment Facility are above the Site background levels and have been reported to exceed water quality criteria. TOC is not a parameter typically associated with mine tailings and May be used to differentiate between Landfill/Septage Leachate and Tailings Leachate impacts. The wood chip stockpile area represents an additional potential source of TOC at the Site.
Iron	76,800 µg/L	21,400 µg/L	The microbial breakdown of dissolved organic matter in landfills creates reducing conditions in leachate affected groundwater. Where conditions are reducing, naturally occurring iron and manganese oxides within the aquifer material are reduced to more soluble forms, which dissolve and result in an increase in dissolved iron and manganese concentrations. Iron and manganese concentrations downgradient of the Landfill footprint are above the Site background levels and have been reported to exceed water quality criteria.
Manganese	3,040 µg/L	1,020 µg/L	
Arsenic	34.4 µg/L	2.3 µg/L	Historical tailings chemistry results indicate that the tailings solids are characterized by elevated levels of arsenic, cadmium, copper, lead, and zinc. Elevated concentrations of arsenic and zinc have been reported in leachate at LW-03-01 and in groundwater at MW-06-01.
Zinc	9.3 µg/L	9,150 µg/L	

mg/L – milligrams per litre
µg/L – micrograms per litre

7. Groundwater Quality

GHD reviewed the available historical groundwater analytical results from the Landfill and TSF EMPs to characterize groundwater quality at the Site. Groundwater quality was assessed in terms of evidence of leachate derived water quality impacts from the three sources described in section 6. This was accomplished through an assessment of the temporal and spatial trends in water quality and a comparison of groundwater quality to background and leachate concentrations.

Based on this characterization, GHD assessed the extent and magnitude of potential impacts to groundwater quality resulting from Landfill and TSF activities. Groundwater quality trends over the past five-years (2019-2023) were also assessed.

The Site groundwater monitoring well network was divided into six groups based on their location and purpose:

– Leachate Wells
– Background Wells
– NCAZ Wells
– SCAZ Wells
– TSF Downgradient Wells
– Off-Site Residential Wells

The locations of the active Landfill and TSF monitoring wells are presented on Figure 6, and details of each monitoring well are presented in Table 7.1, below.

Table 7.1 Site Monitoring Well Network

Monitoring Well ID	Location	Purpose	Screened Stratigraphic Unit
Landfill Monitoring Well Network			
Landfill Leachate Well			
LW-03-01	Landfill Cell 1	Characterize leachate quality in Cell 1	Overburden, sand pack extended into refuse
Background wells			
MW-07-01	Northeast of the Landfill, south of Sheep Creek	Characterize background groundwater quality upgradient of the Landfill	Overburden
S-MW-1[1]	Northeast of the Landfill, south of Sheep Creek		Overburden
MW-2A-01[1]	North of Sheep Creek, north of the Site	Characterize background groundwater in the overburden flow zone, north of the Site	Overburden
MW-03A-01	North of Sheep Creek, northeast of the Site		Overburden
NCAZ Wells			
81-1	Northeast of Cell 1	Evaluate leachate impacts to groundwater in the NCAZ and assess groundwater quality compliance at the northern Site boundary	Overburden
81-3	North of Cell 1		Overburden
81-4	Northwest of Cell 1		Overburden
0200611	Northwest of Cell 1		Overburden
MW-09-02S	Northwest of Cell 1		Overburden
MW-09-02D	Northwest of Cell 1		Overburden
MW99-7D	Northwest of Cell 1		Overburden
SCAZ Wells			
MW99-8	North of Cell 2	Evaluate leachate impacts in the SCAZ and assess the attenuation of leachate impacts along the flow path from the Landfill to the Site boundary.	Overburden
MW99-3S	North of Cell 2		Overburden
MW99-3D	North of Cell 2		Bedrock
MW99-6S	Northwest of Cell 2		Overburden
E207637	Adjacent to northwestern edge of Cell 2		Overburden
S-MW-2[2]	Adjacent to southwestern edge of Cell 2		Overburden

Monitoring Well ID	Location	Purpose	Screened Stratigraphic Unit
MW-02S-03	Northeast portion of tailings deposition area		Tailings
MW-02D-03			Tailings
MW-01A-03	Northeast portion of tailings deposition area		Bedrock
MW-01C-03			Overburden
MW-03S-03	Northeast portion of tailings deposition area		Tailings
MW-05-05	Central portion of the tailings deposition area		Tailings
MW-02-05	Southeast portion of tailings deposition area		Tailings
MW-03S-05	Southeast portion of tailings deposition area	Evaluate leachate impacts in the SCAZ and assess groundwater quality compliance at the southern Site boundary.	Tailings
MW-04S-05[2]	Southeast portion of tailings deposition area		Tailings
Off-Site Residential Wells			
1780 Airport Rd	West of the Site	Monitor groundwater quality at residential groundwater supply wells to the west of the Site.	Unknown
111 Emerald Rd			Unknown
110 Emerald Rd			Unknown
TSF Monitoring Well Network			
Tailings Leachate Source Zone Well			
MW-06-01[2]	Within the northern portion of the TSF	Evaluate groundwater quality in the SCAZ that is impacted by tailings but unaffected by Landfill leachate migration	Overburden/Tailings
Background Well			
MW-05-01	Approximately 200 m east of the earth dam	Characterize background groundwater quality in overburden.	Overburden
Tailings Deposition Area Wells			
MW99-2 (S)	Immediately northwest of the tailings deposition area	Characterize groundwater quality as it flows westward in the northern portion of the TSF.	Overburden/Bedrock
MW99-2 (D)	East of the tailings deposition area	Characterize groundwater quality in the deep bedrock flow zone	Bedrock
TSF Downgradient Wells			
MW-01-2004 (S)	Approximately 150 m south of the earth dam, downgradient of the TSF.	Characterize groundwater quality in the overburden and bedrock flow zones along the flow path from the TSF to the	Overburden
MW-01-2004 (D)			Bedrock
MW99-1 (S)			Overburden

Monitoring Well ID	Location	Purpose	Screened Stratigraphic Unit
MW99-1 (D)	Approximately 500 m south of the earth dam, downgradient of the TSF	property boundary. And assess Site groundwater quality compliance.	Bedrock
MW-02-2004(S)	Approximately 600 m south of the earth dam, downgradient of the TSF		Overburden
MW-02-2004 (D)			Bedrock

Notes:

[1] –S-MW-1 and MW-2A-01 are used to characterize background groundwater quality for both the Landfill and TSF monitoring programs.

[2] –S-MW-2, MW-04S-05, and MW-06-01 are included in both the Landfill and TSF monitoring programs.

To characterize Site groundwater quality, assess the extent and magnitude of potential impacts to groundwater, and evaluate groundwater quality trends, GHD completed the following:

– Compiled and tabulated groundwater quality data from 2019-2023 for the Site monitoring wells. The monitoring wells included in the Landfill EMP were sampled on an annual basis. Analytical results from the Landfill EMP wells are presented in Tables 3 through 7. The monitoring wells included in the TSF EMP were sampled annually from 2019 to 2021, and quarterly in 2022 and 2023, beginning in May 2022. Analytical results from the TSF EMP wells are presented in Table 8.
– Developed piper plots showing major ion chemistry to compare geochemical fingerprints between monitoring well locations and surface water locations (Appendix G).
– Reviewed historical concentration versus time plots for the Landfill (RDCK, 2023a) and TSF EMP (RDCK, 2023b) wells to evaluate long-term groundwater quality trends (Appendix H1 and H2).
– Developed concentration versus time plots for the leachate indicator parameters discussed in Section 6.1 to assess trends in groundwater quality over the last five years (2019-2023) (Appendix I).
– Developed concentration isopleth maps using groundwater quality data from May 2023 to illustrate the spatial distribution of leachate indicator parameters at the Site (Appendix J).
– Assessed the attenuation of selected leachate indicator parameters along the SCAZ flow path using concentration profile plots (Appendix K1 and Appendix K2)

The characterization of leachate and groundwater quality and assessment of leachate impacts is discussed for the Background, NCAZ, SCAZ, TSF Downgradient, and off-Site Residential wells in Sections 7.1, 7.2, 7.3, 7.4, and 7.5, respectively. Groundwater quality at each monitoring well is summarized in terms of concentrations of leachate indicator parameters relative to background groundwater as well as long-term and recent (2019-2023) groundwater quality trends.

A lines of evidence approach is used, taking into account groundwater flow paths, spatial distribution of indicator parameters, major ion geochemical patterns, and general groundwater quality to assess the potential presence and magnitude of leachate impacts to groundwater throughout the Site.

Piper Plots

Piper plots showing major ion chemistry of groundwater, seep, and surface water for the May 2023 monitoring event are presented in Appendix G. The piper plots provide means of comparing geochemical fingerprints between monitoring locations. The percentages of major cation and anion are plotted on trilinear (triangular) diagrams as percentages, which are then projected onto the central diamond plot. Geochemical patterns can be discerned by comparing the relative locations of samples on the plot. Locations that plot close to one another are characterized by similar major ion geochemistry.

For the purposes of this assessment, the piper plots have been employed as an additional line of evidence to support identification of areas where potential Landfill or TSF derived impacts to groundwater may be present. Based on

GHD's experience with similar MSW landfills, landfill leachate typically plots in the central portion of the central diamond on piper plots and fresh shallow groundwater typically plots in the left corner, although this may vary depending on Site-specific leachate and local background geochemical conditions.

Concentration Isopleth Maps

Concentration isopleth maps showing the spatial distribution of leachate indicator parameter concentrations in shallow groundwater at the Site are presented in Appendix J. The concentration isopleth maps provide a visual means to evaluate the extent of leachate impacts to groundwater at the Site. The concentration isopleth figures were developed using leachate indicator parameter concentrations from the May 2023 monitoring event.

7.1 Background Groundwater Quality

Background groundwater quality at the Site is characterized at Landfill background monitoring wells S-MW-1, MW-2A-01, MW-03A-01, and MW-07-01 as well as TSF background monitoring well MW-05-01. The locations of the background wells are presented on Figure 6.

The background monitoring well locations were established during the completion of the DSI (CRA, 2002) based on their upstream/upgradient locations relative to the Landfill and TSF. The background monitoring locations are used to characterize background groundwater within the overburden flow zones.

MW-03A-01 is located approximately 1 km from the seeps area upstream on Sheep Creek. MW-2A-01 is located across Sheep Creek immediately north of the seeps areas. S-MW-1 and MW-07-01 are located approximately 300 and 500 m uphill to the east of the Site along Emerald Mine Road. MW-05-01 is located immediately southeast of the tailings deposition area, uphill on the mountain side.

As presented in Table 4 and summarized in Table 7.2, below, concentrations of leachate indicator parameters in background groundwater are low, and several parameters are consistently below the analytical limit of detection. As noted in Table 4, concentrations of fluoride, iron, and lithium have been reported at concentrations above the applicable water quality criteria for the Site (refer to Section 10), indicating that these parameters are present in groundwater at elevated concentrations in the Site vicinity.

Table 7.2 2019-2023 Background Groundwater Concentration Ranges

Parameter (units)	MW-07-01	S-MW-1	MW-03A-01	MW-2A-01	MW-05-01	Overburden Background Groundwater Range[1]
Chloride (mg/L)	<0.50	<0.50 - 0.65	<0.50 - 0.5	3.93 - 12.6	<0.50	<0.50 – 12.6
Ammonia (as N) (mg/L)	<0.0050	<0.0050	0.0554 - 0.067	0.0051 - 0.0119	<0.0050 - 0.0095	<0.0050 - 0.067
Sulfate (mg/L)	11.0 - 12.4	11.3 - 12.5	8.35 - 9.35	7.47 - 15.9	9.06 - 13.6	7.47 - 15.9
TOC (mg/L)	0.55 - 0.78	<0.50 - 0.52	<0.50	<0.50 - 0.88	<0.50 - 0.69	<0.50 - 0.88
Iron (µg/L)	<10	<10	<10 - 114	700 - 863	<10 - 24	<10 - 863
Manganese (µg/L)	0.3 - 4.31	1.99 - 45.8	48.7 - 174	519 - 644	<0.10 - 9.51	<0.10 - 644
Arsenic (µg/L)	<0.10	0.13 - 0.19	8.47 - 9.72	2.59 - 3.38	0.37 - 0.92	<0.10 - 9.72
Zinc (µg/L)	1.2 - 2.7	<1.0 - 2.7	<1.0 - 1.3	<1.0 - 2.0	<1.0 - 4.0	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW-2A-01, MW-03A-01, and MW-05-01 (2019-2023)

The following observations are made based on the concentration of leachate indicator parameters in groundwater at the background wells. Long-term concentration trends were assessed based on the concentration versus time plots in Appendix H1 and H2. Concentration trends from 2019-2023 were assessed based on the concentration versus time plots presented in Appendix I (Figures I-3 and I-4).

Background Groundwater Quality Summary

MW-07-01

MW-07-01 is located uphill, to the east of the Landfill and is screened within sand, silt, and clay at an interval of approximately 2.29 to 5.33 m BGS. Concentrations of leachate indicator parameters at MW-07-01 are low and stable over the long term. Concentrations of chloride, ammonia, iron, and arsenic were generally close-to or below the analytical limit of detection in all samples.

S-MW-1

S-MW-1 is located uphill, to the east of Cell 1 and is screened within gravely sand, sand, and gravel at an interval of approximately 1.25 to 4.25 m BGS. Where detected, concentrations of all leachate indicator parameters at S-MW-1 are low and stable over the long term. Concentrations of chloride, ammonia, TOC, iron, and zinc are generally close-to or below the analytical limit of detection.

MW-2A-01

MW2A-01 is located to the north of the Site, north of Sheep Creek, and is screened within sand and gravel at an interval of approximately 5.3 to 8.4 m BGS. Concentrations of leachate indicator parameters at MW-02A-01 show the most long-term variability of the background wells. Chloride, iron, and manganese concentrations at MW-2A-01 are the highest of the background wells, at concentrations of 3.93 - 12.6 mg/L, 700 – 863 µg/L, and 519 – 644 µg/L respectively between 2019-2023.

MW-03A-01

MW3A-01 is located to the northeast of the Site, north of Sheep Creek, and is screened within silt and gravel at an interval of approximately 12.04 to 15.09 m BGS. Concentrations of all leachate indicator parameters at MW-03A-01 are low and stable over the long term. Concentrations of chloride, TOC, iron, and zinc are generally close-to or below the analytical limit of detection. Ammonia and arsenic concentrations at MW-03-01 are the highest of the background wells and ranged from 0.0554 - 0.067 mg/L and 8.47 - 9.72 µg/L respectively between 2019-2023.

MW-05-01

MW-05-01 is located to the southeast of the tailings deposition area and is screened within units of sand and silty clay at an interval of approximately 1.07 to 4.11 m BGS. Concentrations of all leachate indicator parameters at MW-05-01 are low and stable over the long term. Concentrations of chloride, ammonia, TOC, dissolved iron, and zinc are generally close-to or below the analytical limit of detection.

Major Ion Chemistry

As shown on the piper plot (Appendix G, Figure G-1), the background wells plot in the left corner and in the lower left quadrant of the central diamond, indicating variability in major ion chemistry at the background wells. S-MW-1 and MW-07-01 plot in the left corner of the central diamond, indicating that major-ion geochemistry at these locations is dominated by magnesium and bicarbonate and is classified as a magnesium bicarbonate type water. This is consistent with expected groundwater chemistry for a monitoring location upgradient of the Landfill which is not impacted by leachate or Landfill operations.

MW-2A-01 and MW-03A-01 plot down and to the right, indicating higher proportions of sodium/potassium compared to the other two background wells. MW-2A-01 and MW-03A-01 are located to the north of Sheep Creek along Sheep

Creek Road. Increased sodium concentrations at these wells May be related to road salt usage. Water here is classified as a mixed type or a sodium bicarbonate type water.

Background wells are located upgradient and are not impacted by the Landfill or Landfill operations and thus provide a point of reference that other major ion chemistry can be compared against.

Background Groundwater Quality Discussion

Concentrations of leachate indicator parameters at the background wells are generally low and stable, with concentrations of chloride, ammonia, TOC, iron, arsenic, and zinc generally close-to or below the analytical limit of detection at most of the background wells between 2019-2023.

Some variation in groundwater quality exists between the background wells, including higher chloride, iron, and manganese concentrations at MW-02A-01 and higher arsenic concentrations at MW-03A-01. These variations reflect the local-scale variability in groundwater quality in the area surrounding the Site, and between groundwater quality in the overburden flow zones.

For the purposes of this report, groundwater quality data from all five Site overburden background wells (S-MW-1, MW-07-01, MW-2A-01, MW-03A-01, and MW-05-01) is used to characterize background groundwater quality in the overburden. No background monitoring wells are available at the Site to characterize groundwater quality in bedrock.

7.2 NCAZ

Groundwater quality in the NCAZ is characterized by samples collected at wells MW99-7D, MW-09-02S/D, 81-1, 81-3, 81-4, and 0200611. The NCAZ wells are all screened within the overburden and are located hydraulically downgradient, to the north of the Landfill, along the flow path toward Sheep Creek. The locations of the NCAZ wells are presented on Figure 6.

NCAZ Groundwater Quality Summary

Groundwater analytical results for the NCAZ wells are presented in Table 5. Tables 7.3 and 7.4 provide a summary of the concentrations of leachate indicator parameters at the NCAZ wells between 2019-2023 compared to median leachate concentrations at LW-03-01 and background groundwater at the overburden background wells.

Table 7.3 2019-2023 NCAZ Groundwater Concentration Ranges (81-1, 81-3, 81-4, MW99-7D)

Parameter	Median Leachate (LW-03-01)	81-1	81-3	81-4	MW99-7D	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1 mg/L	63.9 - 109	13.8 - 31	2.79 - 10.7	57.7 - 94.6	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53 mg/L	<0.0050 - 0.012	<0.0050	<0.0050 - 0.036	6.35 - 8.29	<0.0050 - 0.067
Sulfate (mg/L)	2.4 mg/L	4.5 - 5.45	27.9 - 40.7	3.46 - 4.25	<1.50 - 2.41	7.47 - 15.9
TOC (mg/L)	3.5 mg/L	1.39 - 1.9	0.78 - 1.51	1.2 - 2.08	14.9 - 18.1	<0.50 - 0.88
Iron (µg/L)	76,800 µg/L	615 – 4,750	<10	<10 - 72	48,600 - 60,600	<10 - 863
Manganese (µg/L)	3,040 µg/L	5750 – 8,640	0.59 - 4.5	5.21 - 312	897 – 1,350	<0.10 - 644
Arsenic (µg/L)	34.4 µg/L	1.06 - 4.55	0.33 - 0.44	<0.10 - 0.67	195 - 238	<0.10 - 9.72
Zinc (µg/L)	9.3 µg/L	2.7 - 17.4	<1.0 - 3.4	3.8 - 10	5.4 - 30.1	<1.0 - 4.0
Notes: mg/L – milligrams per litre						

Parameter	Median Leachate (LW-03-01)	81-1	81-3	81-4	MW99-7D	Overburden Background Groundwater Range[1]
µg/L – micrograms per litre [1] - Range of concentrations at S-MW-1, MW-07-01, MW-2A-01, MW-03A-01, and MW-05-01 (2019-2023)						

Table 7.4 2019-2023 NCAZ Groundwater Concentration Ranges (0200611, MW-09-02S, MW-09-02D)

Parameter	Median Leachate (LW-03-01)	0200611	MW-09-02S	MW-09-02D	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1 mg/L	69.3 - 125	16.2 - 39.9	71.2 - 86.3	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53 mg/L	<0.0050	<0.0050	0.0264 - 0.0793	<0.0050 - 0.067
Sulfate (mg/L)	2.4 mg/L	9.76 - 25	8.42 - 27.3	41 - 47.2	7.47 - 15.9
TOC (mg/L)	3.5 mg/L	<0.50 - 0.63	0.58 - 0.86	3.28 - 5.16	<0.50 - 0.88
Iron (µg/L)	76,800 µg/L	<10 - 21	<10	487 - 1110	<10 - 863
Manganese (µg/L)	3,040 µg/L	1.32 - 7.16	1.05 - 5	452 - 572	<0.10 - 644
Arsenic (µg/L)	34.4 µg/L	0.21 - 0.25	0.11 - 0.14	3.63 - 4.05	<0.10 - 9.72
Zinc (µg/L)	9.3 µg/L	3.5 - 7.3	3.3 - 5.2	1.3 - 5.3	<1.0 - 4.0
Notes: mg/L – milligrams per litre µg/L – micrograms per litre [1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)					

The following observations are made based on a comparison of groundwater quality at the NCAZ wells compared to background groundwater and leachate. Long-term concentration trends were assessed based on the concentration versus time plots in Appendix H1. The NCAZ wells are referred to as the Northern Boundary Wells in Appendix H1. Concentration trends from 2019-2023 were assessed based on the concentration versus time plots presented in Appendix I (Figures I-5 and I-6). Major ion geochemistry was assessed based on the piper plot presented in Appendix G (Figure G-1). Spatial variation of leachate indicator parameter concentrations in shallow groundwater was assessed based on the concentration isopleth maps presented in Appendix J.

81-1

Monitoring well 81-1 is located to the north of Cell 1 and is screened mostly in sand and silty sand at an interval of approximately 1.5 to 15 m BGS. Groundwater quality at 81-1 is characterized by elevated concentrations of chloride, iron, and manganese compared to background groundwater and the other NCAZ wells. Chloride concentrations at 81-1 ranged from 63.9 – 109 mg/L between 2019-2023, which is above the maximum chloride concentration in Landfill leachate at LW-03-01. Concentrations of ammonia, sulfate, TOC, and arsenic at 81-1 were generally close-to or within the background groundwater range between 2019-2023.

Manganese concentrations at 81-1 have shown a consistent increasing trend since 2006 and have continued to increase while concentrations at the other NCAZ wells have remained stable. Iron concentrations also show long-term increasing trends at 81-1 but are not the highest in the NCAZ. Chloride concentrations at 81-1 show a long-term decreasing trend since 2006 but increased between 2020 and 2023. From 2019-2023, chloride and manganese concentrations show possible increasing trends, while zinc concentrations appear to be decreasing.

81-3

Monitoring well 81-3 is located to the north of Cell 1 and is screened within fine to coarse sand at an interval of approximately 2 to 6 m BGS. Groundwater quality at 81-3 is characterized by low concentrations of leachate indicator parameters, most of which are comparable to background groundwater. Ammonia, manganese, iron, arsenic, and zinc concentrations at 81-3 were within the range for background groundwater or below the analytical limit of detection between 2019-2023. Chloride and sulfate concentrations were above the background range, while TOC concentrations were comparable to background groundwater but slightly above the background range.

Concentrations of leachate indicator parameters at 81-3 have generally been stable over the long term, with no apparent increasing trends between 2019-2023. Concentrations of sulfate have followed a decreasing trend between 2019-2023.

81-4

Monitoring well 81-4 is located northwest of Cell 1 and is screened within fine to coarse sand and gravel at an interval of approximately 5.5 to 11.5 m BGS. Groundwater quality at 81-4 is characterized by low concentrations of leachate indicator parameters. Concentrations of chloride, ammonia, sulfate, iron, manganese, and arsenic were within the range for background groundwater between 2019-2023.

Concentrations of leachate indicator parameters at 81-4 have generally been stable over the long term, with no apparent increasing trends between 2019-2023.

0200611

Monitoring well 0200611 is located northwest of Cell 1 and is screened within the overburden. Groundwater quality at 0200611 is characterized by elevated concentrations of chloride compared to background groundwater. Chloride concentrations at 0200611 were generally among the highest of the NCAZ wells between 2019-2023 and have shown an increasing trend since 2017. Concentrations of ammonia, TOC, iron, manganese, and arsenic were within the background groundwater range or below the analytical limit of detection between 2019-2023, while sulfate and zinc were elevated compared to background but relatively low compared to the other NCAZ wells.

MW-09-02S/D

Nested well pair MW-09-02S/D is located northeast of Cell 1 and are the farthest downgradient wells within the NCAZ. Both wells are screened within sand and gravel at intervals of approximately 11.3 to 12.8 and 22.5 to 25.3 m BGS respectively. MW-09-02S is screened above the clay unit in the NCAZ while MW-09-02D is screened below.

Groundwater quality varies between the two wells, with higher concentrations of chloride, sulfate, iron, and manganese at the deeper well compared to the shallower well. Concentrations of leachate indicator parameters at MW-09-02D are generally among the highest of the NCAZ wells, while concentrations at MW-09-02S are generally among the lowest.

Chloride and iron concentrations show a long-term increasing trend since 2010 at MW-09-02D and continued to increase between 2019-2023. Concentrations of the other leachate indicator parameters appear to be generally stable at both wells.

MW99-7D

MW99-7D is located northwest of Cell 1 and is screened within silty gravel at an interval of approximately 18.75 to 20.25 m BGS. As shown on cross-section B-B' in Appendix E1, MW99-7D is screened below the clay unit present in the NCAZ. Groundwater quality at MW-99-07 is characterized by elevated concentrations of chloride, ammonia, TOC, iron, manganese, arsenic, and zinc compared to background groundwater and the other NCAZ wells.

Concentrations of ammonia and iron at MW-99-07D are by far the highest of the NCAZ wells. Ammonia, iron, and chloride concentrations spiked in concentration in 2008, and have generally remained elevated compared to the other NCAZ wells since then. Ammonia concentrations at MW99-7D increased slightly between 2019-2023 but remain within the historical range. Iron and chloride concentrations do not show clear increasing or decreasing trends

between 2019-2023. Sulfate concentrations were below the analytical limit of detection in four of the five monitoring events between 2019-2023.

Major Ion Chemistry

As shown on the piper plot (Appendix G, Figure G-1), the NCAZ wells plot between the left corner and the top of the central diamond in between background groundwater in the left corner and leachate at LW-03-01. Groundwater at 0200611, MW-09-02S, 81-1, and MW-09-02D plots away from background groundwater toward the top of the central diamond, indicating higher proportions of chloride. The elevated chloride percentage in groundwater at 0200611, MW-09-02S, 81-1, and MW-09-02D is a strong indication of water quality alteration due to Landfill leachate impacts.

Due to low (below the analytical limit of detection) concentrations of sulfate, MW-99-7D plots close to the left corner of the central diamond despite having relatively high concentrations of leachate indicator parameters as discussed above.

81-3 and 81-4 plot in the left corner of the diamond plot close to the background wells, indicating similar major ion chemistry and minimal water quality alteration. This characterization is consistent with the low concentrations of leachate indicator parameters reported in groundwater at these wells.

Spatial Variance

As shown on the concentration isopleth maps (Appendix J), concentrations of chloride, TOC, iron, arsenic, and manganese (at 81-1) are elevated in the NCAZ compared to background groundwater quality. Chloride concentrations are elevated throughout the NCAZ, while the other parameters are elevated to the north west of the Landfill.

Leachate indicator parameter concentrations are generally highest at MW99-7D, MW-09-02D, and 0200611, which are located downgradient of Cell 1 to the northwest. Elevated concentrations of chloride, iron, and manganese are also apparent at 81-1, which is located to the northeast of Cell 1, while concentrations of all leachate indicator parameters are low at 81-3. The chloride concentration isopleth (Figure J-1) matches the expected pattern for a leachate plume flowing north of the Landfill. The spatial distribution of chloride concentrations roughly demonstrates the extent of the Landfill leachate plume migrating through the NCAZ.

Leachate Impacts

Based on the concentrations of leachate indicator parameters a the NCAZ wells, leachate impacts are greatest at monitoring wells 81-1, 0200611, and MW-99-07S/D. These four wells are screened within the deeper overburden, with MW-09-02D and MW-99-07D screened below the clay unit. This indicates that leachate migration in the NCAZ is occurring in the deeper portion of the overburden flow zone. The increasing chloride and iron concentrations at MW-09-02D indicate that the plume of leachate impacted groundwater is continuing to migrate downgradient from the Landfill. Based on the available groundwater quality data, groundwater quality in the NCAZ does not appear to have improved since the closure of the Landfill and capping of the landfill cells in 2014 – 2016.

At MW99-7D, the elevated concentrations of ammonia, iron, and manganese and the low (generally non-detect) concentrations of sulfate, indicate that reducing conditions are present in groundwater. MW99-7D is screened below the clay unit, which likely prevents the downward flow of oxygenated groundwater. The reducing conditions within the deeper overburden flow zone promote the migration of redox sensitive species such as metals, ammonia, and sulfide.

Monitoring wells 81-3, 81-4, and MW-09-02S show little to no evidence of leachate impacts, with concentrations of most leachate indicator parameters within the background groundwater range. These three wells are screened within the shallow overburden, with MW-09-02S screened above the clay unit. Leachate impacts to groundwater in the shallow overburden are minimal, and the clay unit acts as an effective confining unit, preventing the upward flow of leachate impacted groundwater.

7.3 SCAZ

Groundwater quality in the SCAZ is characterized by samples collected at wells E207637, S-MW-2, MW99-3S, MW99-6S, MW99-8, MW-02S-03, MW-02D-03, MW-01C-03, MW-03S-03, MW-02-05, MW-03S-05, MW-04S-05, MW-05-05, MW99-3D, and MW-01A-03. The SCAZ wells are located hydraulically downgradient to the west-southwest of the Landfill along the flow path through the tailings deposition area toward the earth dam. Several of the SCAZ wells are located within the TSF and are screened in tailings. The locations of the SCAZ wells are presented on Figure 6.

Analytical results from the SCAZ wells were used to characterize groundwater quality downgradient of the Landfill along the southern flow path and to assess the extent and magnitude of Landfill and tailings leachate impacts. The monitoring wells are organized in this section based on their position along the groundwater flow path from the Landfill footprint, downgradient through the tailings deposition area.

SCAZ Groundwater Quality Summary

Groundwater analytical results for the NCAZ wells are presented in Table 5. Tables 7.5 through 7.8, below, provide a summary of the concentrations of leachate indicator parameters at the SCAZ wells between 2019-2023 compared to median leachate concentrations at LW-03-01 and MW-06-01, and the concentration ranges for the overburden background wells.

Table 7.5 2019-2023 SCAZ Groundwater Concentration Ranges (MW99-6S, MW99-8, MW99-3S, MW99-3D, E207637)

Parameter	Median Leachate (LW-03-01)	Tailings Source (MW-06-01)	MW99-6S (Landfill Buffer)	MW99-8 (Landfill Buffer)	MW99-3S (Landfill Buffer)	MW99-3D (Landfill Buffer)	E207637 (Landfill Buffer)	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1	< 10	<2.50	37.2 - 77.3	121 - 179	<0.50 - 1.32	34.8 - 45.1	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53	0.63	<0.0050	2.42 - 3.42	0.398 - 1.86	<0.0050 - 0.0346	22.2 - 25.2	<0.0050 - 0.067
Sulfate (mg/L)	2.4	1,570	219 - 257	4.3 - 8.98	9.21 - 22.4	35.4 - 38.8	<1.50 - <3.00	7.47 - 15.9
TOC (mg/L)	3.5	6.9	0.55 - 0.98	15.3 - 20.9	23 - 32.8	<0.50 - 0.97	32.2 - 35.3	<0.50 - 0.88
Iron (µg/L)	76,800	21,400	<10	<20 - 169,000	23,300 - 68,200	<10	109,000 - 121,000	<10 - 863
Manganese (µg/L)	3,040	1,020	10.4 - 18.8	8,640 - 12,400	11,700 - 22,900	1.21 - 23.8	3,140 - 4,060	<0.10 - 644
Arsenic (µg/L)	34.4	2.3	0.42 - 0.52	0.65 - 39.6	66.9 - 112	2.77 - 5.18	52 - 79	<0.10 - 9.72
Zinc (µg/L)	9.3	9,150	1.5 - 2.9	<2.0 - 4.6	<5.0 - 7.6	<1.0 - 4.1	2.5 - 20	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

Table 7.6 *2019-2023 SCAZ Groundwater Concentration Ranges (S-MW-2, MW-06-01, MW-02-03, MW-02-03, MW-01A-03)*

Parameter	Median Leachate (LW-03-01)	Tailings Source (MW-06-01)	S-MW-2 (Landfill Buffer)	MW-06-01[2] (Tailings)	MW-02S-03 (Tailings)	MW-02D-03 (Tailings)	MW-01A-03* (Tailings)	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1	< 10	4.84 - 8.52	10.1 - <10.0	17.2 - 26.1	29.2 - 32.7	1 - 1.07	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53	0.63	<0.0050 - 0.0085	0.449 - 4.33	0.0371 - 0.362	0.374 - 0.836	<0.0050	<0.0050 - 0.067
Sulfate (mg/L)	2.4	1,570	40.1 - 53.4	1220 - 1690	198 - 1260	1.9 - 52.4	66.1 - 69.7	7.47 - 15.9
TOC (mg/L)	3.5	6.9	7.32 - 9.49	5.75 - 21.6	2.29 - 3.09	3.62 - 4.79	<0.50 - 0.51	<0.50 - 0.88
Iron (µg/L)	76,800	21,400	<10 - 16	<20 - 33400	3,700 - 11,800	19,500 - 31,900	<10	<10 - 863
Manganese (µg/L)	3,040	1,020	2.36 - 86.9	752 - 1130	515 - 1,300	855 - 1,620	0.7 - 1.61	<0.10 - 644
Arsenic (µg/L)	34.4	2.3	0.76 - 1.01	1.63 - 4.91	3.95 - 6.07	13.6 - 18.2	1.9 - 2.21	<0.10 - 9.72
Zinc (µg/L)	9.3	9,150	4.1 - 9.9	407 - 12,500	2,560 - 15,200	3.4 - 40.1	1.0 - 1.8	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)
[2] – MW-06-01 is also discussed in Section 6

Table 7.7 2019-2023 SCAZ Groundwater Concentration Ranges (MW-01C-03, MW-03S-03, MW-05-05, MW-02-05)

Parameter	Median Leachate (LW-03-01)	Tailings Source (MW-06-01)	MW-01C-03 (Tailings)	MW-03S-03 (Tailings)	MW-05-05 (Tailings)	MW-02-05 (Tailings)	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1	< 10	6.54 - 18.9	11.2 - 23.7	2.51 - 3.35	3.03 - 3.73	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53	0.63	0.124 - 0.138	0.112 - 0.861	1.99 - 2.13	1.49 - 1.67	<0.0050 - 0.067
Sulfate (mg/L)	2.4	1,570	73.6 - 245	132 - 451	87.2 - 101	<0.30 - 1.66	7.47 - 15.9
TOC (mg/L)	3.5	6.9	3.49 - 6.08	1.92 - 2.9	3.87 - 5.07	3.57 - 6.19	<0.50 - 0.88
Iron (µg/L)	76,800	21,400	83 - 373	180 - 1,210	46 - 59	12 - 29	<10 - 863
Manganese (µg/L)	3,040	1,020	3,100 - 5,460	12.5 - 1,800	11.8 - 15.4	19.2 - 21.2	<0.10 - 644
Arsenic (µg/L)	34.4	2.3	0.97 - 1.4	0.84 - 2.4	3.09 - 4.22	5.25 - 9.44	<0.10 - 9.72

Parameter	Median Leachate (LW-03-01)	Tailings Source (MW-06-01)	MW-01C-03 (Tailings)	MW-03S-03 (Tailings)	MW-05-05 (Tailings)	MW-02-05 (Tailings)	Overburden Background Groundwater Range[1]
Zinc (µg/L)	9.3	9,150	2.3 - 8.5	2.1 - 4.1	<1.0 - 2.4	1 - 2	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

Table 7.8 2019-2023 SCAZ Groundwater Concentration Ranges (MW-03S-05, MW-04S-05, MW99-2S)

Parameter	Median Leachate (LW-03-01)	Tailings Source (MW-06-01)	MW-03S-05 (Tailings)	MW-04S-05 (Tailings)	MW99-2S (Tailings)	MW99-2D* (Tailings)	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1	< 10	<0.50 - 3.4	3.03 - 9.53	<2.50 - 2.53	<0.50	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53	0.63	0.843 - 3.49	0.0872 - 0.316	0.035 - 0.0734	<0.0050 - 0.0374	<0.0050 - 0.067
Sulfate (mg/L)	2.4	1,570	<0.30 - 2.58	8.74 - 25.2	113 - 226	65 - 73.5	7.47 - 15.9
TOC (mg/L)	3.5	6.9	2.05 - 10.3	1.36 - 1.81	2.52 - 2.73	<0.50 - 0.8	<0.50 - 0.88
Iron (µg/L)	76,800	21,400	<10 - 877	178 - 2,260	3,010 - 5,460	<10 - 832	<10 - 863
Manganese (µg/L)	3,040	1,020	112 - 649	662 - 2,340	2,060 - 4,330	3.6 - 182	<0.10 - 644
Arsenic (µg/L)	34.4	2.3	11.9 - 73.5	0.72 - 4.57	6.31 - 8.5	<0.10 - 0.32	<0.10 - 9.72
Zinc (µg/L)	9.3	9,150	<1.0 - 2.7	1.9 - 12.6	4.1 - 16.6	<1.0 - 3.7	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

The following observations are made based on a comparison of groundwater quality at the SCAZ wells compared to background groundwater and leachate (Landfill and Tailings Leachate). Long-term concentration trends were assessed based on the concentration versus time plots in Appendices H1 and H2. The SCAZ wells are referred to as the Western Boundary Wells in Appendix H1. Concentration trends from 2019-2023 were assessed based on the concentration versus time plots presented in Appendix I (Figures I-7 through I-10). Major ion geochemistry was assessed based on the piper plot presented in Appendix G (Figure G-1). Spatial variation of leachate indicator parameter concentrations in shallow groundwater was assessed based on the concentration isopleth maps presented in Appendix J.

MW99-8

Monitoring well MW99-8 is located at the southwest corner of Cell 1 and is screened within sand and gravel at an interval of approximately 4.7 to 6.2 m BGS. MW99-8 is located directly downgradient of Cell 1 and is upgradient of the Septage Treatment Facility and TSF.

Groundwater quality at MW99-8 is characterized by elevated concentrations of all leachate indicator parameters except for sulfate and zinc. Concentrations of chloride, iron, and manganese at MW99-8 have been among the highest of the SCAZ wells.

Iron concentrations show a long-term increasing trend at MW99-8, while manganese concentrations show a long-term decreasing trend. Chloride concentrations decreased between 2020 and 2021, while all other leachate indicator parameters appear to be stable between 2019-2023.

MW99-3S/D

Nested monitoring well pair MW99-3S and MW99-3D is located to the southwest of Cell 1 and north of Cell 2 and is screened within silty sand overburden and bedrock at intervals of approximately 8.00 to 9.50 and 11.00 to 14.00 m BGS respectively. This well pair is located downgradient of the landfill and upgradient of the Septage Treatment Facility and TSF.

Groundwater quality at MW99-3S is characterized by elevated concentrations of all leachate indicator parameters except for sulfate, ammonia, and zinc. Concentrations of chloride and manganese at MW99-3S have consistently been the highest of the SCAZ wells. Iron and manganese concentrations show long-term increasing trends at MW99-3S, while chloride concentrations have historically been highly variable. Chloride concentrations show an increasing trend between 2017 and 2021 but decreased in 2022 and 2023.

Groundwater quality at MW99-3D is characterized by low concentrations of all leachate indicator parameters except for sulfate. Chloride, ammonia, TOC, iron, and zinc at MW99-3D were consistently close-to, or below the analytical limit of detection between 2019-2023. With the exception of sulfate, concentrations of all leachate indicator parameters have consistently been low and stable at MW99-3D. Sulfate has been consistent but somewhat elevated.

MW99-6S

Monitoring well MW99-6S is located west of Cell 1 cross-gradient of the Septage Treatment Facility and is screened within sand and gravel at an interval of approximately 14.8 to 17.8 m BGS.

Groundwater quality at MW99-6S is characterized by elevated concentrations of sulfate and low concentrations of all other leachate indicator parameters. Sulfate concentrations ranged between 219 to 257 mg/L, while chloride, ammonia, and iron concentrations were below the analytical limit of detection during all monitoring events between 2019-2025.

Sulfate concentrations show a long-term increasing trend at MW99-6S, with a spike in concentration between 2015-2019, but do not show a clear increasing or decreasing trend between 2019-2023.

E207637

Monitoring well E207637 is located to the west of Cell 2. The depth and screened lithology of E207637 are unknown. Groundwater quality at monitoring well E207637 represents groundwater quality downgradient of Cells 1 and 2.

Groundwater quality at E207637 is characterized by elevated concentrations of all leachate indicator parameters except for sulfate, which was below the analytical limit of detection during all monitoring events between 2019 and 2023. Ammonia concentrations at E207637 ranged from 22.2 to 25.2 mg/L between 2019-2023, which were by far the highest of the SCAZ wells.

Chloride and manganese show long-term decreasing trends at E207637. Between 2019-2023, concentrations of all leachate indicator parameters were generally stable with the exception of zinc, which varied considerably between monitoring events.

S-MW-2

Monitoring well S-MW-2 is located immediately to the west of Cell 2 and is screened within gravely sand and gravely, silty sand at an interval of approximately 6.05 to 9.10 m BGS. S-MW-2 represents groundwater quality directly downgradient of Cell 2.

Groundwater quality at S-MW-2 is characterized by low concentrations of most leachate indicator parameters except for TOC. Concentrations of nitrate are also elevated at S-MW-2 compared to the other SCAZ wells. Nitrate concentrations at S-MW-2 ranged from 4.23 to 6.99 mg/L between 2019-2023, while the other SCAZ wells were generally less than 0.1 mg/L and were often below the analytical limit of detection. Chloride, iron, manganese, and arsenic concentrations at S-MW-2 are low compared to the other SCAZ wells, and within the range for background groundwater. Ammonia concentrations are close-to or below the analytical limit of detection.

Chloride and manganese concentrations at S-MW-2 show long-term decreasing trends, while sulfate has increased over time. Between 2019-2023, concentrations of all leachate indicator parameters were stable.

MW-02S-03 / MW-02D-03

Nested monitoring well pair MW-02S-03 and MW-02D-03 is located at the northeastern boundary of the tailings deposition area and are screened within the tailings at intervals of approximately 1.37 to 4.42 and 8.69 to 11.73 m BGS respectively.

Groundwater quality at MW-02S-03 is characterized by elevated concentrations of leachate concentrations compared to background groundwater. Concentrations of zinc at MW-02S-03 ranged from 2.56 to 15.2 mg/L between 2019-2023, which are the highest zinc concentrations reported at the Site during that time period and are similar to MW-06-01. Concentrations of sulfate are also elevated compared to the other SCAZ wells and show considerable variability, ranging from 198 to 1,260 mg/L between 2019-2023.

Groundwater quality at MW-02D-03 is similar to MW-02S-03, but with higher concentrations of chloride, TOC, iron, manganese, and arsenic, and lower concentrations of sulfate and zinc.

Concentrations of chloride show a long-term decreasing trend at both wells and a decreasing trend between 2019-2023. Sulfate concentrations at MW-02S-03 showed an increasing trend between 2019-2023.

MW-01C-03 / MW-01A-03

Nested monitoring well pair MW-01C-03 and MW-01A-03 is located in the northeastern portion of the tailings deposition area. MW-01C-03 is screened within tailings at an interval of approximately 8.96 to 11.73. MW-01A-03 is screened in bedrock at an interval of approximately 19.81 to 22.86 m BGS.

Groundwater quality at MW-01C-03 is characterized by concentrations of leachate indicator parameters that are elevated compared to background groundwater but relatively low compared to the other SCAZ wells. Chloride concentrations show a long-term decreasing trend at MW-01C-03 and continued to decrease between 2019-2023.

Groundwater quality at MW-01A-03 is characterized by concentrations of leachate indicator parameters that are low and generally comparable to background groundwater. Concentrations of TOC, ammonia, and iron were close to or below the analytical reporting limit during all monitoring events between 2019-2023. Concentrations of chloride, sulfate, arsenic, manganese, and zinc were within the range for background groundwater between 2019-2023.

MW-03S-03

Monitoring well MW-03S-03 is located in the northeastern portion of the tailings deposition area and is screened within tailings at an interval of approximately 9.24 to 15.34 m BGS.

Groundwater quality at MW-03S-03 is characterized by moderate to low concentrations of chloride, ammonia, TOC, iron, manganese, arsenic, and zinc, which are generally close to the range for background groundwater, and elevated concentrations of sulfate compared to the other SCAZ wells.

Chloride concentrations at MW-03S-03 show a long-term increasing trend from 2006-2023.

MW-05-05

Monitoring well MW-05-05 is located in the central portion of the tailings deposition area and is screened within tailings at an interval of approximately 9.14 to 15.24 m BGS.

Groundwater quality at MW-05-05 is characterized by low concentrations of chloride, iron, manganese, arsenic, and zinc, which are within the range for background groundwater. Ammonia, sulfate, and TOC concentrations are elevated compared to background, and are among the highest of the SCAZ wells.

Concentrations of leachate indicator parameters have at MW-05-05 have generally been stable over the long-term and remained stable between 2019-2023.

MW-02-05

Monitoring well MW-02-05 is located in the central portion of the tailings deposition area and is screened within tailings at an interval of approximately 9.14 to 15.24 m BGS.

Groundwater quality at MW-02-05 is characterized by low concentrations of chloride, iron, sulfate, manganese, arsenic, and zinc, which are within the range for background groundwater. Ammonia and TOC concentrations are elevated compared to background, with ammonia and TOC concentrations among the highest of the SCAZ wells.

Ammonia and manganese show long-term decreasing trends at MW-02-05 and were generally stable between 2019-2023.

MW99-2S / MW99-2D

Nested monitoring well pair MW99-2S and MW99-2D is located in the northwestern portion of the tailings deposition area. MW99-2S is screened within tailings and shallow bedrock at an interval of approximately 2.30 to 3.90 m BGS. MW99-2D is screened within phyllite bedrock at an interval of approximately 20.5 to 23.5 m BGS.

MW99-2S and MW99-3D are included in the TSF monitoring program. Because they are not located within the TSF downgradient or the SCAZ flow paths, they are discussed in this section with the SCAZ wells.

Groundwater quality at MW99-2S is characterized by low concentrations of chloride, ammonia, and TOC compared to background groundwater and other SCAZ wells. Concentrations of iron, manganese, arsenic, and zinc are elevated compared to background groundwater. Iron, manganese, and zinc concentrations are among the highest of the wells in the tailings deposition area.

Concentrations of most leachate indicator parameters at MW99-2D are low and stable over the long term. Concentrations of chloride, ammonia, and arsenic are generally close-to or below the analytical limit of detection. Sulfate concentrations at MW-99-2D are significantly higher than at the overburden background wells, at concentrations of 65 - 73.5 mg/L compared to a range of 7.47 - 15.9 µg/L at the overburden background wells between 2019-2023. Iron concentrations at MW99-2D show considerable variation between monitoring events, ranging from 832 µg/L to less than the analytical limit of detection.

There do not appear to be any significant trends in leachate indicator parameter concentrations at MW99-2S or MW99-2D except for slight increasing trends for arsenic and manganese at MW99-2S from 2022-2023.

MW-03S-05

Monitoring well MW-03S-05 is located at the southern end of the of the tailings deposition area and is screened within tailings at an interval of approximately 12.19 to 18.29 m BGS.

Groundwater quality at MW-03S-05 is characterized by low concentrations of chloride, sulfate, iron, manganese, and zinc that are within the range for background groundwater. Concentrations of ammonia, arsenic, and TOC are elevated compared to background groundwater, with ammonia, arsenic, and TOC concentrations among the highest of the SCAZ wells.

Ammonia concentrations at MW-03S-05 show a long-term increasing trend, with a spike in concentration between 2016 and 2017. Between 2019-2023, ammonia concentrations decreased while arsenic concentrations increased. Sulfate, iron, and manganese concentrations show a long-term decreasing trend.

MW-04S-05

Monitoring well MW-04S-05 is located at the southern end of the of the tailings deposition area and is screened within tailings at an interval of approximately 11.89 to 17.98 m BGS.

Groundwater quality at MW-04S-05 is characterized by concentrations of chloride, sulfate, TOC, ammonia, and arsenic that are generally within the range for background groundwater, and concentrations of iron, manganese, and zinc that are elevated compared to background groundwater but low relative to the other SCAZ wells.

Concentrations of leachate indicator parameters at MW-04-03 have generally been stable over the long-term and continued to be stable between 2019-2023.

Major Ion Chemistry

As shown on the piper plot in Appendix G (Figure G-1), the SCAZ wells generally plot along the left side of the central diamond, with some wells plotting toward the top and others toward the bottom. The SCAZ wells are interpreted to fall into three general groups on the central diamond:

S-MW-2, MW-99-3D, MW-4S-05, MW-1C-03, and MW-02D-03 plot in the left corner of the central diamond close to background groundwater. These wells are located outside of the SCAZ flow path or are screened in bedrock or the deep overburden. As discussed above, these wells are also generally characterized by relatively low concentrations of leachate indicator parameters. The major ion chemistry of groundwater at these wells indicates little to no impacts from leachate migration.

MW-02S-03, MW99-2S, MW-99-6S, MW-05-05, and MW-03S-03 plot in positions shifted toward the top of the central diamond closer to leachate at LW-03-01. MW-05-05, MW-03S-03 are located along the SCAZ flow path and are screened in tailings. MW99-2S is located at the western edge of the TSF and is screened in tailings. As discussed above, groundwater quality at these wells is generally characterized by elevated concentrations of leachate indicator parameters. The position of these wells on the plot is an indication of water quality alteration due to leachate migration. Based on the locations of these wells at the Site, water quality alteration May be due to leachate from the Landfill, tailings, or septage.

207637, MW-01A-03, MW-99-3S, MW-99-8, MW-02-05, and MW-03S-05 toward the bottom of the central diamond. These wells are located along the SCAZ flow path and are screened in shallow overburden, tailings, and bedrock (MW-01A-03). With the exception of MW-01A-03, groundwater quality at these wells is generally characterized by elevated concentrations of leachate indicator parameters.

Monitoring wells located within the tailings deposition generally show higher proportions of calcium (75-95%) (MW-02S-03, MW99-2S, MW03S-03, MW04S-05, MW01C-03, and magnesium (65-78%) (MW-02-05 and MW-05-05) compared to the wells located outside of the tailings deposition area. This trend is consistent with the high carbonate content reported in the tailings.

Overall, the major ion chemistry of groundwater at the SCAZ wells is highly variable, indicating that groundwater in this area May be affected by multiple leachate sources.

Spatial Variance

As shown on the concentration isopleth maps (Appendix J), concentrations of leachate indicators are generally elevated compared to background groundwater at the upgradient SCAZ wells, and similar to background at the downgradient wells. Based on the spatial distribution of leachate indicator parameter concentrations, two distinct patterns of leachate migration are apparent in the SCAZ.

Concentrations of chloride, ammonia, TOC, iron, manganese, and arsenic concentrations are highest in the upgradient area of the SCAZ near the toe of the Landfill at MW99-3S and E207637 and decrease with distance along

the groundwater flow path into the tailings deposition area. The elevated chloride concentrations in this area indicates the presence of a plume of groundwater impacted by Landfill leachate that is migrating to the southwest. Concentrations of these parameters are generally close to background groundwater downgradient in the SCAZ in the southern portion of the tailings deposition area.

Sulfate and zinc concentrations are highest in the northern portion of the tailings deposition area at MW-06-01 and MW-02S-03. Ammonia, TOC, and Iron concentrations are also high at MW-06-01, while concentrations of chloride, manganese, and arsenic are low compared to the upgradient area. The spatial distribution of sulfate, zinc, iron, ammonia, and TOC in the tailings deposition area indicates the presence of a leachate source that is independent of the landfill (i.e. tailings and possibly septage).

Leachate Impacts

In general, concentrations of leachate indicator parameters at the SCAZ wells were stable between 2019-2023 with some exceptions. Manganese concentrations at several wells showed decreasing trends, while concentrations of sulfate increased at MW-02S-03 and ammonia decreased at MW-03S-05. Chloride concentrations were generally stable with the exception of MW-03S-03 where concentrations increased.

Based on the concentrations of leachate indicator parameters reported in the SCAZ wells, Landfill Leachate impacts are greatest at upgradient monitoring wells MW99-6S, MW99-3S, and E207637, which are located closest to the Landfill. Concentrations of most leachate indicator parameters decrease along the groundwater flow path and are mostly within the range for background groundwater at the southern end of the SCAZ at wells MW-03S-05 and MW-04S-05.

With the exception of elevated sulfate concentrations compared to background groundwater, MW99-6S shows no indication of leachate impacts from the Landfill or Septage Treatment Facility. Based on the location of MW99-6S, it is likely cross-gradient of the groundwater flow path from Cell 1, and upgradient of the raw septage in the Septage Treatment Facility.

Within the TSF, groundwater at MW-02S-03 displays elevated concentrations of TOC, sulfate, and ammonia. The elevated concentrations of these parameters indicates that groundwater at this location Maybe affected by the migration of septage leachate from the Septage Treatment Facility or the infiltration of water in the wood chip stockpile area. Groundwater at TSF monitoring well MW99-2S is possibly impacted by tailings leachate based on the elevated iron, manganese, and zinc concentrations compared to background groundwater. Groundwater at MW99-2D, which is screened in the deep bedrock, does not appear to be impacted by leachate migration. MW99-2S and MW99-2D are not impacted by Landfill leachate as they are located away from the SCAZ flow path and chloride and ammonia concentrations are low.

Concentrations of chloride decrease significantly along the groundwater flow path from the Landfill to the southern boundary, indicating that leachate impacts from the Landfill are attenuated by dilution and dispersion within the SCAZ. The differences in chloride concentrations at monitoring wells MW-03S-05 and MW-04S-05, which are both located at the southern boundary, indicate that impacts from Landfill leachate May be concentrated in the eastern portion of the tailings deposition area with limited migration to the west.

Field pH measurements of groundwater samples from wells screened in tailings ranged from 6.80 to 9.75, with an average of 7.99 between 2019-2023 (Table 6). The pH values of groundwater at these wells are elevated (more alkaline) compared to the other wells at the Site, where groundwater pH tends to be neutral to slightly acidic. Elevated pH of groundwater within the tailings deposition area is consistent with the presence of carbonate minerals (e.g., calcite and dolomite) in the tailings as described in section 5.4.2.2, and indicate that the tailings are not producing acidic conditions in groundwater.

As discussed in Section 5.4.2.2, zinc, cadmium, copper, and lead have been identified as potential parameters of environmental interest within the tailings deposition area. Concentrations of zinc are highest at MW-02S-03, MW-02D-03, MW-01C-03, which are located downgradient in the SCAZ and are screened in tailings. Concentrations of cadmium, copper, and lead are also slightly elevated at the tailings wells compared to wells screened in native overburden (Table 6). However, concentrations of these metals at the tailings wells are only slightly above the

analytical limit of detection and generally less than 1µg/L. The low concentrations of these metals in groundwater within the tailings indicates that the geochemical conditions in the tailings do not favor their migration.

The deep monitoring wells MW99-3D and MW-01A-03 show little to no evidence of leachate impacts from any of the Site sources, with concentrations of most leachate indicator parameters below the analytical limit of detection or within the background groundwater range. This indicates that downward migration of leachate and leachate impacted groundwater into the bedrock flow zone is limited.

Overall, the groundwater quality data from the SCAZ wells indicates that Landfill leachate impacts are effectively attenuated along the groundwater flow path from the Landfill cells to the Landfill boundary. Elevated concentrations of ammonia, TOC, and arsenic, which are likely derived from tailings, septage, and/or infiltration at the wood chip storage area at MW-03S-05 indicate that groundwater quality in the tailings deposition area is variable and that some impacts are not fully attenuated at the southern end of the SCAZ. Based on the available groundwater quality data, no clear trend of groundwater quality improvement is apparent in the SCAZ since the closure of the Landfill and capping of the landfill cells in 2014 – 2016.

7.4 TSF Downgradient

Groundwater quality downgradient of the TSF is characterized by samples collected at nested well pairs MW-01-2004(S)/(D), MW99-1S/D, and MW-02-2004(S)/(D). The TSF Downgradient wells are located hydraulically downgradient, to the south of the TSF and earth dam. Each of the three nested monitoring locations consists of a shallow well screened in the overburden and a deep well screened in bedrock. The locations of the TSF Downgradient wells are presented on Figure 6.

Analytical results from the TSF Downgradient wells were used to characterize groundwater quality downgradient of the TSF along the flow path to the south, and to assess the extent and magnitude of potential leachate impacts. Tables 7.9 through 7.10 provide a summary of the concentrations of leachate indicator parameters at the TSF Downgradient wells between 2019-2023 compared to median leachate concentrations at LW-03-01 and MW-06-01, and the concentration ranges for the overburden background wells.

Table 7.9 2019-2023 TSF Downgradient Overburden Wells Groundwater Concentration Ranges (MW-01-2004(S), MW99-1S, MW-02-2004(S))

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	MW-01-2004(S)	MW99-1S	MW-02-2004(S)	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1 | < 10	<0.50	1.09 - 1.62	2.12 - 7.58	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53 | 0.63	0.166 - 0.249	0.0849 - 0.463	<0.0050 - 0.006	<0.0050 - 0.067
Sulfate (mg/L)	2.4 | 1,570	1.66 - 5.15	28.6 - 76.1	67.8 - 187	7.47 - 15.9
TOC (mg/L)	3.5 | 6.9	1.56 - 1.92	1.4 - 2.89	0.91 - 1.42	<0.50 - 0.88
Iron (µg/L)	76,800 | 21,400	<10 - 14	417 - 7,310	<10	<10 - 863
Manganese (µg/L)	3,040 | 1,020	2,530 - 4,510	125 - 308	0.28 - 6.24	<0.10 - 644
Arsenic (µg/L)	34.4 | 2.3	0.76 - 1.41	0.15 - 0.4	0.13 - 0.21	<0.10 - 9.72
Zinc (µg/L)	9.3 | 9,150	2.5 - 6.4	<1.0 - 5.2	1.1 - 4.2	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

Table 7.10 2019-2023 TSF Downgradient Bedrock Wells Groundwater Concentration Ranges (MW-01-2004(D), MW99-1D, MW-02-2004(D))

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	MW-01-2004(D)*	MW99-1D*	MW-02-2004(D)*	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1 | < 10	2.68 - 2.92	7.13 - 8.5	12.8 - 15.5	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53 | 0.63	<0.0050 - 0.0055	0.407 - 1.57	<0.0050 - 0.284	<0.0050 - 0.067
Sulfate (mg/L)	2.4 | 1,570	84.6 - 92.8	36.6 - 43.8	21 - 26.1	7.47 - 15.9
TOC (mg/L)	3.5 | 6.9	0.66 - 1.24	<0.50 - 0.78	<0.50	<0.50 - 0.88
Iron (µg/L)	76,800 | 21,400	<10	<10 - 42	<10	<10 - 863
Manganese (µg/L)	3,040 | 1,020	3.98 - 13.2	33.1 - 159	0.35 - 282	<0.10 - 644
Arsenic (µg/L)	34.4 | 2.3	0.8 - 1.08	0.28 - 0.46	0.74 - 1	<0.10 - 9.72
Zinc (µg/L)	9.3 | 9,150	1.1 - 3.1	<1.0 - 2.2	<1.0 - 7.4	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
* - Well screened in bedrock
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

The following observations are made based on a comparison of groundwater quality at the TSF Downgradient wells compared to background groundwater and leachate. Groundwater quality at the three deep wells screened in bedrock are compared to background groundwater quality from MW99-2D. The monitoring wells are ordered based on their location along the groundwater flow path from the Landfill to the southern Site boundary.

Overburden Wells (MW-01-2004(S), MW99-1S, MW-02-2004(S))

Groundwater quality at the TSF Downgradient wells that are screened in the overburden is characterized by low concentrations of leachate indicator parameters, which are mostly within the background range.

Concentrations of chloride, ammonia (at MW-01-2004(S) and MW-02-2004(S)), and arsenic are comparable to or within the background groundwater range at all three of the wells screened in the overburden. Sulfate concentrations are below the background range at MW-01-2004(S), the most upgradient well, and elevated at MW99-1S and MW-04-2004(D). Manganese and zinc concentrations are elevated at MW-01-2004(S). Iron concentrations are elevated at MW99-1S and mostly below the analytical limit of detection at the other two wells.

Bedrock Wells (MW-01-2004(D), MW99-1D, MW-02-2004(D))

TSF Downgradient groundwater quality within bedrock is characterized by low concentrations of leachate indicator parameters, which are comparable to background groundwater quality with some exceptions.

Chloride concentrations at all three bedrock wells are elevated compared to the shallower nested wells, with the highest chloride concentrations at MW-02-2004(D), the farthest downgradient well. Ammonia concentrations at MW99-1D ranged from 0.407 - 1.57 between 2019-2023, which is above the background range.

Major Ion Chemistry

As shown on the piper plot in Appendix G (Figure G-1), the TSF Downgradient wells do not plot together as a group on the central diamond plot.

MW-99-1S and MW-01-2004(S) plot in the left corner of the diamond plot, with similar major ion proportions to background groundwater. MW99-1D and MW-02D-2004(D) plot in the lower portion of the diamond near background well MW-02A-01, indicating higher proportions of sodium/potassium compared to the other wells at the Site. MW-02-2004(S) and MW-01-2004(D) plot in the upper left portion of the diamond plot, indicating higher proportions of sulfate and lower proportions of bicarbonate compared to the other wells.

The major ion chemistry at the TSF Downgradient wells indicates variable groundwater quality in the bedrock and overburden. Based on the major ion geochemistry in combination with the bulk water quality trends discussed above, there does not appear to be any pattern indicating water quality alteration due to leachate migration.

Spatial Variance

As shown on the concentration isopleth maps (Appendix J), concentrations of chloride, ammonia, TOC, arsenic, and zinc are close to background groundwater in the TSF Downgradient, and concentrations of sulfate, iron, and manganese are slightly elevated compared to background groundwater. Sulfate and iron concentrations are highest at the wells furthest downgradient from the TSF. Manganese concentrations are concentrated around MW-01-2004(S). The spatial distributions of the leachate indicator parameter concentrations do not indicate the presence of groundwater plumes impacted by tailings leachate at the TSF Downgradient.

Leachate Impacts

In general, concentrations of leachate indicator parameters at the TSF Downgradient wells are stable, with the exception of decreasing sulfate and increasing ammonia and iron concentrations at MW99-1S. Overall, concentrations of leachate indicator parameters at the TSF Downgradient wells are low and close-to or within the range for background groundwater, suggesting that they aren't impacted by Landfill or tailings leachate. The highest leachate indicator parameter concentrations at the TSF Downgradient wells are mostly at MW99-1S/D and MW-02-2004(S)/(D) which are the farthest downgradient wells. The elevated chloride concentrations at MW-02-2004(S)/(D) May be related to the infiltration runoff from Highway 3 containing road salt.

7.5 Off-Site Residential Wells

Three residential wells, 110 Emerald Rd., 111 Emerald Rd., and 1780 Airport Rd. are monitored as part of the Landfill EMP. The residential wells are located to the west of the Site and are presented on Figure 6. The three wells are located within the boundaries of Aquifer 0496. Groundwater analytical results for the residential wells are presented in Table 7. A summary of leachate indicator concentration ranges at the residential wells from 2019-2023 is presented in Table 7.11, below.

Analytical results from the residential wells were reviewed to assess for possible off-Site groundwater quality impacts.

Table 7.11 2019-2023 Residential Wells Groundwater Concentration Ranges (110 Emerald Rd., 111 Emerald Rd., 1780 Airport Rd.)

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	110 Emerald Rd.*	111 Emerald Rd.*	1780 Airport Rd.*	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1 | < 10	1.66 - 3.67	0.64 - 0.8	1.39 - 3.44	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53 | 0.63	<0.0050	<0.0050	<0.0050	<0.0050 - 0.067
Sulfate (mg/L)	2.4 | 1,570	5.33 - 6.19	6.84 - 8.16	7.25 - 8.16	7.47 - 15.9
TOC (mg/L)	3.5 | 6.9	<0.50 - 0.57	<0.50	<0.50 - 0.62	<0.50 - 0.88
Iron (µg/L)	76,800 | 21,400	12 - 21	<10 - 116	47 - 129	<10 - 863
Manganese (µg/L)	3,040 | 1,020	0.85 - 1.79	0.32 - 2.34	2.51 - 5.71	<0.10 - 644
Arsenic (µg/L)	34.4 | 2.3	<0.10	0.17 - 0.19	0.14 - 0.17	<0.10 - 9.72

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	110 Emerald Rd.*	111 Emerald Rd.*	1780 Airport Rd.*	Overburden Background Groundwater Range[1]
Zinc (µg/L)	9.3 | 9,150	5.2 - 7	4.3 - 35.4	5.4 - 25.1	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
*Iron, manganese, arsenic, and zinc concentrations for the residential wells are total metals
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

The following observations are made based on a comparison of groundwater quality at the residential wells to background groundwater and leachate.

The concentrations of all leachate indicator parameters in groundwater at the residential wells are below background concentrations or within the background range, with the exception of zinc, which is elevated at all three wells compared to background groundwater. Based on the concentration versus time plots (Appendix I, Figures I-11 and I-12), zinc concentrations appear to be increasing at 111 Emerald Rd and 1780 Airport Rd. over the last five years. Concentration trends over the last five years at 110 Emerald Road were not interpreted as this monitoring well was sampled only three times between 2019 and 2023. As shown on the piper plot (Appendix G, Figure G-1), all three residential wells plot in the left corner of the diamond plot, which is typical of fresh, unaltered groundwater. Considering that all other leachate indicator parameters are low and stable at the residential wells, the elevated and increasing zinc concentrations are likely unrelated to the Site.

8. Seep and Surface Water Quality

Surface water quality at the Site is assessed through an evaluation of leachate indicator analytical results and trends across the Site surface water monitoring locations described in Table 8.1.

GHD reviewed the available analytical results to characterize seep and surface water quality at the Site. Seep and surface water quality was assessed in terms of evidence of leachate derived water quality impacts from the three sources described in Section 7 (Landfill, Septage, and Tailings Leachate). This was accomplished through an assessment of the temporal and spatial trends in water quality and a comparison of water quality at upstream (background) and downstream locations.

Based on this characterization, GHD assessed the extent and magnitude of potential impacts to surface water quality resulting from the Landfill, Septage, and TSF. Seep and surface water quality trends over the past five years (2019-2023) were also assessed.

The Site seep and surface water monitoring well network was divided into three groups based on their location and purpose:

– Seeps
– Sheep Creek surface water monitoring locations
– Site surface water monitoring locations

The locations of the seep and surface water monitoring locations are presented are presented on Figures 6 and 7, and details of each location are presented in Table 8.1.

Table 8.1 Site Surface Water Monitoring Locations

Monitoring Location ID	Location	Rationale
Landfill EMP		
Seep A	North of the Landfill, south of Sheep Creek	Characterize water quality of groundwater seeps that discharge to Sheep Creek
Seep E		
Seep G		
Seep I		
SW-C	Sheep Creek, northeast of the Site	Characterize background surface water quality in Sheep Creek upstream of the Site and discharge location of the seeps
SW-B	Sheep Creek, north of the Site	Characterize surface water quality in Sheep Creek in the mixing zone where water from the seeps discharges to the creek
SW-A		Characterize surface water quality in Sheep Creek downstream from the mixing zone where water from the seeps discharges to the creek
TSF EMP		
SW3-07	Background sample collected from the seasonal South Spur Channel upstream of the TSF.	Characterize background surface water quality in the South Spur Channel before it drains over the reclaimed TSF.
SW5-19	Background sample collected from the seasonal North Spur Channel upstream of the TSF.	Characterize background surface water quality in the North Spur Channel before it drains over the reclaimed TSF.
SW1-07	Central Landfill outflow collected immediately upstream of the TSF in the Main Channel	Characterize background surface water quality before it drains over the reclaimed TSF and account for landfill influences.
SW2-07	Collected from the seasonal stream located upstream of the North and South Spur Channels	Characterize background surface water quality before it drains over the reclaimed TSF.
SW4-07 (decommissioned)	Collected from the Main Channel of the TSF	Characterize surface water quality in the Main Channel as it drains over the reclaimed TSF.
Seepage Weir	Collected from seepage upstream of the v-notch weir below the dam	Characterize surface water quality draining from the reclaimed TSF downstream from the spillway.
Tailings Pond Outlet/Spillway Inlet	Collected in the spillway inlet area at a location downstream of the TSF.	Characterize surface water quality draining from the reclaimed TSF.
Spillway Outlet	Collected immediately downstream of the stilling basin.	Characterize surface water quality draining from the reclaimed TSF downstream from the spillway.
Outlet Ditch	Collected upstream of the culvert crossing Highway 3.	Characterize surface water quality draining from the property onto the Salmo River floodplain.
Salmo – Upstream	Collected approximately 100m upgradient of the point of discharge where the downstream channel intersects the Salmo River.	Characterize background surface water quality in Salmo River upstream of the point of discharge.

Monitoring Location ID	Location	Rationale
Salmo - Downstream	Collected approximately 100m downgradient of the point of discharge where the downstream channel intersects the Salmo River.	Characterize surface water quality in Salmo River downstream of the point of discharge.

8.1 Seep and Sheep Creek

Seep water and Sheep Creek surface water analytical results are presented in Tables 9 and 10. Table 8.2, below, provides a summary of the concentrations of leachate indicator parameters at the seep monitoring locations between 2019-2023 compared to median leachate concentrations at LW-03-01 and background groundwater at the overburden background wells.

Table 8.2 2019-2023 Seep Concentration Ranges (Seep A, Seep E, Seep G, Seep I)

Parameter	Median Leachate (LW-03-01)	Seep A	Seep E	Seep G	Seep I	Overburden Background Groundwater Range[1]
Chloride (mg/L)	24.1	74.1 - 150	77.3 - 120	25.6 - 77.5	5.94 - 15	<0.50 - 12.6
Ammonia (as N) (mg/L)	0.53	0.21 - 0.858	4.68 - 5.86	<0.0050	<0.0050 - 0.0052	<0.0050 - 0.067
Sulfate (mg/L)	2.4	25.1 - 38.2	4.0 - 7.97	11 - 17	6.46 - 11.6	7.47 - 15.9
TOC (mg/L)	3.5	4.85 - 14.4	12 - 18.2	1.54 - 15.9	<0.50 - 0.85	<0.50 - 0.88
Iron (µg/L)	76,800	198 - 47,400	4,340 - 73,100	13 - 75	<10 - 17	<10 - 863
Manganese (µg/L)	3,040	457 - 4,230	2,440 - 3,670	4.02 - 22	0.13 - 1.25	<0.10 - 644
Arsenic (µg/L)	34.4	1.25 - 97.6	7.09 - 222	0.2 - 0.31	0.21 - 0.27	<0.10 - 9.72
Zinc (µg/L)	9.3	<3.0 - 3.3	<3.0	<3.0 - 3.6	<3.0	<1.0 - 4.0

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
Iron, manganese, arsenic, and zinc concentrations are total metals
[1] - Range of concentrations at S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (2019-2023)

The highest concentrations of leachate indicator parameters were reported at Seep A and Seep E, which are the seeps located farthest to the west. Concentrations of chloride ammonia, sulfate, and TOC at Seeps A and E are similar to the concentrations in groundwater at the NCAZ wells located immediately downgradient of the Landfill.

Concentrations of leachate indicator parameters are lower at Seeps G and I, indicating that leachate impacts decrease to the east, with minimal impact apparent at Seep I.

Temporal Trends

As shown on the surface water concentration versus time plots included in Appendix H and Appendix I (Figures I-15 and I-16), concentrations of leachate indicator parameters at the seeps are generally consistent over time and do not show clear increasing trends. For the period when samples we collected on a semi-annual basis (2014-2022), chloride concentrations at Seeps A and E show seasonal variation.

Major Ion Chemistry

As shown on the piper plot (Appendix G, Figure G-2), the seeps mostly plot in the left corner of the diamond plot. Seeps G and I plot in the leftmost corner of the diamond, which is typical of fresh shallow groundwater. Seeps A and E plots away from the other surface water locations closer to the centre of the diamond, indicating higher proportions of sulfate, chloride, sodium, and potassium. Seeps A and E plot in a location shifted towards the centre which is expected of locations that have been impacted by typical landfill leachate.

Table 8.3, below, provides a summary of the concentrations of leachate indicator parameters at the Sheep Creek surface water monitoring locations between 2019-2023 compared to median leachate concentrations at LW-03-01 and background groundwater at the overburden background wells.

Table 8.3 2019-2023 Sheep Creek Surface Water Concentration Ranges (SW-A, SW-B, SW-C)

Parameter	Median Leachate (LW-03-01)	SW-C*	SW-B	SW-A
Chloride (mg/L)	24.1	<0.50	<0.50 - 1.58	<0.50
Ammonia (as N) (mg/L)	0.53	<0.0050 - 0.0054	<0.0050	<0.0050
Sulfate (mg/L)	2.4	3.1 - 5.58	3.88 - 6.33	3.13 - 5.02
TOC (mg/L)	3.5	0.8 - 1.54	0.73 - 1.58	0.58 - 1.67
Iron (µg/L)	76,800	<10 - 38	<10 - 651	<10 - 31
Manganese (µg/L)	3,040	0.2 - 1.32	0.84 - 16.6	0.18 - 1.05
Arsenic (µg/L)	34.4	0.1 - 0.17	0.12 - 1.19	0.11 - 0.16
Zinc (µg/L)	9.3	3.2 - 9.6	3.3 - 9.1	3.2 - 9.6

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
Iron, manganese, arsenic, and zinc concentrations are total metals
* - SW-C represents upstream (background) surface water quality

Surface water quality at the Sheep Creek monitoring locations is characterized by low concentrations of leachate indicator parameters, with chloride, ammonia, and iron mostly below the analytical limit of reporting. Concentrations of chloride, ammonia, sulfate, TOC, arsenic, and zinc at the downstream Sheep Creek monitoring locations SW-A and SW-B are lower or close to the upstream Sheep Creek monitoring location, SW-C. Iron and manganese concentrations at the downstream locations were higher than the upstream location during a spike in 2022. Overall, the concentrations of leachate indicator parameters at the downstream locations are comparable to the upstream location and indicate that surface water quality in Sheep Creek is not impacted by leachate migration or discharge of water from the seeps.

Temporal Trends

As shown on the surface water concentration versus time plots presented in Appendix H and Appendix I (Figures I-15 and I-16), concentrations of leachate indicator parameters at the three surface water monitoring locations are generally consistent over time and do not show clear increasing trends.

Major Ion Chemistry

As shown on the piper plot in Appendix G (Figure G-2), surface water at the Sheep Creek monitoring locations plots together in left corner of the central diamond in a similar location to background groundwater. The position of the Sheep Creek monitoring location on the plot and the similar water quality between the upstream and downstream locations indicates that surface water quality at these locations is not impacted by leachate.

Leachate Impacts

Based on the elevated concentrations of leachate indicator parameters, water quality at the seeps is clearly impacted by leachate migration from the Landfill. The strongest leachate impacts are apparent at Seeps A and E, which are located the farthest to the west, indicating that these two locations are most directly located along the groundwater flow path from the landfill. Concentrations of leachate indicator parameters are lower at Seeps G and I, indicating that these locations are not directly located along the groundwater flow path from the Landfill.

Based on the low and stable concentrations of leachate indicator parameters at the Sheep Creek surface water monitoring locations, there is no evidence of leachate impacts to surface water quality in Sheep Creek. Concentrations of leachate indicator parameters at the two downstream monitoring locations have consistently been similar to the upstream monitoring location, indicating that any impacted discharge from the seeps is quickly diluted and does not alter downstream water quality.

8.2 TSF Surface Water Monitoring Network

Surface water quality in the TSF surface water management ditches is characterized by samples collected at locations SW01-7, Spillway Inlet, Seepage Weir, Spillway Outlet, and Outlet Ditch. The surface water monitoring locations are located along the flow path to the earth dam at the south of the Site, and then off-Site along the flow path to the Salmo River. The locations of the surface water monitoring locations are presented on Figure 7.

TSF Surface Water Quality Summary

Surface water analytical results for the TSF surface water monitoring locations are presented in Table 11. Tables 8.4 through 8.6 provide a summary of the concentrations of leachate indicator parameters at the TSF surface water monitoring locations between 2019-2023 compared to median leachate concentrations at LW-03-01 and MW-06-01 and background (upstream) surface water quality at SW3-07 and SW5-19.

Table 8.4 2019-2023 On-Site Surface Water Concentration Ranges (SW3-07, SW5-19, SW1-07, SW2-07, SW4-07)

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	SW3-07*	SW5-19*	SW1-07	SW2-07	SW4-07**	Background Surface Water Range[1]
Chloride (mg/L)	24.1 | < 10	<0.50	<0.50	17.2 - 52.6	0.56 - 5.05	29 - 35.6	<0.50
Ammonia (as N) (mg/L)	0.53 | 0.63	<0.0050	<0.0050	0.0086 - 2.98	<0.0050 - 0.072	0.0066 - 0.0208	<0.0050
Sulfate (mg/L)	2.4 | 1,570	6.59 - 10.2	7.18 - 15.5	38.3 - 148	5.05 - 202	245 - 1890	6.59 - 15.5
TOC (mg/L)	3.5 | 6.9	1.09 - 2.16	1.05 - 1.81	6.06 - 21.8	2.41 - 4.81	5.88 - 14	1.05 - 2.16
Iron (µg/L)	76,800 | 21,400	<10 - 255	127 - 890	139 - 1650	283 - 8190	57 - 366	<10 - 890
Manganese (µg/L)	3,040 | 1,020	0.97 - 8.96	2.82 - 23.4	146 - 914	6.89 - 495	13.4 - 51.9	0.97 - 23.4
Arsenic (µg/L)	34.4 | 2.3	0.14 - 0.29	0.28 - 0.47	0.46 - 4.25	0.53 - 4.56	1.12 - 1.69	0.14 - 0.47
Zinc (µg/L)	9.3 | 9,150	<3.0 - 6.7	<3.0 - 5	12.6 - 66.5	4.1 - 41.2	964 - 3020	<3.0 - 6.7
Notes: mg/L – milligrams per litre							

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	SW3-07*	SW5-19*	SW1-07	SW2-07	SW4-07**	Background Surface Water Range[1]
µg/L – micrograms per litre Iron, manganese, arsenic, and zinc concentrations are total metals * Upstream, background monitoring locations ** SW4-07 was decommissioned in 2021 [1] - Range of concentrations at SW3-07 and SW5-19 (2019-2023)							

Table 8.5 2019-2023 On-Site Surface Water Concentration Ranges (Tailings Pond Outlet, Seepage Weir, Outlet Ditch, Spillway Inlet, Spillway Outlet)

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	Tailings Pond Outlet	Seepage Weir	Outlet Ditch	Spillway Inlet	Spillway Outlet	Background Surface Water Range[1]
Chloride (mg/L)	24.1 | < 10	<0.50 - 2.9	<2.50 - 3.67	1.97 - 6.4	2.51 - 6.68	2.35 - 6.49	<0.50
Ammonia (as N) (mg/L)	0.53 | 0.63	<0.0050 - 0.0123	0.0087 - 0.138	0.0057 - 0.157	0.0055 - 0.21	<0.0050 - 0.182	<0.0050
Sulfate (mg/L)	2.4 | 1,570	34.1 - 183	162 - 233	32.8 - 357	30.8 - 366	33.5 - 328	6.59 - 15.5
TOC (mg/L)	3.5 | 6.9	2.12 - 4.53	2.38 - 3.75	2.57 - 5.58	3.1 - 6.35	2.44 - 5.77	1.05 - 2.16
Iron (µg/L)	76,800 | 21,400	<10 - 267	46 - 838	15 - 646	79 - 366	63 - 880	<10 - 890
Manganese (µg/L)	3,040 | 1,020	2.3 - 239	138 – 4,930	2.03 - 79.6	21.7 - 254	9.88 – 2,100	0.97 - 23.4
Arsenic (µg/L)	34.4 | 2.3	0.54 - 3.02	0.53 - 3.02	0.68 - 2.32	0.71 - 2.64	0.79 - 2.02	0.14 - 0.47
Zinc (µg/L)	9.3 | 9,150	55.9 - 136	3.3 - 12.6	13.1 - 130	7.7 - 48.5	9.6 - 49.4	<3.0 - 6.7
Notes: mg/L – milligrams per litre µg/L – micrograms per litre Iron, manganese, arsenic, and zinc concentrations are total metals [1] - Range of concentrations at SW3-07 and SW5-19 (2019-2023)							

Table 8.6 2019-2023 On-Site Surface Water Concentration Ranges (Salmo Upstream, Salmo Downstream)

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	Salmo - Upstream	Salmo - Downstream	Background Surface Water Range[1]
Chloride (mg/L)	24.1 | < 10	1.13	1.15	<0.50
Ammonia (as N) (mg/L)	0.53 | 0.63	<0.0050	<0.0050	<0.0050
Sulfate (mg/L)	2.4 | 1,570	8.49	10.0	6.59 - 15.5
TOC (mg/L)	3.5 | 6.9	0.75	0.81	1.05 - 2.16

Parameter	Median Leachate (LW-03-01) and Tailings (MW-06-01) Concentrations (2019-2023)	Salmo - Upstream	Salmo - Downstream	Background Surface Water Range[1]
Iron (µg/L)	76,800 | 21,400	50	52	<10 - 890
Manganese (µg/L)	3,040 | 1,020	13.0	16.7	0.97 - 23.4
Arsenic (µg/L)	34.4 | 2.3	0.33	0.36	0.14 - 0.47
Zinc (µg/L)	9.3 | 9,150	<3.0	<3.0	<3.0 - 6.7

Notes:
mg/L – milligrams per litre
µg/L – micrograms per litre
Iron, manganese, arsenic, and zinc concentrations are total metals
[1] - Range of concentrations at SW3-07 and SW5-19 (2019-2023)

The following observations are made based on a comparison of surface water quality at the TSF surface water monitoring locations wells compared to background surface water. Background surface water is characterized by the water quality at locations SW3-07 and SW5-19 as they are located upstream of the TSF. SW2-07 has historically been considered a background location, however it is not representative as it is located beside the Landfill and so may be impacted by the Landfill. Long-term concentration trends were assessed based on the concentration versus time plots in Appendix H2. Concentration trends from 2019-2023 were assessed based on the concentration versus time plots presented in Appendix I (Figures I-17 and I-18).

SW3-07 and SW5-19 (Background)

SW3-07 and SW5-19 represent background surface water quality as they are located upstream of the TSF. SW3-07 is located at the seasonal South Spur Channel and SW5-19 is located at the seasonal North Spur Channel.

Background surface water quality is characterized by low and stable concentrations of chloride, ammonia, sulfate, TOC, arsenic, and zinc. Chloride and ammonia concentrations at SW3-07 and SW5-19 were consistently below the analytical limit of detection from 2019-2023.

SW1-07

SW1-07 is located immediately north and upstream of the TSF, where Landfill outflow is collected in the main channel. SW1-07 represents surface water quality influenced by the Landfill but not by the TSF.

Surface water quality at SW1-07 is characterized by elevated concentrations of chloride and TOC compared to background surface water and other monitoring locations. At SW1-07, there are slightly elevated concentrations of iron, manganese, arsenic, and zinc compared to background surface water and other monitoring locations. Ammonia concentrations spiked to 2.98 mg/L in May 2022, but returned close to background levels in November 2022.

Manganese concentrations show a general long-term decreasing trend since 2008. TOC and iron concentrations show a slight decreasing trend from 2019-2023.

SW2-07

SW2-07 is located at the seasonal stream upstream of the North and South Spur Channels. SW1-07 represents surface water quality upstream of the TSF.

Surface water quality at SW2-07 is characterized by elevated concentrations of iron compared to background surface water and other monitoring locations. Concentrations of chloride, ammonia, TOC, and zinc at SW2-07 were generally comparable to background surface water between 2019-2023. Manganese concentrations show an overall decreasing trend from 2009-2021, however trends from 2021-2023 are unclear.

SW4-07

SW4-07 is located along the Main Channel in the centre of the TSF and represents surface water quality as water drains across the tailings deposition area. SW4-07 was removed from the monitoring program in 2021 when surface water flow in the tailings deposition area was re-directed during remediation work.

Surface water quality at SW4-07 is characterized by elevated concentrations of chloride, sulfate, TOC, and zinc compared to background surface water and other monitoring locations. Sulfate concentrations in 2019-2023 ranged from 245-1890 mg/L, which is higher than the median tailings range. Manganese and iron concentrations show a long-term decreasing trend.

Seepage Weir

The Seepage Weir sampling location is located upstream of the v-notch weir below the earth dam. Surface water at Seepage Weir represents surface water quality draining from the TSF downstream of the spillway.

Surface water quality at the Seepage Weir is characterized by elevated concentrations of manganese compared to background surface water and other monitoring locations. Chloride, ammonia, TOC, and zinc concentrations are within or close to background concentration ranges.

Tailings Pond Outlet and Spillway Inlet

The Tailings Pond Outlet sampling location was decommissioned in 2022 when the tailing pond was dewatered, and the Spillway Inlet sampling location was added to the monitoring program to replace the former Tailings Pond Outlet. The Spillway Inlet is in the same location as the former Tailings Pond Outlet, but at an elevation 1.5 m lower due to the lowering of the spillway. These two surface water monitoring locations represent surface water quality as it discharges from the tailings deposition area and are considered as the same location for assessment purposes.

Chloride, ammonia, TOC, and iron concentrations are within or close to background concentration ranges. Manganese and zinc concentrations are slightly elevated at this monitoring location. Zinc concentrations show long-term decreasing trends from 2013-2023.

Spillway Outlet

The Spillway Outlet is located immediately downstream of the stilling basin and represents surface water quality draining from the TSF downstream of the spillway.

Surface water quality at the Spillway Outlet is characterized by higher concentrations of manganese compared to background surface water and other monitoring locations. Chloride, ammonia, TOC, and iron concentrations are within or close to background concentration ranges. No trend analysis can be made as sampling at this location began in 2022.

Outlet Ditch

The Outlet Ditch is the furthest sampling location along the surface water flow path on-Site and is the compliance location. The Outlet Ditch is located upstream of the culvert crossing Highway 3. The Outlet Ditch represents surface water quality draining from the property onto the Salmo River floodplain.

Surface water quality at the Outlet Ditch is characterized by higher concentrations of zinc compared to background surface water and other monitoring locations. Concentrations of all other leachate indicator parameters are within or close to background concentration ranges. From 2013-2023, zinc concentrations show a long-term decreasing trend.

Salmo Upstream and Downstream

The Salmo Upstream sampling location is located approximately 100 m upgradient of the point of discharge where the downstream channel intersects the Salmo River. The Salmo Downstream location is located approximately 100 m downgradient of this point of discharge. These locations represent surface water quality in the Salmo River upstream and downstream of the point of discharge.

Surface water quality upstream and downstream of the Salmo River are very similar to each other and to background surface water. Ammonia and zinc concentrations at both upstream and downstream locations are below the analytical limit of detection. As for the other leachate indicator parameters, they are within or close to the background surface water concentration range.

Major Ion Chemistry

As shown on the piper plot in Appendix G (Figure G-2), surface water at the TSF surface water monitoring network plots between the left corner and the top of the central diamond.

Background surface water monitoring locations SW2-07 and SW3-07 plot in the left corner of the central diamond in a similar location to background groundwater. The location of SW2-07 and SW3-07 on the plot indicates that surface water quality at these locations is not impacted by leachate.

Seepage Weir plots the farthest toward the top of the diamond plot, indicating a higher proportion of sulfate compared to background surface water and the other monitoring locations. Spillway Inlet and Spillway outlet plot in between the background locations and Seepage Weir. The elevated sulfate content at these monitoring locations May be due to interaction with groundwater in the tailings deposition area, which is high in sulfate.

SW1-07 plots to the right of the other samples, closer to the centre of the diamond plot due to a higher proportion of chloride. The elevated chloride content at SW1-07 is an indication of leachate impacts.

Surface Water Quality Impacts

In general, concentrations of leachate indicator parameters at the TSF surface water monitoring locations were stable between 2019-2023 with a few exceptions. At SW4-07, there was a long-term increasing trend of sulfate. Manganese concentrations at SW1-07 show a general long-term decreasing trend. At Spillway Inlet (and Tailings Pond Outlet) and Outlet Ditch, zinc concentrations show long-term decreasing trends from 2013-2023.

Based on the concentrations of leachate indicator parameters at the TSF surface water monitoring locations, impacts are greatest at SW1-07, which is located at the beginning of the surface water flow path. Surface water at SW1-07 has elevated levels of chloride and May be impacted by discharge from the Landfill seeps (as discussed in Section 3.1). Other potential sources of contamination include runoff from the Septage Treatment Facility and the treated wood stockpile area which is located immediately west of SW1-07. Surface water quality impacts are attenuated downstream along the flow path. At the Outlet Ditch, leachate indicator parameter concentrations are low except for slightly elevated levels of zinc, suggesting minimal impacts to surface water quality. There were no impacts to surface water at the Salmo River Upstream and Downstream monitoring locations.

9. Attenuation Capacity Assessment

The attenuation capacity (i.e., the capacity to reduce the concentrations of contaminants in groundwater through natural physical and chemical processes) of the NCAZ and SCAZ has been assessed by Klohn Krippen (2000), CRA (2005), AMEC (2014), and Wood (2020). Most of the assessments have been qualitative, involving a comparison of leachate indicator parameter concentrations at monitoring wells adjacent to the Landfill with downgradient locations at the Site boundary and with surface water in Sheep Creek. All of the attenuation capacity assessments have concluded that the attenuative capacities of the NCAZ and SCAZ were adequate to protect downgradient receptors.

Evaluations of the attenuative capacity of the NCAZ by CRA (2005) and Wood (2020) determined that leachate impacted groundwater within the northern flow zone ultimately discharges into Sheep Creek. Assessments of the attenuative capacity of the NCAZ were based on the surface water quality in Sheep Creek at the monitoring locations upstream and downstream of the seeps. Both assessments found no indication of surface water quality impacts at the downstream location compared to the upstream location. Based on this observation, both studies concluded that the attenuative capacity of the NCAZ was adequate to protect surface water quality in Sheep Creek.

CRA (2005) and Wood (2020) assessed the attenuation capacity of the SCAZ quantitatively using concentration profiles by plotting the concentrations of chloride, iron, and manganese against the horizontal distance of selected wells along the groundwater flow path. The concentration profiles found that concentrations decreased along the groundwater flow path and reached background levels.

CRA (2005) also developed a geochemical model and water balance model for the NCAZ and tailings deposition area. These two models were used to estimate the capacity of the tailings to reduce iron and manganese concentrations in groundwater, and the rate at which leachate from Cell 2 was diluted by unimpacted groundwater along the SCAZ flow path. These assessments provide quantitative estimates of the attenuative capacity of the SCAZ.

The geochemical model developed by CRA (2005) determined that the tailings have a significant capacity to attenuate dissolved iron and manganese in leachate affected groundwater. The model predicted that iron and manganese in leachate affected groundwater would precipitate within the tailings deposition area, and that iron and manganese concentrations in groundwater should be reduced to approximately 5-6 mg/L and 2-3 mg/L respectively.

The water balance model developed in CRA (2005) estimated that leachate from Cell 2 was diluted by a factor of 67 to 77 times upon entering the groundwater flow zone, and that leachate was diluted by a factor of 180 times by unimpacted groundwater as it flows into the western buffer zone. This estimate was based on Site conditions prior to the expansion and closure of the Landfill, which has increased the footprint of the Landfill and decreased the infiltration rate. Updated leachate generation modeling for the closed Landfll cells is required to evaluate the dilution rate of leachate in groundwater under current conditions.

Assessments of the attenuative capacity of the NCAZ and SCAZ under current (2023) conditions are presented in Sections 9.1 and 9.2 respectively. GHD applied similar methodologies to the assessments described above to provide results that are comparable to the historical investigations.

9.1 NCAZ Attenuation Capacity Assessment

The attenuative capacity of the NCAZ was assessed through a qualitative evaluation of water quality in Sheep Creek, which is the aquatic receiving environment that groundwater in the NCAZ discharges to.

Groundwater that discharges via the Seeps north of the Landfill, flows overland and into Sheep Creek. As described in Section 8, water quality at the Seeps is characterized by elevated concentrations of leachate indicator parameters, with the strongest leachate impacts at Seeps A and E. The rate of discharge at the seeps has been described as variable, and likely fluctuates seasonally. Water quality in Sheep Creek is assessed at three locations, SW-C, which is located upstream of the Site, SW-B, which is located in the mixing area where water from the Seeps discharges into Sheep Creek, and at SW-A, which is located downstream.

New Graph Environment completed biological impact assessment in Sheep Creek in 2019 to assess potential impacts to the creek from the Site (New Graph Environment, 2019. Based on the results of the biological impact assessment, and the Sheep Creek surface water quality assessment presented in Section 8.1, discharge from the Seeps appears to have a minimal impact on water quality in Sheep Creek, and does not appear to be negatively impacting aquatic life. These results indicate that the attenuation capacity of the NCAZ is sufficient to protect water quality and aquatic life in Sheep Creek.

9.2 SCAZ Attenuation Capacity Assessment

To assess the attenuative capacity of the SCAZ under current conditions, GHD developed concentration profile plots for chloride, iron, and manganese at SCAZ monitoring wells using analytical data from May 2023. The concentration profiles were developed using the same methodology as CRA (2005) and Wood (2020), by plotting concentrations of chloride, iron, and manganese at a set of SCAZ monitoring wells relative to their horizontal distance along the groundwater flow path. GHD selected monitoring wells E207637, MW-02D-03, MW-01C-03, MW-03S-03, MW-05-05, MW-02-05, and MW03S-05, which are screened in the overburden or tailings, and are located along the groundwater flow path from Cell 2 through the tailings deposition area.

Figures K-1, K-2, and K-3 in Appendix K1 present the May 2023 concentration profiles for chloride, iron, and manganese respectively. The decrease in concentration along the groundwater flow path was quantified using an exponential best-fit curve for each parameter. The best-fit equations for the three parameters based on the May 2023 data set are $y = 61.7e^{-0.008x}$ (chloride), $61{,}679e^{-0.019x}$ (iron), and $y = 4{,}144e^{e-0.009x}$ (manganese), where y represents concentration in mg/L (chloride) and µg/L (iron and manganese), x represents horizontal distance from E207637, and the exponent represents the rate of concentration decrease with distance. These results are similar to the concentration profiles in CRA (2005), which are presented in Appendix K2. The results from CRA (2005) were $y = 114.0e^{-0.014x}$ (chloride), $y = 10{,}800e^{-0.017x}$ (iron), and $y = 17{,}100e^{-0.015x}$ (manganese). The similarity of the exponents between parameters and between the 2023 data and CRA (2005) indicate that the concentrations of chloride, iron, and manganese decrease along the flow path at a similar rate to each other, and at a similar rate over time.

As shown on Figures K-1, K-2, and K-3, the concentrations of all three parameters are reduced to levels within the range for background groundwater at the southern end of the flow path at MW-03S-05 and MW-04S-05. These results indicate that the attenuative capacity of the SCAZ continues to be sufficient to attenuate leachate migration along the flow path from the Landfill to the southern Landfill site boundary.

10. Regulatory Framework and Applicable Water Quality Criteria

To assess the appropriate water quality criteria applicable at the Site, GHD reviewed the Landfill OC, the TSF Permit and the following provincial acts, regulations, and guidance documents:

– BC Environmental Management Act (EMA), [SBC 2003] with amendments to March 24, 2021.
– BC Contaminated Sites Regulation (CSR), [B.C. Reg. 133/2022], with amendments to March 1, 2023.
– Hazardous Waste Regulation (HWR), [B.C. Reg. 76/2022] with amendments to March 30, 2022.
– BC Landfill Criteria for Municipal Solid Waste, Second Edition. June 2016.
– Protocol 21 for Contaminated Sites (Protocol 21), Water Use Determination, Version 2.0. November 1, 2017.
– Protocol 9 for Contaminated Sites (Protocol 9), Establishing Local Background Concentrations in Groundwater, Version 4. February 1, 2023.
– Technical Guidance 15 on Contaminated Sites (Technical Guidance 15), Concentration Limits for the Protection of Aquatic Receiving Environments, Version 2.0. November 1, 2017.
– Water Quality Management Plan, HB Mine Tailings Management Facility – 2022 Update, SLR Consulting. August 2022.

To determine the appropriate water quality criteria, GHD considered both generic requirements and guidance from the provincial regulatory documents and Site-specific requirements form the Landfill OC and TSF Permit.

Regulatory Guidance

– Section 4.1 of the Landfill Criteria states that the appropriate water quality criteria to be applied to a landfill site must be recommended by a Qualified Professional (QP). The appropriate water quality criteria must be selected and justified based on current and planned future uses of groundwater and surface water within a one km radius of the landfill footprint.
– The BC CSR provides water quality standards applicable to groundwater. Schedule 3.2 of the CSR lists the Generic Numerical Water Standards, where four different categories can be applied to site groundwater quality based on the current and future groundwater use at, and in the vicinity of the site in question.
– The WQG provides water quality standards applicable to surface water, and groundwater in some cases. Some parameters under the WQGs have been developed with either long-term average or short-term maximum values.

To determine if the long-term average guideline is being met, a minimum of five samples over a given averaging period is required. The short-term maximum guidelines should be met at all times.

– Technical Guidance 15 specifies that WQG criteria May apply to groundwater within the dilution zone of an aquatic receiving environment (i.e., within 10 m of the high water mark of the receiving environment), and that CSR standards apply to groundwater outside of the dilution zone.
– Per the Landfill Criteria, the appropriate water quality criteria must be satisfied at and beyond the landfill site boundary, or 150 m from the landfill footprint, whichever is closer.

Permit and OC Requirements

– Section 3.12 of the Landfill OC states that "*The Operational Certificate holder must take appropriate measures to ensure that ground water and surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines or other appropriate criteria as May be specified by the Director at and beyond the landfill property boundary*."
– Section C. 1. (a) of the TSF Permit states that "*The Permittee shall develop and submit a Water Management and Monitoring Plan by May 31, 2021 to the satisfaction of the Chief Inspector. The Permittee shall ensure the plan includes, but is not limited to, surface water, tailings porewater, seepage, and groundwater quality and quantity monitoring locations, frequencies and parameters. The Permittee shall ensure that an effective QA/QC program for the surface water, groundwater and seepage monitoring programs is included and implemented*."
    - The Water Quality Management Plan 2022 Update (SLR Consulting, 2022) provides a rationale for the applicable water quality criteria for groundwater and surface water at the TSF.

Groundwater Use Assessment

Based on the surrounding land and water use assessment in Section 4, GHD applied the procedures outlined in Protocol 21 to determine the appropriate categories of water use to apply to groundwater at the Landfill and TSF EMP monitoring wells. As described in the Landfill Criteria and the Landfill OC, water quality compliance should be assessed at the landfill site boundary, therefore groundwater quality criteria should be applied at the monitoring wells located at the Landfill Site boundary.

As discussed in Section 5.5, a groundwater flow divide has been identified in the north of the Site, which separates groundwater flow into a northern flow path directed towards Sheep Creek, and a west to south-southwestern flow path directed toward the TSF and the earth dam. Because groundwater at the Landfill flows in both directions, water use applicability was assessed for both the north and south Landfill Site Boundaries.

Groundwater in the TSF flows to the south, therefore water use applicability was assessed for the southern boundary of the TSF.

The assessment of water use applicability is presented in Table 10.1.

Table 10.1 Applicable Water Quality Criteria – Protocol 21

CSR Water Use Standard	Water Use Applicability	Applicability
Aquatic Life[1]	Aquatic life water use applies to all groundwater located within 500 m of an aquatic receiving environment unless it can be demonstrated that the groundwater does not flow into that receiving environment. Beyond 500 m of an aquatic receiving environment, aquatic water use applies to groundwater that contains substances with concentrations above the aquatic life water use standards and has the potential to migrate within 500 m of the receiving environment.	There are two aquatic receiving environments located within 500m of the Site: – Sheep Creek – The unlined surface water ditch downstream of the earth dam with eventual discharge to the Salmo River Based on the above, aquatic life water quality standards **do apply** to the Site and

CSR Water Use Standard	Water Use Applicability	Applicability
		have been applied to north and south property boundary (downgradient) wells.
Irrigation[2] and Livestock[3]	Irrigation or livestock water use applies where groundwater wells at or nearby a site are currently used for irrigation or livestock watering. Nearby irrigation or livestock wells include those located within a radial distance of 500 m from the site boundary or from the outer extent of the groundwater contamination source. If groundwater flow direction is determined using approved methods, nearby current uses May be limited to include sources located 100 m upgradient and 500 m cross-gradient and downgradient of the site boundary or outer extent of the groundwater contamination source. If current irrigation or livestock watering wells are limited to a deeper confined aquifer, irrigation and livestock use does not apply to geological units above the confining barrier. Where it can be shown through well capture zone analysis that site groundwater will not enter the capture zone of nearby wells located within 500 m distance or 100 m upgradient of the site boundary or groundwater contamination source, irrigation or livestock water uses do not apply.	There are two groundwater wells at the Ross Property to the south of the Site (refer to Section 4.2). The wells are used to supply groundwater for agricultural and domestic use. Irrigation and livestock water use standards **do apply** at the Site and have been applied to groundwater monitoring wells at the southern (downgradient) property boundary. As there is a groundwater divide at the Site, the IW/LW standards have not been applied to the northern property boundary wells, as there are no groundwater wells located north (downgradient) of the Site.
Current Drinking Water[4]	Drinking water use applies where groundwater at or near a site is currently used for drinking water. Nearby drinking water wells include those located within a radial distance of 500 m from the site boundary or from the outer extent of the groundwater contamination source. If groundwater flow direction is determined using approved methods, nearby current uses May be limited to include wells located 100 m upgradient and 500 m cross-gradient and downgradient of the site boundary or outer extent of the groundwater contamination source.	There are two groundwater wells at the Ross Property to the south of the Site (refer to Section 4.2). The wells are used to supply groundwater for agricultural and domestic use. Drinking water use standards **do apply** to the Site and have been applied at the groundwater monitoring wells at the southern (downgradient) property boundary. As there is a groundwater divide at the Site, the DW standards have not been applied to the norther property boundary wells, as there are no groundwater wells located north (downgradient) of the Site.
Future Drinking Water[4]	Future drinking water use applies to drinking water aquifers below a site whether or not current drinking water use applies. Drinking water aquifers are saturated geological units that have suitable hydraulic properties and natural water quality to support a single-family domestic water supply. Where information is unavailable or inadequate to demonstrate an absence of drinking water aquifers below a site, drinking water aquifers are considered to exist. Where drinking water aquifers below a site are protected from contamination sources by a natural confining barrier and no shallow drinking water aquifers exist, future drinking water does not apply to geological units above the confining barrier. Where drinking water aquifers are unconfined, future drinking water use will apply to all units below the site.	The area to the south of the Site is underlain by Aquifer 496, which May be used as a future source of drinking water. The hydraulic conductivity of the overburden sediments to the north of the Landfill has been estimated to be approximately 3.8 x 10-6 m/s, and the hydraulic conductivity of the overburden sediments to the south of the Landfill have been estimated to be approximately 5.0 x 10^{-5} m/s (Section 5.6). Protocol 21 specifies that unconsolidated geologic units with hydraulic conductivity greater than 1.0 x 10^{-6} m/s are considered drinking water aquifers. Future drinking water use standards **do apply** at the Site and have been applied to groundwater monitoring locations at the southern and northern (downgradient) property boundary wells.

CSR Water Use Standard	Water Use Applicability	Applicability
Notes: BC CSR – British Columbia Contaminated Sites Regulations [1] – Schedule 3.2 Generic Numerical Water Standards Column 3 for the protection of Freshwater Aquatic (FAW). [2] – Schedule 3.2 Generic Numerical Water Standards Column 4 for the protection of Irrigation Water (IW). [3] – Schedule 3.2 Generic Numerical Water Standards Column 5 for the protection of Livestock (LW). [4] – Schedule 3.2 Generic Numerical Water Standards Column 6 for the protection of Drinking Water (DW). [5] – CSR Technical Guidance on Contaminated Sites 15, Version 2.0, November 1, 2017.		

As no monitoring wells at the Site are located within 10 m of the high-water mark of an aquatic receiving environment, based on Technical Guidance 15, CSR standards apply to groundwater at the Site and WQGs should not apply to groundwater. However, because the Landfill OC specifies that WQGs apply unless otherwise specified by the Director, and no other criteria have been specified by the Director, WQGs should also be applied to groundwater monitoring locations at the Landfill Site boundary. Per the Landfill Criteria, to assess groundwater quality at the site boundary and beyond, the applicable CSR groundwater standards have been applied at the Site boundary wells. WQG criteria do not apply to groundwater monitoring locations that are part of the TSF EMP.

Surface Water Use Assessment

The assessment of applicable surface water criteria is based on the same rationale presented in Table 10.1.

10.1 Site Applicable Criteria and Compliance Locations

Based on water use applicability assessment presented in Table 10.1, the applicable groundwater and surface water quality criteria for the Site groundwater and surface water monitoring locations are presented in Tables 10.2 and 10.3.

Table 10.2 Property Boundary Well Applicable Groundwater Quality Criteria

Criteria	Landfill EMP Locations	TSF EMP Locations
CSR AW	North Landfill Site Boundary Wells: **81-1, 81-3, 81-4, MW99-7D, 0200611, MW-09-02S, MW09-02D,** South Landfill Site Boundary Wells: **MW-03S-05, MW-04S-05**	**MW99-1S, MW99-1D, MW-01-2004(S), MW-01-2004(D), MW-02-2004(S), MW-02-2004(D)**
CSR DW	North Landfill Site Boundary Wells: **81-1, 81-3, 81-4, MW99-7D, 0200611, MW-09-02S, MW09-02D,** South Landfill Site Boundary Wells: **MW-03S-05, MW-04S-05**	**MW99-1S, MW99-1D, MW-01-2004(S), MW-01-2004(D), MW-02-2004(S), MW-02-2004(D)**
CSR IW/LW	**None**	**MW99-1S, MW99-1D, MW-01-2004(S), MW-01-2004(D), MW-02-2004(S), MW-02-2004(D)**
WQG AW	North Landfill Site boundary wells: **81-1, 81-3, 81-4, MW99-7D, 0200611, MW-09-02S, MW09-02D,** South Landfill Site boundary wells: **MW-03S-05, MW-04S-05**	**None**
WQG DW	North Landfill Site boundary wells: **81-1, 81-3, 81-4, MW99-7D, 0200611, MW-09-02S, MW09-02D,**	**None**

Criteria	Landfill EMP Locations	TSF EMP Locations
	South Landfill Site boundary wells: **MW-03S-05, MW-04S-05**	

Table 10.3 Surface Water Sampling Location Applicable Surface Water Criteria

BC Water Quality Guideline (WQG)	Landfill EMP Locations	TSF EMP Locations
Freshwater Aquatic Life[1]	Sheep Creek SW monitoring locations: **SW-A, SW-B** Seep monitoring locations: **Seep A, Seep E, Seep G, Seep I**	TSF SW monitoring locations: **Spillway Inlet, Spillway Outlet, Seepage Weir, Outlet Ditch, Salmo River Downstream**
Irrigation[1], Livestock[1]	**None**	**Outlet Ditch**
Drinking Water[1]	**None**	**Outlet Ditch**
Notes: [1] – British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (ENV, 2018), BC Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (MOE, 2017) and BC Source Drinking Water Quality Guidelines (ENV, 2017), for the protection of Freshwater Aquatic Life (FWAL), Irrigation (IW), Livestock (LW), and Drinking Water (DW).		

11. Impact Assessment

11.1 Groundwater

Groundwater analytical data from the Site monitoring wells from 2019 to 2023 was compared to the applicable groundwater quality criteria as discussed in Section 10. Groundwater analytical results that were above the applicable criteria are noted in Tables 3 through 6. Groundwater analytical results that were greater than the applicable criteria were subsequently compared to the appropriate Site background locations (and regional background concentrations from Protocol 9 where applicable). Parameters that were reported at concentrations greater than the applicable CSR and WQG standards and are greater than background groundwater at the Site (and regional background concentrations where applicable) are summarized in Table 11.1, below.

Table 11.1 Groundwater Impact Assessment

CSR Standard	Parameter	Monitoring Wells (number of exceedances / number of samples between 2019-2023)	Impact Assessment
Northern Landfill Site Boundary			
CSR DW	Arsenic (dissolved)	MW-99-7D (5/5)	The arsenic and cobalt exceedances at MW-99-7D are likely due to the migration of leachate affected groundwater. The source of arsenic and cobalt in groundwater May be related to leachate or naturally occurring minerals containing arsenic and cobalt.
CSR AW	Arsenic (dissolved)	MW-99-7D (5/5)	
CSR DW	Cobalt (dissolved)	MW-99-7D (5/5)	
Southern Landfill Site Boundary			
CSR DW	Antimony (dissolved)	MW-03S-05 (2/5)	The antimony exceedances at MW-03S-05 are likely due to isolated hotspot concentrations in the tailings. Antimony concentrations in the tailings deposition area are generally low and often below the limit of detection.
CSR DW	Arsenic (dissolved)	MW-03S-05 (5/5)	The arsenic exceedances at MW-03S-05 are due to the migration of Landfill leachate.
CSR AW	Arsenic (dissolved)	MW-03S-05 (2/5)	
CSR AW	Ammonia	MW-03S-05 (1/5)	The ammonia exceedance at MW-03S-05 is due to leachate migration from the Landfill or Septage Treatment Facility.
CSR DW	Tungsten (dissolved)	MW-03S-05 (2/5)	The tungsten exceedances at MW-03S-05 are likely due to migration of tailings leachate. Elevated tungsten concentrations are reported at upgradient wells in the tailings deposition area.
CSR DW	Manganese (dissolved)	MW-04S-05 (3/5)	The manganese exceedances are likely due to the migration of Landfill leachate.
TSF Downgradient			
CSR FAW	Ammonia	MW-99-1D (1/10)	The ammonia exceedance at MW-99-1D May be due to leachate migration from the Landfill or Septage Treatment Facility.
CSR DW	Arsenic (total)	MW-01-2004(S) (4/10)	The arsenic exceedances at MW-01-2004(S) are due to the migration of tailings leachate.

CSR Standard	Parameter	Monitoring Wells (number of exceedances / number of samples between 2019-2023)	Impact Assessment
CSR DW	Iron (total)	MW-99-1S (6/10)	The iron exceedances are due to the migration of tailings leachate.
CSR IW	Iron (total)	MW-01-2004(S) (1/10) MW-99-1S (6/10)	
CSR DW	Iron (dissolved)	MW-99-1S (3/10)	
CSR IW	Iron (dissolved)	MW-99-1S (4/10)	
CSR DW	Lithium (total)	MW-01-2004(S) (6/10) MW-99-1S (6/10) MW-99-1D (7/10) MW-02-2004(D) (7/10)	The lithium exceedances are due to the migration of tailings leachate.
CSR DW	Lithium (dissolved)	MW-01-2004(D) (10/10) MW-99-1S (10/10) MW-99-1D (10/10) MW-02-2004(D) (10/10)	
CSR IW	Molybdenum (total)	MW-01-2004(S) (3/10)	The molybdenum exceedances at MW-01-2004(S) are due to the migration of tailings leachate.
CSR DW	Manganese (total)	MW-01-2004(S) (7/10)	The manganese exceedances are due to the migration of tailings leachate.
CSR IW	Manganese (total)	MW-01-2004(D) (1/10) MW-99-1S (6/10) MW-99-1D (2/10) MW-02-2004(D) (4/10)	
CSR DW	Manganese (dissolved)	MW-01-2004(S) (10/10)	
CSR IW	Manganese (dissolved)	MW-01-2004(S) (10/10) MW-99-1S (6/10) MW-02-2004(D) (2/10)	
WQG Standard	**Parameter**	**Monitoring Wells (number of exceedances between 2019-2023)**	**Impact Assessment**
Northern Landfill Site Boundary			
WQG FAW	pH (field)	81-1 (1/10) MW99-7D (2/10) 200611 (1/10)	pH of groundwater at the Site is variable. The small number of pH exceedances represent seasonal variations.
WQG FAW	Iron (dissolved)	81-1 (4/5) MW99-7D (5/5) MW09-02D (2/5)	The iron exceedances at 81-1, MW99-7D and MW09-02D are likely due to the migration of Landfill leachate.
WQG DW	TOC	MW99-7D (5/5) MW-09-02D (2/5)	The TOC exceedances at MW99-7D and MW-09-02D are likely due to leachate

CSR Standard	Parameter	Monitoring Wells (number of exceedances / number of samples between 2019-2023)	Impact Assessment
			migration from the Landfill or Septage Treatment Facility.
WQG FAW	Cadmium (dissolved)	81-4 (3/5)	The cadmium exceedances at 81-4 May be due to the migration of Landfill leachate.
WQG FAW	Nitrate	81-4 (1/5)	The nitrate exceedance at 81-4 May be related to Landfill leachate or Site operations. Nitrate concentrations at the Site are generally low.
Southern Landfill Site Boundary			
WQG FAW	Ammonia	MW-03S-05 (1/5)	The ammonia exceedance at MW-03S-05 is due to leachate migration from the Landfill or Septage Treatment Facility.
WQG FAW	Iron (dissolved)	MW-03S-05 (1/5)	The iron exceedance at MW-03S-05 is likely due to the migration of Landfill leachate.
WQG DW	TOC	MW-03S-05 (3/5)	The TOC exceedances at MW-03S-05 are likely due to leachate migration from the Landfill or Septage Treatment Facility.

Notes:

Groundwater quality was compared to background concentrations at monitoring wells S-MW-1, MW-07-01, MW2A-01, MW-03A-01, and MW-05-01 (overburden).

The CSR criteria for iron do not apply at the northern Site boundary as the Landfill is not used for industrial or commercial purposes or activity listed under footnote 32 of BC CSR Schedule 3.2.

The CSR criteria for iron and manganese do apply at the southern boundary as the TSF is used for industrial or commercial purposes or activity listed under footnote 35 of BC CSR Schedule 3.2.

The interim regional background cobalt concentration of 20 ug/L is applied at the Site (Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023). Concentrations of cobalt in groundwater below 20 µg/L are not considered exceedances.

11.2 Seeps

Seep water analytical data from the Seep locations from 2019 to 2023 was compared to the applicable water quality criteria as discussed in Section 10. Seep water analytical results that were above the applicable criteria are noted in Table 9 and summarized in Table 11.2, below.

Table 11.2 Seep Impact Assessment

WQG Standard	Parameter	Monitoring Location (number of exceedances / number of samples between 2019-2023	Impact Assessment
WQG FAW	pH (field)	Seep A (1/10) Seep E (1/10)	pH of seeps at the Site is variable. The small number of pH exceedances represent seasonal variations.
WQG FAW	Ammonia	Seep A (1/10) Seep E (2/10)	The exceedances at Seeps A and E are likely due to leachate migration from the Landfill. Migration of leachate results in reducing redox conditions which encourages the migration of metals.
WQG FAW	Iron (dissolved)	Seep E (2/10)	
WQG FAW	Iron (total)	Seep A (9/10) Seep E (8/10)	
WQG FAW	Arsenic (total)	Seep A (9/10) Seep E (10/10)	
WQG FAW	Cobalt (total)	Seep A (7/10) Seep E (10/10)	
WQG FAW	Manganese (total)	Seep A (1/10) Seep E (7/10)	
WQG FAW	Uranium (total)	Seep A (10/10)	
Notes: The WQG criteria for phosphorus apply only to lakes, and do not apply at the Site surface water monitoring locations.			

11.3 Surface Water

Surface water analytical data from the Site monitoring locations from 2019 to 2023 was compared to the applicable surface water quality criteria as discussed in Section 10. Surface water analytical results that were above the applicable criteria are noted in Tables 10 and 11. Surface water analytical results that were greater than the applicable criteria were subsequently compared to the appropriate Site background locations where appropriate. Parameters that were reported at concentrations greater than both background surface water at the Site and the applicable WQG standards are summarized in Table 11.3, below.

Table 11.3 Surface Water Impact Assessment

WQG Standard	Parameter	Monitoring Location (number of exceedances / number of samples between 2019-202)	Impact Assessment
WQG DW	Temperature	Tailings Pond Outlet/Spillway Inlet (2/10) Outlet Ditch (1/10)	The temperature exceedances are likely unrelated to the Site.
WQG DW	TOC	Outlet Ditch (4/10)	The TOC exceedances are likely due to the discharge of

WQG Standard	Parameter	Monitoring Location (number of exceedances / number of samples between 2019-202)	Impact Assessment
		Tailings Pond Outlet/Spillway Inlet (4/10) Spillway Outlet (2/10)	impacted groundwater from the tailings deposition area.
WQG FAW	Iron (total)	Tailings Pond Outlet/Spillway Inlet (1/10) Spillway Outlet (2/7) Seepage Weir (4/13)	Sporadic exceedances of iron, lead, manganese, and uranium May be related to natural background conditions and seasonal variation in redox conditions. Consistent manganese exceedances at the Seepage Weir monitoring location are due to the discharge of groundwater which contains elevated manganese concentrations
WQG FAW	Iron (dissolved)	Seepage Weir (1/13)	
WQG DW	Lead (total)	Tailings Pond Outlet/Spillway Inlet (4/10)	
WQG FAW	Lead (total)	Tailings Pond Outlet/Spillway Inlet (2/10)	
WQG DW	Manganese (total)	Seepage Weir (13/13) Outlet Ditch (3/8) Tailings Pond Outlet/Spillway Inlet (9/10) Spillway Outlet (6/7)	
WQG DW	Uranium (total)	Tailings Pond Outlet/Spillway Inlet (1/10) Spillway Outlet (2/7) Outlet Ditch (1/8)	
WQG FAW	Uranium (total)	Tailings Pond Outlet/Spillway Inlet (1/10) Spillway Outlet (2/7) Seepage Weir (1/13) Outlet Ditch (1/8)	
Notes: The WQG criteria for phosphorus apply only to lakes, and do not apply at the Site surface water monitoring locations.			

12. Conceptual Site Model

GHD developed a Conceptual Site Model (CSM) for the Site using existing data including groundwater elevations, borehole logs, EMP analytical results, and Site observations. Development of the CSM involved the characterization of the groundwater and surface water flow conditions throughout the Site.

The CSM is based on previous CSMs developed for the Site including Wood (2020) and SRK (2019). The CSM should be updated as new data and Site information that improves the understanding of Site hydrologic and hydrogeologic conditions becomes available.

The CSM provides a general summary of the hydrogeologic and hydrologic conditions at the Site and nearby receptors (e.g., surface water courses and domestic water wells).

– The Site is located on the west slope of Iron Mountain at an elevation of approximately 700 to 800 m AMSL. Topography of the Site generally slopes to the south, with variable topography created by two bedrock ridges which trend north-south. Topography at the north of the Site slopes to the north toward Sheep Creek.

- The Site contains two separate facilities, the Landfill, which consists of three closed landfill cells, a composting facility, and a septage treatment facility, and the TSF, which consists of the tailings deposition area and earth dam.
- The Site is bounded to the north by Sheep Creek, to the west by a north-south oriented bedrock ridge located west of the TSF area, to the east by a topographic rise, and to the south by the Salmo River valley.
- The generalized stratigraphic sequence underlying the Site includes overburden sediments (sandy gravel overlying silty to sandy glacial till with varying amounts of clay and silt) and ranges in thickness between 0 and 28.7 m. The overburden sediments are underlain by bedrock consisting of phyllites of the Upper Laib Formation. Intrusive granodioritic bedrock underlies the southwestern portion of the site, including the TSF spillway.
- The mine tailings in the TSF consist mostly of silty sand and are characterized as having low ML/ARD potential.
- Two mapped faults exist at the Site: the Waneta fault, which cuts across the north-south ridge between the Salmo River floodplain and the tailings deposition area and an unnamed fault that trends north-south under the tailings deposition area.
- Groundwater flow at the Site takes place within the overburden sediments, in the underlying weathered bedrock, through the waste in the closed Landfill cells, and in the tailings. Groundwater flow follows topography and is influenced by the variable elevation of the underlying bedrock surface. Discontinuous clay units are present in the overburden which acts as confining units to the vertical flow of groundwater in some areas. A groundwater flow divide exists in the north of the Site which divides groundwater flow into a northern direction toward Sheep Creek, and a western direction toward the TSF and tailings deposition area.
- Three potential sources of groundwater contamination exist at the Site:
  - Landfill Leachate derived from the MSW waste buried at the Landfill
  - Septage Leachate derived from the raw liquid septage discharged in the Septage Treatment Facility
  - Tailings Leachate derived from the mine tailings in the TSF
- Two buffer zones, the NCAZ and SCAZ, have been established at the Site to allow for the attenuation of Landfill leachate. The NCAZ is located to the north of the groundwater flow divide along the northern flow path, and the SCAZ is located to the south of the groundwater flow divide along the southern flow path.
  - Groundwater flow to the north of the groundwater flow divide in the NCAZ is directed toward Sheep Creek. A portion of groundwater flow in the NCAZ discharges at groundwater seeps to the north of the Landfill, on the southern bank of Sheep Creek. Water discharging from the seeps flows overland before discharging into Sheep Creek.
  - Water flowing to the west of the groundwater flow divide in the SCAZ flows through the tailings deposition area toward the earth dam.
- Groundwater quality at the Site is assessed using a network of monitoring wells which characterize background conditions, leachate conditions, and quality within the NCAZ, SCAZ, and the area downgradient of the TSF. Groundwater at wells in the NCAZ, SCAZ, and TSF Downgradient area is compared to background groundwater and leachate quality to assess for leachate impacts and to evaluate the attenuation of leachate impacts along the groundwater flow paths toward the Site boundary.
- Plumes of leachate impacted groundwater, as characterized by elevated concentrations of leachate indicator parameters compared to background groundwater, are apparent in the areas immediately surrounding the Landfill and the northern portion of the tailings deposition area.
  - Leachate impacts to groundwater in the NCAZ are characterized by elevated concentrations of chloride, iron, arsenic, and TOC. The elevated concentrations of these parameters is likely due to the migration of Landfill Leachate.
  - Leachate impacts to groundwater in the SCAZ are characterized by elevated concentrations of chloride, ammonia, sulfate, TOC, iron, manganese, arsenic, and zinc compared to background groundwater. The elevated concentrations of these parameters are likely due to the migration of leachate from the Landfill, Septage Treatment Facility, and TSF.

- Leachate impacts in groundwater attenuate along the flow path in the NCAZ. Landfill leachate impacted groundwater discharges at groundwater seeps to the south of Sheep Creek and flows overland toward the creek. Surface water quality and benthic monitoring in Sheep Creek indicates that leachate impacted groundwater and seepage do not appear to impact surface water quality or aquatic life in Sheep Creek. Landfill leachate impacts in the SCAZ attenuate along the flow path and are mostly reduced to background levels at the southern Landfill site boundary.
- Surface water at the Site is managed using a series of surface water management ditches and culverts which divert water from the Landfill cells and direct it southwest towards the TSF, where it is conveyed by three lined surface water management ditches to the spillway located west of the earth dam. Surface water discharging at the spillway is directed to the south where it crosses Highway 3, flows through a ditch, and discharges to the Salmo River.
- Water quality is monitored in the surface water management system on Site, downstream at the southern property boundary, and at the discharge point to the Salmo River. Impacts to surface water from a possible combination of leachate, runoff from the Septage Treatment Facility, and the treated woodchip storage area, are apparent at the northern end of the of the tailings deposition area, downstream of the Septage Treatment Facility. Impacts to surface water quality attenuate along the flow path to the earth dam. No water quality impacts are apparent in the Salmo River.
- Groundwater and surface water quality at the Site boundaries is generally in compliance with the applicable water quality criteria. Concentrations of metals such as arsenic, cobalt, iron, manganese, and lithium exceed the applicable criteria at certain wells at the north and south boundaries. The cause of these exceedances is likely due to a combination of naturally elevated concentrations and the mobilization of metals under reducing redox conditions resulting from Landfill leachate migration.

13. Conclusions

This HHCR was completed to characterize the physical hydrogeologic and hydrologic setting of the Site and to provide a five-year update on the environmental performance of the Landfill and TSF in their current conditions. Based on the findings of this report, the following conclusions are made:

- Groundwater flow conditions at the Site were characterized for three geographic areas: the NCAZ, the SCAZ, and TSF Downgradient area. Based Site-specific hydraulic properties and groundwater elevation data collected in May 2023, the following hydrogeologic conditions were estimated:
  - Groundwater flow velocity in the NCAZ was estimated to be 48 m/year, and groundwater flux was estimated to be 23,300 m^3/year
  - Groundwater flow velocity in the SCAZ Landfill area was estimated to be approximately 94 m/year, and groundwater flux was estimated to be 66,500 m^3/year
  - Groundwater flow velocity in the SCAZ TSF area was estimated to be approximately 5.4 m/year
  - Groundwater flow velocity within the overburden in the TSF Downgradient area was estimated to be 65 m/year
  - Groundwater flow velocity within the bedrock in the TSF Downgradient area was estimated to be 10 m/year
- Three potential sources of groundwater contamination exist at the Site:
  - Landfill Leachate derived from the MSW waste buried at the Landfill
  - Septage Leachate derived from the raw liquid septage discharged in the Septage Treatment Facility
  - Tailings Leachate derived from the mine tailings buried in the TSF

- Leachate impacts to groundwater, seep, and surface water quality at the Site were assessed based on a set of eight leachate indicator parameters (chloride, ammonia, sulfate, TOC, iron, manganese, arsenic, and zinc), and through a comparison with background and leachate concentrations.
- Groundwater quality in the NCAZ is affected by the migration of Landfill leachate. Groundwater quality in the SCAZ is affected by the migration of Landfill leachate, septage leachate, and tailings leachate. Groundwater quality impacts attenuate along the two groundwater flow paths.
- The attenuation capacity of the NCAZ and SCAZ were assessed qualitatively and quantitatively. Based on groundwater, seep, and surface water quality data, the NCAZ and SCAZ are effective in attenuating leachate migration and protecting downgradient receptors (i.e., Sheep Creek).
- Based on analytical data from 2019-2023, groundwater quality at the northern Site boundary in the NCAZ exceeded the applicable groundwater quality criteria for arsenic and cobalt (CSR standards) as well as pH, iron, nitrate, TOC, and cadmium (WQG standards). Exceedances of the applicable WQG standards for the seeps were reported for temperature, pH, ammonia, iron, arsenic, cobalt, manganese, and uranium. Only one exceedance of the applicable WQG standards was reported for surface water in Sheep Creek, an exceedance of the iron standard at SW-B.
- Groundwater quality at the southern Site boundary in the SCAZ exceeded the applicable water quality criteria for antimony, arsenic, ammonia, manganese, and tungsten (CSR standards) as well as iron, ammonia, and TOC (WQG standards). The exceedances are likely due to leachate impacts to groundwater.

14. Recommendations

- Request from the Director that the applicable groundwater quality criteria for the Site be changed from the Water Quality Guidelines to the BC CSR Schedule 3.2. Section 3.12 of the Landfill OC states that groundwater quality should not decrease beyond the criteria of the BC Water Quality Guidelines or other appropriate criteria as specified by the Director. Based on the assessment presented in Section 10, the BC CSR Schedule 3.2 generic numerical water quality standards are currently the most appropriate criteria for groundwater at the Site.
- Take actions to rehabilitate the leachate seeps observed on the slopes of Cell 1 and Cell 4 (Appendix B, Photos 3 and 4).
- Consider the following modifications to the environmental monitoring programs for the Landfill and TSF.
  - Add Biological Oxygen Demand (BOD_5) to the list of groundwater analytical parameters for the Landfill EMP. BOD_5 is a measure of the quantity of organic matter available for microorganisms to consume, and is a useful indicator parameter for impacts sources that contain large quantities of organic matter such as landfills, compost facilities and septage treatment facilities.
  - Add un-ionized sulphide (as H_2S) to the groundwater analytical parameters for the Landfill EMP. Un-ionized sulphide is a CSR compliance parameter and a useful indicator parameter for leachate impacts.
  - Add Escherichia coli (E. coli) and Fecal Coliforms to the to the surface water analytical parameters for SW1-07. If E. Coli is detected at SW1-07, assess for E. Coli at the Spillway and other surface monitoring locations as appropriate. E. coli and fecal coliforms are WQG compliance parameters that are associated with septage that is treated at the Site.
  - Discontinue sampling for total metals at the TSF monitoring wells. Dissolved metals provide a more accurate representation of in-site groundwater conditions. Total metals concentrations for groundwater May be biased by elevated turbidity.
- Consider installing a groundwater monitoring well in the shallow overburden downgradient of the Septage Treatment Facility, and upgradient of the tailings deposition area. The purpose of the well would be to assess potential groundwater quality alteration from Septage Leachate.

15. References

AMEC Environment and Infrastructure. (2014). *Five Year Hydrogeology Review, Central Landfill, Salmo BC.*

Amec Foster Wheeler. (2015). *Central Landfill, Closure Plan.*

BC Ministry of Environment. (2002). *Detailed Site Investigation Technical Review.*

BC Ministry of Environment. (2016). *Landfill Criteria for Municipal Solid Waste Second Edition.* BC Ministry of Environment.

BC Ministry of Environment. (2017). *Protocol 21 for Contaminated Sites, Water Use Determination. Version 2.0.* BC Ministry of Environment and Climate Change Strategy.

BC Ministry of Environment. (n.d.). *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills .*

BGC Engineering Inc. (2002). *H.B. Mine Tailings Pond and Dyke Decommissioning Plan.*

Conestoga Rovers & Associates. (1995). *Compiling and interpreting chemical data from municipal solid waste landfill leachate. Waterloo (ON): Prepared for Environment and Climate Change Canada. Report No.: 054555 (10).* Conestoga Rovers & Associates.

Conestoga-Rovers and Associates. (2001). *Detailed Site Investigation Summary Report.*

Conestoga-Rovers and Associates. (2002a). *Detailed Site Investigation Summary Report.*

Conestoga-Rovers and Associates. (2002b). *Final Cover Design Cell 1, 2, and 3.*

Conestoga-Rovers and Associates. (2004). *2004 Updated Environmental Monitoring Program (EMP).*

Conestoga-Rovers and Associates. (2004). *Attenuation Zone Evaluation.*

Conestoga-Rovers and Associates. (2005). *Contaminant Attenuation Zone Evaluation, Southern Groundwater Flow Path.*

Conestoga-Rovers and Associates. (2006). *Northern Groundwater Flow Path Contaminant Attenuation Zone.*

Gartner Lee Limited. (1999). *Creston Landfill - Phase 2 Leachate Assessment Work Program.* Gartner Lee Limited.

Klohn-Crippen. (2000). *Canex Landfill, Hydrogeological Impact Assessment.*

Lengyel, T., Verma, S., & Hinnell, A. (2022, December 30). *Aquifer 496 Summary.* Retrieved from British Columbia Wells and Aquifers: https://apps.nrs.gov.bc.ca/gwells/aquifers/496

Mulamoottil, G., McBean, E., & Rovers, F. (1999). *Constructed wetlands for the Treatment of Landfill Leachates.* CRC Press.

Natural Resources Canada. (2009). *Bedrock Geology, Salmo, British Columbia, Open File 6048.* Natural Resources Canada.

New Graph Environment. (2020). *Sheep Creek Biological Impact Assessment 2019.*

RDCK. (2020). *HB Mine Tailings Facility Remediation and Closure Plan, HB Mine Tailings Storage Facility, Salmo, BC.*

RDCK. (2023a). *Central Landfill 2022 Annual Operations and Monitoring Report.* RDCK.

RDCK. (2023b). *Annual Reclamation Report for 2022 - HB Mines Tailings Storage Facility, Permit M-218.* RDCK.

RDCK. (2024). *Annual Reclamation Report for 2023, Mines Act Permit Number: M-218. HB Mine Tailings Storage Faciility.* RDCK.

SLR Consulting. (2022). *Water Quality Management and Monitoring Plan - 2022 Update.*

SNC. (2013). *Limited Risk-based Preliminary and Detailed SIte Investigation and Human Health Risk Assessment. Blocks 3 and 4, District Lot 275, Plan NEP23118 and Lot A, Block 5, West Half of Block 6 and Block 7, Kootenay Land District, 6 km South of Salmo, BC.*

Spitz, K., & Moreno, J. (1996). *A Practical Guide to Groundwater and Solute Modeling.* John Wiley and Sons.

SRK. (2016). *HB Mine Tailings Facility Remediation and Closure Preliminary Assessment.*

SRK. (2017). *Prediction of Geochemical Performance of HB Tailings Under Proposed Remediation Conditions Memo.*

SRK. (2019). *HB Mine Tailings Facility, Remediation and Closure Plan.*

SRK. (2022b). *Geochemical Characterization Results from 2021 Operational ML/ARDMonitoring of Construction Materials at the HB Mine. Technical Memo.*

SRK. (2023b). *2022 ML/ARD Monitoring of the Quartz Monzonite Quarry and Construction Rock.* SRK Consulting.

SRK Consulting. (2018). *HB Mine Tailings Facility - Closure and Remediation Preliminary Design Report.*

SRK Consulting. (2022a). *HB Mine Tailings Facility - 2021 Dam Safety Inspection Report.*

SRK Consulting. (2023a). *HB Mine Tailings Facility - 2022 Dam Safety Inspection Report.*

Teck Cominco Ltd. (1999). *Letter re: HB Mine ABA Test Results from Sampling of HB Mine Tailings Conducted May 17, 1999.*

UMA Environmental. (1995). *Landfill Operation Plan.*

Wood Environment & Infrastructure Solutions. (2020). *Central Landfill 5 Year Hydrogeologic Review.*

Tables

Table 1

Monitoring Well Details and Hydraulic Elevation Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

									May 2019		April/May 2020		May 2021		May 2022		May 2023	
EMS Number	Well ID	Aquifer	Northing (UTM Zone 11N)	Easting (UTM Zone 11N)	Reference Elevation	Well Depth	Screened Interval	Screened Geologic Unit	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
					(m AMSL)	(m)	(m BGS)		(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)
Landfill and Tailings Leachate Source Wells																		
E252599	LW-03-01	OB	5443025.22	482209.84	733.68	9.72	4.70 - 7.80	Sand, Gravel, and Clay	7.54	726.14	6.75	726.93	7.22	726.46	7.07	726.61	7.00	726.68
E252594	MW-06-01	OB	5442731.42	481821.05	714.36	4.030	0.75 - 3.81	Sand-like tailings	1.12	713.24	0.93	713.43	1.13	713.23	0.41	713.95	0.59	713.77
Background Wells																		
E221702	S-MW-1	OB/BR	5442972.89	482564.61	765.46	5.07	1.25 - 4.25	Gravelly Sand, Silty Sand, and Bedrock	3.78	761.68	3.73	761.73	3.76	761.70	3.75	761.71	3.74	761.72
E252591	MW-02A-01	OB	5443202.18	482060.27	680.66	9.00	5.30 - 8.40	Gravel and Sand	4.15	676.51	4.25	676.41	4.19	676.47	4.18	676.48	3.99	676.67
E252592	MW-03A-01	OB	5443292.84	483120.82	704.64	15.84	12.04 - 15.09	Silt and Gravel	TOP	>704.64	TOP	>704.64	TOP	>704.64	TOP	>704.64	TOP	>704.64
E252595	MW-07-01	OB	5442934.84	482840.83	802.00	6.11	2.29 - 5.33	Sand, Silt, and Clay	2.64	799.36	2.081	799.92	2.34	799.67	2.14	799.86	2.19	799.81
NCAZ Wells																		
E240505	MW-99-7D	OB	5443076.13	482136.83	732.08	20.72	18.75 - 20.25	Sand and Silty Gravel	14.62	717.46	14.29	717.80	14.43	717.65	14.32	717.76	14.47	717.61
E252601	MW-09-02S	OB	5443095.13	482126.67	731.57	13.70	11.30 - 12.80	Sand	12.18	719.39	11.70	719.87	12.19	719.38	12.07	719.50	12.01	719.56
E252602	MW-09-02D	OB	5443095.13	482112.18	731.42	26.00	22.50 - 25.60	Sand, Gravel, Bedrock	19.35	712.08	19.03	712.39	19.18	712.24	19.04	712.38	19.26	712.16
O200583	81-1	OB	5443030.26	482424.19	752.53	16.60	1.50 - 15.00	Sand with Silt and Gravel, Clay, and Silty Sand	12.49	740.04	10.88	741.66	12.48	740.06	12.49	740.04	12.30	740.24
O200584	81-3	OB	5443050.78	482282.84	736.82	6.30	2.00 - 6.00	Sand, Sandy Silt, and Bedrock	4.46	732.36	4.37	732.45	4.44	732.38	4.35	732.47	4.29	732.53
O200585	81-4	OB	5443028.12	482142.14	731.23	11.02	5.50 - 11.50	Clayey Silt and Sand	6.71	724.52	6.77	724.46	6.57	724.66	6.50	724.73	6.46	724.78
O200611	200611	OB	5443070.78	482062.86	729.68	12.56	- - -	Unknown	8.85	720.83	-	722.80	8.45	721.23	7.62	722.06	8.59	721.09
SCAZ Wells																		
E207637	207637	OB	5442758.26	482040.81	Not Available	7.88	- - -	Not Available	3.51	-	3.03	-	3.43	-	3.29	-	2.78	-
E221703	S-MW-2	OB	5442629.59	482024.90	729.55	10.19	6.05 - 9.10	Gravelly Sand and Silty Sand	8.00	721.55	7.49	722.06	8.07	721.48	8.12	721.43	7.29	722.26
E275564	MW99-3S	OB	5442890.10	482154.56	728.27	9.93	8.00 - 9.50	Silty Clay and Silty Sand	5.57	722.70	7.00	721.28	7.28	720.99	7.04	721.23	6.46	721.81
E254762	MW99-6S	OB	5442948.68	482058.08	725.6	18.27	14.80 - 17.80	Sand and Gravel	4.78	720.82	4.18	721.42	4.40	721.20	4.26	721.34	4.66	720.94
E240506	MW-99-8	OB	5442905.06	482218.57	730.68	6.81	4.70 - 6.20	Silt, Sand, and Gravel	5.32	725.36	5.01	725.67	5.15	725.53	5.05	725.63	5.18	725.50
E254755	MW-02S-03	OB	5442722.19	481886.35	714.19	5.08	1.37 - 4.42	Silt with Sand: tailings	1.30	712.89	0.89	713.30	0.91	713.28	0.37	713.83	0.43	713.76
E254756	MW-02D-03	OB	5442716.09	481878.72	714.17	12.58	8.69 - 11.73	Gravelly Sand with Silt and Sandy Gravel	1.45	712.72	1.107	713.06	1.14	713.03	0.52	713.65	0.63	713.54
E254759	MW-01C-03	OB	5442635.30	481887.39	713.2	11.38	8.69 - 11.73	Silt and Sand: tailings	1.01	712.20	0.85	712.35	0.93	712.27	TOP	>713.20	TOP	>713.20
E254760	MW-03S-03	OB	5442594.22	481811.84	712.6	16.08	9.24 - 15.34	Silt and Sand: tailings	1.11	711.49	0.78	711.82	0.77	711.83	TOP	>712.60	TOP	>712.60
E266346	MW-02-05	OB	5442403.30	481865.56	715.37	15.14	9.14 - 15.24	Silt and Sand: tailings	1.38	713.99	0.85	714.52	1.01	714.36	0.47	714.90	0.41	714.96
E266348	MW-03S-05	OB	5442024.89	481917.88	708.05	12.86	12.19 - 18.29	Silt and Sand: tailings	1.19	706.86	0.77	707.28	0.88	707.18	0.42	707.63	0.25	707.80
E266349	MW-04S-05	OB	5442329.98	481902.62	713.24	18.01	11.89 - 17.99	Silt and Sand: tailings	0.89	712.35	0.78	712.46	0.86	712.38	0.35	712.89	0.05	713.19
E266350	MW-05-05	OB	5442497.63	481826.63	709.88	15.38	9.14 - 15.24	Silt and Sand: tailings	1.33	708.55	0.91	708.97	1.10	708.78	0.40	709.48	0.48	709.40
E240503	MW99-3D	BR	5442890.04	482154.59	728.27	14.61	11.0 - 14.0	Bedrock	7.33	720.94	6.83	721.45	7.03	721.24	6.79	721.48	7.20	721.08
E254757	MW-01A-03	BR	5442625.18	481930.11	713.17	23.50	19.81 - 22.86	Bedrock	0.86	712.31	0.75	712.42	0.76	712.41	TOP	>713.17	TOP	>713.17

Notes

OB	Overburden
BR	Bedrock
EMS	Environmental Monitoring System
m AMSL	metres above mean sea level
m BTOR	metres below top of riser
BGS	Below ground surface
TOP	Artesian conditions, water level is above top of riser

Table 2

Monitoring Well Details and Hydraulic Elevation Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

									May 2019		April/May 2020		May 2021		May 2022		September 2022		December 2022		March 2023		May 2023		September 2023		November 2023	
EMS Number	**Well ID**	**Aquifer**	**Northing (UTM Zone 11N)**	**Easting (UTM Zone 11N)**	**Reference Elevation[1]**	**Total Well Depth**	**Screened Interval**	**Screened Geologic Unit**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**	**Depth to Water**	**Water Elevation**
					(m AMSL)	(m)	(m BGS)		(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)	(m BTOR)	(m AMSL)
TSF Downgradient (Overburden Unit)																												
E252593	MW-05-01[2]	OB	5442004.32	482071.91	741.64	4.42	1.07 - 4.11	Sand and Silty Clay	1.68	739.96	1.63	740.01	1.72	739.92	1.61	740.03	2.97	738.68	3.08	738.56	1.82	739.82	1.63	740.01	3.00	738.64	2.05	739.59
E303722	MW-01-2004 (S)	OB	5441842.39	481638.49	682.71	6.10	2.30 - 5.50	Sandy Silt, Sandy Gravel, and Silty Sand	3.22	679.49	2.86	679.85	3.37	679.34	3.12	679.59	3.80	678.91	3.73	678.98	3.41	679.30	3.09	679.63	3.74	678.97	3.35	679.36
E275563	MW99-1S	OB	5441572.83	481526.30	645.21	17.4	13.50 - 16.50	Sand and Gravel and Silty Gravel	11.34	633.88	11.30	633.91	11.96	633.26	12.62	632.59	13.28	631.94	13.93	631.28	12.01	633.20	11.74	633.47	13.11	632.11	12.76	632.45
E303724	MW-02-2004 (S)	OB	5441482.24	481527.33	638.81	9.75	6.71 - 9.75	Gravelly Sand and Silty Sand	4.42	634.39	4.40	634.41	5.05	633.76	5.66	633.15	8.60	630.21	8.60	630.21	4.11	634.70	4.90	633.91	8.75	630.06	7.14	631.67
TSF Downgradient (Bedrock Unit)																												
E275543	MW99-2S[2]	BR	5442696.34	481620.50	714.55	4.60	2.30 - 3.90	Shallow Bedrock	0.59	713.96	0.52	714.03	0.65	713.90	0.10	714.45	1.27	713.28	0.85	713.70	0.15	714.40	0.02	714.53	1.23	713.32	0.25	714.30
E240502	MW99-2D[2]	BR	5442696.30	481620.61	714.55	24.4	20.50 - 23.50	Bedrock	0.35	714.20	TOP	>714.55	0.10	714.45	0.01	714.54	0.81	713.74	0.52	714.03	0.05	714.50	TOP	>714.55	0.78	713.77	0.03	714.52
E303723	MW-01-2004 (D)	BR	5441838.85	481634.62	682.75	20.73	16.15 - 19.20	Bedrock	2.85	679.90	2.67	680.08	2.96	679.79	2.82	679.93	3.44	679.31	3.38	679.38	3.15	679.60	2.95	679.80	3.40	679.35	3.14	679.61
E240501	MW99-1D	BR	5441582.96	481529.16	645.21	29.7	26.20 - 29.20	Bedrock	7.96	637.25	7.87	637.34	8.12	637.09	8.13	637.08	-	-	9.07	636.14	8.41	636.80	8.02	637.19	8.98	636.23	8.73	636.48
E303725	MW-02-2004 (D)	BR	5441474.36	481527.56	638.47	53.19	50.14 - 53.19	Bedrock	6.43	632.04	6.04	632.43	6.32	632.15	6.26	632.21	7.63	630.85	8.11	630.36	7.57	630.90	5.98	632.50	7.90	630.57	7.86	630.61

Notes

OB	Overburden
BR	Bedrock
EMS	Environmental Monitoring System
m AMSL	metres above mean sea level
m BTOR	metres below top of riser
TOP	Artesian conditions, water level is above top of riser
(1)	Reference elevation estimated based on stratigraphy log information, except where noted.
(2)	Reference elevation approximated by estimating ground surface and adding stick-up from stratigraphy log information. Survey required.

Table 3

Leachate and Tailings Source Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	LW-03-01 (E252599)	LW-03-01 (E252599)	LW-03-01 (E252599)	LW-03-01 (E252599)	LW-03-01 (E252599)
Date Sampled							2-May-2019	06-May-2020	12-May-2021	25-May-2022	17-May-2023	29-May-2019	01-May-2020	12-May-2021	25-May-2022	17-May-2023
Time Sampled							10:09	11:24	09:52	09:45	11:05	11:15	14:35	10:45	10:54	12:03
ALS Sample ID							L2267651-8	VA20A6269-008	VA21A9252-017	VA22B1687-002	VA23B1196-001	L2282164-5	VA20A5832-010	VA21A9252-018	VA22B1687-004	VA23B1196-002
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d										
Field Parameters																
pH, Field			--	--	--	6.5-9.0	6.89	7.36	7.15	6.94	6.8	6.77	7.79	6.71	6.36[d]	6.22[d]
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	7.3	7.1	8.2	7.7	8.8	10.9	7.7	8.5	7.2	8.3
Conductivity		µS/cm	--	--	--	--	1942	1795	1947	1732	1647	364.8	334.4	282.0	309.6	318.1
Turbidity		NTU	--	--	(b)	(b)	5.43	64.0	76.0	11.02	40	55.3	7.72	20.8	9.08	12
General Chemistry																
Conductivity	2.0	µS/cm	--	--	--	--	2790	2680	3070	2420	2180	241	342	243	257	286
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	1900	1740	1940	1540	1330	108	84.5	92.7	92.5	93.0
pH	0.10		--	--	--	6.5-9.0	7.12	7.26	7.71	8.09	7.55	6.90	6.23[d]	6.57	6.53	6.54
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	324	284	305	237	237	116	76.6	114	26.4	117
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-		-	-	<1.0	-	
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-		-	-	<1.0	-	
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-		-	-	<1.0	-	
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	305	-		-	-	114	-	
Bromide (Br)	0.050	mg/L	--	--	--	--	<1.0	<1.00	<1.00	<1.00	<1.00	<0.050	0.267	<0.050	0.384	0.053
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	<10	<10.0	<10.0	<10.0	10.1	7.25	56.5	4.27	57.6	24.1
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	<0.40	<0.400	-	<0.400	<0.400	0.074	0.061	-	0.032	0.047
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	1580[acd]	1570[acd]	1690[acd]	1380[acd]	1220[acd]	5.08	1.91	1.65	2.37	5.02
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	0.101	0.087	0.239	-	0.104	0.079	0.105	0.201
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	0.095	0.092	0.225	0.162	0.098	0.074	0.112	0.189
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	84.3	72.7	86.6	72.5	64.6	54.4	52.8	56.3	40.0	44.6
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	6.93[c]	5.75[c]	5.93[c]	21.6[c]	17.2[c]	11.5[c]	3.20	3.13	4.28[c]	3.47
Nutrients																
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	0.6300	0.449	0.575	1.56	4.33	0.607	0.933	0.227	0.271	0.534
Nitrate (as N)	0.0050	mg/L	10	400	10	3	<0.10	<0.100	<0.100	<0.100	<0.100	0.0071	0.0343	<0.0050	0.0404	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.020	<0.0200	<0.0200	<0.0200	<0.0200	0.0036	0.0085	<0.0010	0.0016	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	1.21	0.969	1.03	2.80	5.83	3.79	1.64	1.24	1.05	1.28
Dissolved Metals (Semi-Trace)																
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	557000	529000	566000	476000	465000	32100	25300	27500	27400	28000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	125000	102000	128000	84600	40800	6900	5210	5830	5850	5600
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	12000	10300	12700	16000	23200	1690	1620	1260	1360	1350
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	8740	6590	7140	21800	22300	6620	4730	4300	3460	2810
Dissolved Metals (Trace)																
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	<5.0	2.6	5.6	2.3	3.2	3.1	2.3	4.0	<1.0	3.3
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.50	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	2.27	1.63	2.32	2.98	4.91	32.7[a]	34.4[a]	49.7[a]	0.24	37.8[a]
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	6.91	8.40	8.69	36.1	62.3	92.6	93.8	63.6	63.5	88.6
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.50	<0.200	<0.200	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.25	<0.100	<0.100	<0.100	<0.100	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	272	130	157	21	38	27	10	12	11	11
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	1.95[d]	2.98[d]	3.09[d]	<0.0100	<0.0100	0.0225	0.0056	0.0096	0.0078	0.0067
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.939	0.865	1.25	1.39	0.555	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	<0.50	<0.20	<0.00100	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	3.84[a]	4.9[a]	3.53[a]	0.83	1.5[a]	10.2[a]	25[a]	13.8[a]	20.9[a]	12.6[a]
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	<1.0	<0.40	<0.40	<0.40	<0.40	0.24	<0.20	<0.20	<0.20	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	25200[ad]	17900[ad]	21400[ad]	<20	33400[ad]	80100[ad]	94900[ad]	66000[ad]	<10	76800[ad]
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	2.52	0.434	0.482	<0.100	0.460	0.053	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	<5.0	4.00	4.2	3.4	4.1	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	1130	918	1020	752	1100	3680[a]	3560[a]	2010[a]	2260[a]	3040[a]
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	0.590	0.458	0.585	0.616	0.401	1.26	1.17	1.63	<0.050	0.995
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	24.7	24.6	21.8	3.32	3.50	0.65	1.33	<0.50	1.32	<0.50
Phosphorus (P)-Dissolved	50	mg/L	--	--	--	--	<250	<100	<100	<100	<100	96	143	182	<50	180
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	34.7	27.7	33.0	30.8	34.3	0.43	0.67	0.24	0.26	0.42
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	<0.25	<0.100	<0.100	<0.100	<0.100	0.051	2.38	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	9140	6020	8020	4020	6020	17700	15000	15800	11700	16200
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.050	<0.020	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	856	667	820	708	700	201	183	159	170	194
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	590000	548000	631000	486000	428000	1040	1060	<500	780	1410
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<1.0	<0.40	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	0.637	0.668	0.723	0.442	0.036	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.50	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	1.18	<0.20	<0.20	<0.20	<0.20	0.55	0.36	0.12	0.13	0.13
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<1.5	<0.60	<0.60	<0.60	<0.60	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.50	<0.20	<0.20	<0.20	<0.20	<0.10	0.10	<0.10	<0.10	0.11
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	3.74	4.12	3.96	2.48	4.76	0.020	<0.010	<0.010	<0.010	0.013
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<2.5	<1.00	<1.00	<1.00	<1.00	0.78	0.52	0.51	<0.50	0.68
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	10300[ab]	12500[ab]	9150[ab]	407	667	18.4	12.7	6.1	6.0	9.3
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.30	<0.40	<0.40	<0.40	<0.40	<0.060	<0.20	<0.20	<0.20	<0.20

Table 4

Background Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-07-01 (E252595)	MW-07-01 (E252595)	MW-07-01 (E252595)	MW-07-01 (E252595)	MW-07-01 (E252595)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	S-MW-1 (E221702)	S-MW-1 (E221702)	S-MW-1 (E221702)	S-MW-1 (E221702)	S-MW-1 (E221702)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)
Date Sampled							14-May-2019	28-Apr-2020	03-May-2021	12-May-2022	01-May-2023	13-May-2019	28-Apr-2020	03-May-2021	12-May-2022	02-May-2023	14-May-2019	29-Apr-2020	03-May-2021	16-May-2022	02-May-2023	13-May-2019	28-Apr-2020	03-May-2021	16-May-2022	03-May-2023
Time Sampled							9:07	14:40	10:06	11:03	12:36	15:11	10:30	12:48	13:09	14:18	10:22	11:54	15:51	10:50	09:20	16:13	12:31	14:09	10:04	15:01
ALS Sample ID							L2274410-1	VA20A5832-001	VA21A8717-001	VA22B0631-001	VA23A9648-001	L2274410-5	VA20A5832-003	VA21A8717-003	VA22B0631-002	VA23A9648-008	L2274410-2	VA20A5832-002	VA21A8717-002	VA22B0967-001	VA23A9648-002	L2274410-4	VA20A5832-004	VA21A8717-004	VA22B0967-002	VA23A9844-001
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d																				
Field Parameters																										
pH, Field			--	--	--	6.5-9.0	7.32	8.96	6.84	6.72	6.67	9.14[d]	8.56	7.66	8.31	8.28	8.35	7.98	7.23	7.66	7.73	8.93	7.67	7.23	7.32	7.36
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	6.5	5.6	5.8	6.1	9.2	11.1	8.9	8.5	9.0	17.6[c]	7.6	5.9	6.7	6.7	6.2	5.0	5.1	4.7	4.8	7.2
Conductivity		µS/cm	--	--	--	--	135.7	174.8	118.9	120.5	112.6	201.1	260.8	181.5	190.8	239.4	222.2	200.6	210.2	216.4	213.8	184.4	251.9	214.0	185.8	210.4
Turbidity		NTU	--	--	(b)	(b)	0.85	0.18	0.00	1.88	3.9	10.9	4.72	0.00	5.38	1.6	73.9	48.9	26.2	11.33	11	3.41	0.99	0.17	1.61	1.5
General Chemistry																										
Conductivity	2.0	µS/cm	--	--	--	--	210	181	186	181	154	267	267	261	263	264	324	328	315	285	317	291	256	338	292	302
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	111	89.2	97.7	86.1	74.8	103	104	98.7	95.9	90.7	188	181	175	183	157	63.9	85.4	66.2	75.2	62.2
pH	0.10		--	--	--	6.5-9.0	7.71	7.55	7.82	7.89	7.67	8.31	8.31	8.36	8.32	8.34	8.24	8.23	8.36	8.18	8.29	8.03	7.86	8.17	8.29	8.23
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	95	79.3	93.6	85.0	69.9	135	137	144	135	132	175	186	178	140	164	129	114	166	130	132
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.65	<0.50	0.52	9.68	3.93	12.6	8.46	11.4
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	0.046	0.044	0.045	0.043	0.047	1.30	1.31	1.35[d]	1.37[d]	1.37[d]	0.101	0.093	0.097	0.098	0.100	0.895	0.682	1.09	0.817	0.990
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	11.8	11.0	12.4	11.7	11.0	8.44	8.35	9.35	8.80	9.06	12.0	11.3	12.4	11.8	12.5	7.47	15.9	10.1	10.1	10.4
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011	-	0.021	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	0.020	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	25.5	23.6	46.9	24.6	18.1	34.0	30.7	33.8	35.5	27.9	41.9	38.9	42.9	42.9	39.4	34.2	28.8	39.4	35.1	29.5
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	0.78	0.63	0.55	0.71	0.74	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50	0.80	0.86	0.62	<0.50	0.88
Chemical Oxygen Demand (COD)	20.00	mg/L	--	--	--	--	-	-	<20	-	-	-	-	<20	-	-	-	-	<20	-	-	-	-	48	-	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0601	0.0670	0.0590	0.0619	0.0554	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0119	0.0051	0.0116	0.0068	0.0082
Nitrate (as N)	0.0050	mg/L	10	400	10	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0171	0.0080	0.0054	0.0176	<0.0050	0.0052	<0.0050	<0.0050	0.0179	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0296	0.0210	0.0083	0.0019	0.0051	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	0.058	0.086	0.063	0.079	0.058	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.051	<0.050	0.194	<0.050
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	36300	29200	32300	28600	24600	26700	26600	25600	25500	23800	50300	48000	47200	48900	41800	19100	25700	19600	22900	18400
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	4960	3940	4150	3560	3250	8760	9140	8450	7820	7590	15100	14900	13900	14800	12800	3930	5150	4180	4380	3940
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	582	579	808	561	457	1370	1410	1430	1350	1250	1350	1250	1520	1190	1140	889	854	958	843	845
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	1480	1280	1350	1240	1120	23400	22900	22200	23000	19500	3600	3390	3420	3180	2980	45800	26500	56000	36100	41200
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	<1.0	<1.0	<1.0	1.1	1.7	1.5	1.7	1.6	2.1	1.8	2.5	2.2	2.8	1.8	1.2	1.7	1.4	1.1	2.0	1.6
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.29	<0.10	<0.10	0.11	0.11	0.11	0.11	0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	9.72	9.47	8.47	9.23	8.98	0.16	0.15	0.19	0.13	0.14	2.68	2.59	3.38	2.78	3.17
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	21.8	19.5	19.7	17.1	15.0	63.3	55.2	57.8	56.3	56.9	20.1	19.7	18.6	20.1	17.8	53.8	62.1	59.4	59.2	56.5
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	<10	<10	<10	<10	<10	73	65	70	71	62	<10	<10	<10	<10	<10	362	165	476	311	312
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.0451	0.0408	0.0501	0.0395	0.0365	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	0.011	0.014	0.019	0.432	0.339	0.310	0.352	0.340	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	0.41	0.22	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.22	0.31	0.22	0.22	0.22
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	<0.20	<0.20	0.37	0.33	0.26	<0.20	<0.20	0.45	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.37	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	<10	<10	<10	<10	<10	91	114	64	<10	72	<10	<10	<10	<10	<10	700[d]	832[d]	863[d]	840[d]	862[d]
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	1.4	1.4	1.4	1.3	1.3	9.4[a]	11.2[a]	9.5[a]	8.9[a]	8.7[a]	5.4	5.3	4.8	4.9	4.6	10.2[a]	10.5[a]	10.9[a]	9.8[a]	10.2[a]
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	4.19	4.31	1.04	0.30	0.99	141	174	146	48.7	124	6.12	6.22	45.8	2.57	1.99	519	614	644	554	558
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	0.081	0.062	0.099	0.080	0.077	0.511	0.927	0.951	0.507	0.509	2.55	2.34	3.10	2.29	2.37	0.732	0.495	0.814	0.622	0.565
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	62	<50	112	73	69
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	0.65	0.72	0.63	0.63	0.62	1.72	1.66	1.56	1.67	1.39	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	0.072	0.062	0.054	0.065	0.071	<0.050	<0.050	<0.050	<0.050	<0.050	0.503	0.331	1.08	1.16	0.640	0.241	0.275	0.268	0.29	0.282
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5740	5480	5690	5000	5610	5600	5410	5690	5490	5830	6090	6250	6320	6670	6300	5750	5810	6260	6540	5980
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	181	143	150	152	112	681	684	643	662	578	349	311	312	298	274	123	156	130	133	120
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	3450	3520	3570	3360	3120	2750	2460	2620	2840	2890	3520	3370	3920	4590	3840	2290	4900	3090	3680	3150
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	0.11	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.50	0.47	0.50	0.49	0.49	<0.10	<0.10	<0.10	<0.10	<0.10	0.68	0.57	0.81	0.65	0.69
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	0.503	0.391	0.385	0.364	0.243	0.424	0.463	0.411	0.421	0.392	12.1	11.8	8.84	10.0	10.6	0.270	0.249	0.249	0.285	0.194
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.87	0.69	0.62	0.69	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	1.8	1.2	1.2	2.7	1.8	<1.0	1.3	<1.0	<1.0	<1.0	1.8	2.7	2.3	1.0	<1.0	<1.0	1.6	<1.0	2.0	1.1
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 5

NCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							81-1 (02200583)	81-1 (0200583)	81-1 (O200583)	81-1 (O200583)	81-1 (O200583)	81-3 (0200584)	81-3 (0200584)	81-3 (O200584)	81-3 (O200584)	81-3 (O200584)	81-4 (02200585)	81-4 (0200585)	81-4 (O200585)	81-4 (O200585)	81-4 (O200585)	MW-99-7D (E240505)	MW-99-7D (E240505)	MW-99-7D (E240505)	MW-99-7D (E240505)	MW-99-7D (E240505)
Date Sampled							16-May-2019	07-May-2020	10-May-2021	17-May-2022	10-May-2023	15-May-2019	30-Apr-2020	05-May-2021	17-May-2022	08-May-2023	16-May-2019	06-May-2020	10-May-2021	24-May-2022	10-May-2023	28-May-2019	08-May-2020	12-May-2021	24-May-2022	15-May-2023
Time Sampled							13:43	13:32	11:02	14:57	14:04	10:44	15:32	12:40	09:16	15:48	15:48	12:54	12:33	09:18	15:09	9:16	13:47	10:33	10:31	15:44
ALS Sample ID							L2275781-7	VA20A6269-013	VA21A9252-001	VA22B0967-010	VA23B0390-003	L2275781-2	VA20A5832-008	VA21A8717-008	VA22B0967-006	VA23B0094-004	L2275781-8	VA20A6269-009	VA21A9252-002	VA22B1521-001	VA23B0390-004	L2282164-1	VA20A6269-018	VA21A9252-013	VA22B1521-002	VA23B0769-006
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d																				
Field Parameters																										
pH, Field			--	--	--	6.5-9.0	8.81	-	6.31[d]	6.54	6.6	7.74	7.67	6.85	7.31	7.25	8.38	8.44	6.87	6.77	6.7	6.56	8.25	6.4[d]	6.51	6.45[d]
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	10.7	10.1	10.4	10.2	10.3	6.5	6.9	6.3	5.6	7	7.3	6.5	7.0	6.3	7	9.0	9.0	8.0	9.7	10.6
Conductivity		µS/cm	--	--	--	--	641	676	773	823	752	433.8	414.1	411.9	451	341.9	175.3	124.7	123.1	129.8	134.3	903	980	816	931	977
Turbidity		NTU	--	--	(b)	(b)	24.2	0.93	10.39	1.81	2.5	5.83	12.4	8.37	14.6	3	265	251	145	89.6	120	5.17	4.17	5.68	2.66	3.8
General Chemistry																										
Conductivity	2.0	µS/cm	--	--	--	--	842	959	1050	859	986	636	649	637	493	474	252	199	182	202	202	1080	1290	1180	1160	1160
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	435	450	501	582	423	341	349	344	388	248	123	87.3	81.4	85.1	81.5	481	519	442	466	458
pH	0.10		--	--	--	6.5-9.0	7.39	7.30	7.49	8.03	8.23	8.02	8.07	7.63	7.91	8.05	7.31	7.20	7.51	7.83	7.94	7.88	6.65	6.90	7.03	6.89
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	375	454	416	291	381	281	276	303	167	218	113	89.5	78.9	82.1	80.6	531	614	516	523	526
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	416	-	-	-	-	-	-	-	-	-	78.9	-	-	-	-	516	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	0.470	0.472	0.692	0.680	0.684	0.078	0.077	0.055	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.490	0.671	0.501	0.509	0.558
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	65.6	63.9	104	102	109	26.9	26.1	15.3	31.0	13.8	10.7	7.69	2.79	6.81	8.04	63.9	94.6	57.7	67.9	75.9
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	<0.10	<0.100	-	<0.100	<0.100	0.073	0.069	0.063	<0.100	0.067	0.035	0.027	-	0.027	0.036	<0.10	<0.100	-	<0.100	<0.100
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	5.10	5.45	5.33	5.16	4.50	39.2	40.7	32.1	37.9	27.9	4.20	3.77	4.25	3.54	3.46	<1.5	2.41	<1.50	<1.50	<1.50
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	0.014	<0.010	0.012	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.075	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	0.013	<0.011	0.011	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010	0.019	<0.018	<0.010	<0.080	<0.010
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	101	120	117	120	117	68.5	68.8	80.3	76.1	57.4	34.8	25.7	25.5	26.9	29.0	153	177	161	169	176
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	1.49	1.90	1.68	1.58	1.39	0.92	1.12	1.22	0.78	1.51	2.08	1.57	1.76	1.28	1.20	15.7[c]	18.1[c]	14.9[c]	16.3[c]	17.7[c]
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-	-	-	-	-	66
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	0.0073	0.0120	0.0075	0.0069	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0360	0.0068	0.0119	<0.0050	<0.0050	6.35	7.81	6.57	8.29	7.59
Nitrate (as N)	0.0050	mg/L	10	400	10	3	0.0750	0.0557	<0.0250	<0.0250	<0.0250	<0.0050	<0.0050	<0.0050	0.0420	<0.0050	1.94	0.378	1.61	0.365	3.12[d]	<0.025	0.0391	0.0477	<0.0250	<0.0250
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	0.0018	<0.0010	0.0014	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.071	0.080	0.100	0.062	<0.050	<0.050	0.087	<0.050	0.140	<0.050	0.474	0.199	0.427	0.117	0.155	6.89	9.14	7.64	8.28	7.48
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	133000	141000	152000	175000	125000	118000	120000	121000	132000	86800	39600	28700	26300	27400	26400	140000	155000	129000	134000	131000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	24900	23800	29600	35100	27000	11100	11800	10200	14100	7510	5780	3790	3830	4050	3780	31800	32200	29000	31900	31900
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2940	3090	3360	3220	3020	2450	2540	2270	2550	2050	2610	2340	2160	2150	2210	20100	21000	18200	19000	18900
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	19200	18600	18200	17600	16200	5590	6400	6460	6020	5550	4490	2730	2830	2180	2340	49300	56600	46200	57200	49200
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	2.2	<1.0	1.6	3.3	3.0	1.5	2.6	2.3	1.5	1.7	1.2	<1.0	1.8	<3.0	<1.0	2.7	2.9	3.0	<4.0	2.3
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.14	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	1.06	2.27	3.73	4.55	4.21	0.44	0.33	0.34	0.39	0.34	0.67	0.17	0.22	<0.10	<0.10	227[ab]	212[ab]	238[ab]	202[ab]	195[ab]
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	219	245	282	293	258	50.8	48.0	48.8	53.1	35.5	83.3	79.6	49.0	61.1	62.2	546	634	532	558	560
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.200	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.100	<0.100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	41	36	37	40	41	16	15	23	15	19	27	<10	14	<10	<10	444	480	414	512	426
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.0524	0.0933	0.0192	0.0299	0.0248	0.0617	0.0473	0.0588	0.137	0.0440	0.241	0.177	0.285[d]	0.266[d]	0.278[d]	0.0204	0.0075	0.0205	0.0162	0.0122
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	0.31	0.13	<0.00050	<1.00	<0.50	0.19	0.43	0.00084	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	0.47	0.59	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	3.47[a]	4.33[a]	6.02[a]	6.51[a]	4.53[a]	<0.10	<0.10	<0.10	<0.10	<0.10	2.15[a]	0.48	0.38	<0.10	0.15	33.2[a]	34.8[a]	28.4[a]	29.8[a]	32.4[a]
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	2.55	0.46	<0.20	<0.40	0.96	0.87	0.34	0.39	0.50	0.38	0.44	0.27	0.38	0.31	0.29	<0.20	<0.20	0.44	<0.20	0.58
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	615[d]	2650[d]	3630[d]	4750[d]	3360[d]	<10	<10	<10	<10	<10	72	27	24	<10	14	54200[ad]	60600[ad]	48600[ad]	49700[ad]	52100[ad]
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	<0.050	<0.050	<0.050	<0.100	<0.100	<0.050	<0.050	<0.050	<0.050	<0.050	0.105	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.067	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	5.4	6.2	6.3	5.8	5.4	3.0	3.7	3.5	3.4	3.2	<1.0	<1.0	<1.0	<1.0	<1.0	6.6	6.7	6.0	6.3	5.9
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	6170[a]	5750[a]	7580[a]	8640[a]	6220[a]	0.59	4.50	4.29	2.65	1.87	312	35.7	37.9	5.21	12.2	1280	1350	968	897	1000
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	0.727	0.686	0.584	0.669	0.710	1.07	1.04	0.931	1.05	0.858	0.566	0.177	0.200	0.103	0.118	4.54	4.25	4.66	4.85	4.24
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	3.59	2.31	3.23	2.95	1.86	<0.50	1.76	2.01	<0.50	<0.50	2.11	1.35	1.40	1.48	1.18	22.4	27.4	19.3	22.2	22.2
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<100	<100	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	122	136	160	121	122
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.35	0.40	0.41	0.51	0.45	1.02	1.08	0.94	0.97	0.79	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	<0.050	<0.050	<0.100	0.161	<0.100	0.221	0.264	0.190	0.132	0.204	0.081	0.054	0.096	0.072	0.100	0.113	0.115	0.129	0.105	0.109
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	16500	17800	20600	20900	20600	6730	7020	7860	7930	7710	7810	7980	8240	9180	8900	25500	22400	23700	24400	25500
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	390	461	518	577	458	398	402	401	429	290	205	161	140	153	144	1150	1270	1090	1190	1220
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	1720	2350	2180	2930	1400	12300	13200	10900	14800	9660	1100	1390	1380	1420	1110	960	1030	920	810	540
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	0.21	0.16	0.33	0.19	0.20
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.60	<0.60	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	0.11	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	1.04	1.57	1.55	2.22	1.89	5.19	6.07	5.23	6.18	3.84	0.054	0.036	0.063	0.048	0.051	2.91	3.19	2.27	2.18	2.10
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<1.00	<1.00	<0.50	0.52	0.52	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	1.21	1.35	1.09	1.26	1.24
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	17.4	8.5	10.8	2.7	4.4	1.4	1.8	1.6	3.4	<1.0	4.1	10.0	4.4	4.9	3.8	10.6	17.5	8.1	5.4	30.1
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.40	<0.40	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 5

NCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-09-02S (E252601)	MW-09-02S (E252601)	MW09-02S (E252601)	MW-09-02S (E252601)	MW-09-02S (E252601)	MW-09-02D (E252600)	MW-09-02D (E252600)	MW09-02D (E252600)	MW-09-02D (E252600)	MW-09-02D (E252600)	200611 (E200611)	200611 (E200611)	200611 (E200611)	200611 (E200611)	200611 (E200611)
Date Sampled							15-May-2019	29-Apr-2020	05-May-2021	16-May-2022	08-May-2023	14-May-2019	30-Apr-2020	05-May-2021	16-May-2022	08-May-2023	14-May-2019	29-Apr-2020	04-May-2021	16-May-2022	08-May-2023
Time Sampled							8:55	15:00	11:09	14:19	13:54	15:18	10:19	09:45	13:37	12:47	12:24	13:33	15:33	12:00	10:50
ALS Sample ID							L2275781-1	VA20A5832-006	VA21A8717-007	VA22B0967-005	VA23B0094-003	L2274410-12	VA20A5832-007	VA21A8717-006	VA22B0967-004	VA23B0094-002	L2274410-3	VA20A5832-005	VA21A8717-005	VA22B0967-003	VA23B0094-001
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d															
Field Parameters																					
pH, Field			--	--	--	6.5-9.0	6.80	6.80	6.63	6.56	6.64	7.85	7.50	6.92	7.13	7.02	7.64	6.86	6.03[d]	6.57	6.5
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	8.4	7.8	10.2	8.1	9.3	8.2	9.6	9.8	9.9	10	8.7	7.8	8.0	8.6	8.5
Conductivity		µS/cm	--	--	--	--	217.9	195	202.8	176.9	210.9	605	624	699	692	759	314.6	296.8	332.7	326.7	407.2
Turbidity		NTU	--	--	(b)	(b)	1.07	0.63	0.00	2.62	0.6	119	28.0	121	27.0	21	1.51	1.71	0.00	1.31	1.2
General Chemistry																					
Conductivity	2.0	µS/cm	--	--	--	--	301	298	281	262	279	829	888	977	720	981	457	459	500	472	553
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	131	139	124	120	121	496	492	494	493	514	190	191	183	191	207
pH	0.10		--	--	--	6.5-9.0	7.29	7.49	7.02	8.15	7.44	7.85	7.91	7.46	7.94	7.94	7.63	7.49	7.72	8.08	7.50
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	66.1	106	84.3	89.7	65.5	302	336	370	211	388	68.8	87.5	82.2	84.2	73.8
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	0.257	0.185	0.159	0.087	0.152	0.250	0.299	0.340	0.360	0.343	0.418	0.331	0.518	0.404	0.480
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	39.9	22.4	20.8	16.2	28.2	71.6	71.2	82.9	76.3	86.3	88.2	69.3	98.4	77.7	125
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	0.035	0.041	0.043	0.042	0.042	<0.10	<0.100	<0.100	<0.100	<0.100	0.033	0.037	0.040	0.040	0.039
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	20.5	8.42	20.4	11.5	27.3	41.0	42.3	47.2	46.4	42.5	15.3	25.0	12.7	22.0	9.76
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	0.016	0.021	<0.011	-	<0.018	<0.011	<0.010	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	0.015	0.022	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	19.9	30.5	26.8	28.0	21.8	89.1	84.1	97	91.4	98.8	23.6	26.3	24.3	24.3	21.9
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	0.63	0.74	0.82	0.58	0.86	3.78	3.69	4.8[e]	3.28	5.16[e]	<0.50	0.63	<0.50	<0.50	0.61
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	101	-	-	-	-	94	-	-	-	-	78	-	-
Nutrients																					
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0283	0.0266	0.0314	0.0793	0.0264	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	400	10	3	1.34	0.947	1.12	0.494	1.41	<0.025	<0.0250	<0.0250	<0.0250	<0.0250	0.0210	0.0703	0.107	0.0513	0.0625
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.228	0.174	0.281	0.050	0.256	0.251	0.211	0.274	0.295	0.221	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Metals (Semi-Trace)																					
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	40800	42300	37700	36700	36600	141000	138000	139000	138000	143000	55900	57200	53000	56200	59200
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	7050	8180	7350	7000	7300	34900	35600	35700	36000	38200	12200	11800	12300	12400	14300
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	4760	5160	4350	4000	4250	3430	3410	3360	3150	3460	1970	1890	1940	1820	2070
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	4540	4500	4280	3850	5050	9860	11300	12700	12400	15700	15200	14400	18800	14500	20400
Dissolved Metals (Trace)																					
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	<1.0	<1.0	<1.0	1.0	1.1	2.1	1.8	1.3	2.2	1.9	1.3	1.2	<1.0	<1.0	1.5
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.11	0.10	0.13	0.13	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	0.13	0.11	0.14	0.12	0.11	3.86	3.63	4.05	3.85	3.84	0.25	0.24	0.21	0.24	0.22
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	78.5	68.4	66.3	57.4	62.8	159	160	198	190	205	63.3	57.2	64.0	58.4	69.2
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	26	22	24	20	18	17	20	31	38	57	34	21	37	26	28
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.235	0.167	0.159	0.162	0.183	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0931	0.0638	0.0627	0.0563	0.0769
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	0.12	0.10	<0.00050	<0.50	<0.50	<0.10	0.14	<0.00050	<0.50	<0.50	0.42	0.44	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.17	0.21	0.32	0.35	0.45	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	0.69	0.57	0.38	0.44	0.35	0.22	<0.20	<0.20	0.33	<0.20	0.48	0.28	0.49	0.33	0.33
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	<10	<10	<10	<10	<10	487[d]	588[d]	748[d]	865[d]	1110[d]	<10	<10	<10	21	<10
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	1.8	1.8	1.6	2.1	5.4	5.5	5.1	4.9	5.3
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	1.05	2.26	5.00	3.28	2.74	452	454	482	572	539	7.16	3.65	5.28	1.32	2.61
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	0.085	0.144	0.155	0.129	0.109	1.90	1.90	1.97	1.91	1.92	0.051	0.059	0.083	0.061	<0.050
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	1.14	0.78	0.98	0.76	0.93	1.74	2.10	3.06	3.14	4.21	0.72	<0.50	0.54	0.54	0.71
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<50	<50	59	60	62	70	63	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	1.22	1.31	1.43	1.13	1.31	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	0.321	0.204	0.412	0.310	0.600	<0.050	0.054	<0.050	<0.050	<0.050	0.077	0.074	0.058	0.126	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	6270	5860	5980	7980	6770	8170	7910	8480	8540	8620	10400	10400	10300	11600	10100
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	240	246	226	197	205	911	925	984	908	976	370	340	376	356	401
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	6090	2360	6740	4330	9210	14000	14300	16800	17500	16600	4780	7740	3880	8080	3390
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	0.24	0.22	0.26	0.23	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	0.109	0.234	0.194	0.245	0.146	8.27	9.56	8.74	9.22	9.84	0.079	0.241	0.104	0.208	0.112
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	5.2	4.3	4.0	3.3	3.7	5.3	1.4	2.0	1.5	1.3	7.3	3.6	4.1	3.5	4.4
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 6

SCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-99-6S (E254762)	MW-99-6S (E254762)	MW99-6S (E254762)	MW-99-6S (E254762)	MW-99-6S (E254762)	MW-99-8 (E240506)	MW-99-8 (E240506)	MW-99-8 (E240506)	MW-99-8 (E240506)	MW-99-8 (E240506)	MW-99-3S (E275564)	MW-99-3S (E275564)	MW99-3S (E275564)	MW-99-3S (E275564)	MW-99-3S (E275564)	MW-99-3D (E240503)	MW-99-3D (E240503)	MW-99-3D (E240503)	MW-99-3D (E240503)	MW-99-3D (E240503)
Date Sampled							15-May-2019	01-May-2020	05-May-2021	17-May-2022	09-May-2023	29-May-2019	12-May-2020	12-May-2021	25-May-2022	16-May-2023	28-May-2019	12-May-2020	12-May-2021	24-May-2022	16-May-2023	16-May-2019	05-May-2020	06-May-2021	17-May-2022	09-May-2023
Time Sampled							12:40	11:25	14:03	10:22	10:11	9:15	11:10	14:19	09:07	12:59	13:52	09:59	13:35	12:54	11:42	8:30	09:50	10:30	12:16	12:17
ALS Sample ID							L2275781-3	VA20A5832-009	VA21A8717-009	VA22B0967-007	VA23B0094-006	L2282164-4	VA20A6593-002	VA21A9252-016	VA22B1687-001	VA23B0769-009	L2282164-3	VA20A6593-001	VA21A9252-015	VA22B1521-004	VA23B0769-008	L2275781-5	VA20A6269-001	VA21A8717-010	VA22B0967-008	VA23B0094-005
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d																				
Field Parameters																										
pH, Field			--	--	--	6.5-9.0	7.17	7.30	6.73	7.17	7.06	6.47[d]	5.93[d]	8.37	6.44[d]	6.54	7.79	5.95[d]	7.57	6.81	6.75	8.02	7.72	7.26	7.60	7.46
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	11.6	11.8	11.0	10.6	12.3	9.2	8.7	8.0	8.0	10.3	12.3	9.6	9.0	9.9	16.6[c]	9.2	9.5	12.3	11.1	12.8
Conductivity		µS/cm	--	--	--	--	725	678	657	671	745	1226	1115	969	993	1071	1330	1284	1473	1591	1576	268.7	264.0	283	287.4	309.3
Turbidity		NTU	--	--	(b)	(b)	0.57	0.67	0.00	1.30	1.4	67.4	6.67	6.14	7.44	13	18.2	5.24	11.8	14.0	11	134	5.93	40.4	5.74	4.5
General Chemistry																										
Conductivity	2.0	µS/cm	--	--	--	--	918	933	890	713	901	1210	1330	1240	1030	1130	1570	1770	2090	1950	1700	360	378	377	391	368
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	546	555	489	529	515	509	502	467	432	467	745	775	748	842	672	186	176	181	196	185
pH	0.10		--	--	--	6.5-9.0	7.83	7.96	7.50	7.92	8.02	6.83	7.19	6.55	6.76	6.51	7.74	7.42	7.05	7.10	7.24	8.14	8.07	8.33	8.42	8.19
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	288	296	291	161	288	588	632	595	530	581	732	795	842	800	761	171	179	176	172	170
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	-	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	595	-	-	-	-	842	-	-	-	-	-	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.25	<0.250	<0.250	<0.250	<0.250	0.490	0.438	0.336	0.284	0.280	0.580	0.665	0.953	<1.00	0.724	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	<2.5	<2.50	<2.50	<2.50	<2.50	77.3	76.6	43.0	37.2	42.4	121	142	179[d]	164[d]	133	<0.50	1.32	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	<0.10	<0.100	<0.100	<0.100	<0.100	0.120	<0.100	-	<0.100	<0.100	<0.20	<0.200	-	<0.400	<0.200	0.577	0.558	0.576	0.586	0.578
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	257	234	230	219	248	4.30	8.64	8.98	5.57	5.94	22.4	20.1	13.1	10.8	9.21	35.7	35.4	38.8	36.9	35.9
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	<0.011	<0.010	<0.011	-	0.062	0.050	0.079	0.119	-	<0.018	0.019	<0.075	0.036	-	<0.018	<0.011	<0.010	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	0.041	0.058	0.047	0.084	0.112	<0.018	<0.018	0.018	<0.080	0.034	<0.018	<0.018	<0.010	<0.011	<0.010
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	72.1	74.6	78.4	76.8	74.0	198	24.6	184	207	240	195	23.2	250	265	74.7	41.0	39.5	43.5	45.3	44.1
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	0.98	0.97	0.70	0.55	0.89	20.9[c]	20.9[c]	15.3[c]	16[c]	17.9[c]	23[c]	25.9[c]	31.4[c]	32.8[c]	26.5[c]	0.97	0.80	0.71	<0.50	<0.50
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	85	-	-	-	-	99	-	-	51	-	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	2.80	2.42	2.67	3.35	3.42	0.398	0.746	1.81	1.86	1.20	0.0140	0.0071	0.0346	0.0132	<0.0050
Nitrate (as N)	0.0050	mg/L	10	400	10	3	0.0800	0.0402	0.0354	<0.0250	<0.0250	<0.025	<0.0250	0.0501	0.0361	<0.0250	<0.050	<0.0500	<0.0500	<0.100	<0.0500	0.0343	0.0222	0.0194	0.0284	0.0304
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0100	<0.0100	<0.0200	<0.0100	<0.0010	0.0014	<0.0010	0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	4.49	3.50	3.46	3.77	4.29	1.79	2.15	3.42	3.21	2.48	0.072	0.079	0.057	0.051	<0.050
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	182000	182000	161000	175000	168000	155000	150000	141000	127000	140000	205000	201000	193000	213000	169000	58100	55800	55500	59400	56000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	22400	24300	21200	22400	23300	29400	30800	28000	28000	28500	56600	66600	64600	75200	60600	10100	8960	10400	11700	11000
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2510	2640	2350	2520	2730	17200	13900	13200	12000	12100	7310	8300	7750	11900	8700	1390	1420	1330	1400	1450
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	5310	5520	5280	5130	5460	62800	57000	47200	42500	38100	78800	82900	118000	123000	124000	8120	8130	8610	8320	9170
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	1.1	<1.0	<1.0	1.3	1.2	2.8	7.3	4.2	<2.0	3.6	5.1	6.0	<5.0	8.5	5.4	4.1	3.9	2.4	2.6	2.3
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	0.21	0.19	<0.50	<0.50	<0.50	0.16	0.14	0.16	0.13	0.17
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	0.42	0.44	0.50	0.52	0.48	38.8[a]	38.3[a]	39.6[a]	0.65	28.7[a]	66.9[ab]	98[ab]	74.1[ab]	112[ab]	85.4[ab]	3.88	2.77	5.18	3.90	4.65
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	69.7	55.6	54.7	51.3	51.9	563	527	453	205	465	245	301	326	411	332	38.3	38.6	38.1	42.4	39.5
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.500	<0.500	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.100	<0.100	<0.050	<0.050	<0.250	<0.250	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	<10	<10	<10	<10	<10	495	403	347	326	296	580	599	832	1080	800	40	36	40	41	41
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.104	0.0918	0.0930	0.101	0.123	0.0053	0.0093	0.0334	<0.0100	0.0152	0.0819	0.0922	0.0331	<0.0250	0.0329	0.0092	0.0100	0.0053	0.0089	0.0107
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.050	<0.050	<0.050	0.652	0.945	0.712	0.744	0.978
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	<0.10	<0.10	<0.00050	<0.50	<0.50	0.51	0.62	0.0005	<0.50	<0.50	0.77	0.79	<0.00250	<2.50	0.66	<0.10	<0.10	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	9.44[a]	8.19[a]	5.96[a]	4.01[a]	4.81[a]	8.08[a]	8.19[a]	12.8[a]	10.8[a]	8.41[a]	<0.10	<0.10	0.11	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	0.82	0.28	0.31	0.55	0.39	<0.20	<0.20	<0.20	<0.40	<0.40	0.54	0.78	<1.00	<1.00	<1.00	0.25	0.22	<0.20	0.34	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	<10	<10	<10	<10	<10	169000[ad]	155000[ad]	131000[ad]	<20	132000[ad]	23300[ad]	25300[ad]	55700[ad]	68200[ad]	38400[ad]	<10	<10	<10	<10	<10
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.073	<0.050	<0.100	<0.100	<0.050	0.114	<0.250	<0.250	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	9.4[a]	10.6[a]	9.1[a]	8.9[a]	9.4[a]	3.4	2.9	2.9	2.7	2.5	2.6	2.8	<5.0	<5.0	<5.0	12.9[a]	14.3[a]	13.2[a]	14.1[a]	14.6[a]
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	10.4	11.5	15.4	15.6	18.8	12400[a]	12200[a]	10300[a]	8640[a]	8730[a]	18900[a]	22200[a]	22900[a]	17200[a]	11700[a]	23.8	1.21	15.2	8.50	1.24
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	0.0061	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	0.223	0.292	0.362	0.383	0.301	3.43	2.95	2.66	0.658	2.36	11.2	14.1	12.8	15.8	8.98	1.19	0.684	0.747	0.573	0.689
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	0.66	<0.50	<0.50	<0.50	0.77	8.13	7.88	5.82	5.28	5.14	13.5	17.8	18.0	19.0	19.3	1.97	<0.50	1.84	0.87	1.38
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<50	<50	<50	95	136	<100	<100	148	217	<250	<250	<250	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.88	0.86	0.85	0.90	1.01	0.28	0.21	0.23	<0.40	<0.40	0.86	0.95	1.12	<1.00	1.16	3.12	3.11	3.12	3.10	3.14
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	0.114	0.093	0.082	0.070	<0.050	0.304	0.171	0.197	0.117	0.176	0.274	0.325	<0.250	<0.250	<0.250	0.089	0.068	0.111	0.087	0.128
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	10500	11000	11000	11300	11700	25300	20600	21400	14600	22400	23300	19900	19000	20100	17400	7000	7530	7760	8100	8010
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	697	684	658	622	662	1280	1170	1090	1060	1140	1480	1510	2270	1760	1640	975	954	990	990	978
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	79700	76300	82900	79300	84700	1740	4030	3100	2900	3460	9200	8400	4600	7190	4690	10500	11400	13200	13300	12300
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.40	<0.20	<0.20	<1.00	<1.00	<1.00	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.010	<0.010	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.012	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.50	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	0.17	<0.20	<0.20	<0.10	<0.10	<0.50	<0.50	<0.50	0.12	0.18	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.60	<0.60	0.40	0.39	<1.50	<1.50	<1.50	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	<0.20	<0.20	0.24	0.22	<0.50	<0.50	<0.50	0.59	0.35	0.72	0.58	0.59
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	2.61	2.93	3.04	3.69	3.82	1.04	0.752	0.784	0.252	0.362	22.5[a]	26.7[a]	7.07	10.2	9.94	1.87	1.81	1.72	1.85	2.00
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	3.62	3.38	2.66	<1.00	2.58	5.15	4.93	3.40	3.98	3.11	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	2.9	2.4	2.4	1.5	1.8	3.8	3.6	3.4	<2.0	4.6	3.3	6.4	5.8	<5.0	7.6	4.1	3.3	<1.0	<1.0	<1.0
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	0.379	0.31	0.25	<0.40	<0.40	1.32	1.43	1.47	1.67	<1.00	0.170	<0.20	<0.20	<0.20	<0.20

Table 6

SCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							207637 (E207637)	207637 (E207637)	207637 (E207637)	207637 (E207637)	207637 (E207637)	S-MW-2 (E221703)	S-MW-2 (E221703)	S-MW-2 (E221703)	S-MW-2 (E221703)	S-MW-2 (E221703)	MW-02S-03 (E254755)	MW-02S-03 (E254755)	MW-02S-03 (E254755)	MW-02S-03 (E254755)	MW-02S-03 (E254755)	MW-02D-03 (E254756)	MW-02D-03 (E254756)	MW-02D-03 (E254756)	MW-02D-03 (E254756)	MW-02D-03 (E254756)
Date Sampled							28-May-2019	08-May-2020	12-May-2021	24-May-2022	16-May-2023	21-May-2019	07-May-2020	06-May-2021	17-May-2022	10-May-2023	22-May-2019	08-May-2020	11-May-2021	19-May-2022	15-May-2023	22-May-2019	08-May-2020	11-May-2021	19-May-2022	15-May-2023
Time Sampled							11:27	15:19	12:39	11:55	10:06	9:52	11:16	13:39	13:36	11:25	10:43	09:23	12:12	10:49	10:13	11:38	12:23	12:47	11:04	11:24
ALS Sample ID							L2282164-2	VA20A6269-019	VA21A9252-014	VA22B1521-003	VA23B0769-007	L2278658-1	VA20A6269-012	VA21A8717-012	VA22B0967-009	VA23B0390-002	L2278658-6	VA20A6269-015	VA21A9252-006	VA22B1095-002	VA23B0769-002	L2278658-7	VA20A6269-017	VA21A9252-007	VA22B1095-004	VA23B0769-003
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d																				
Field Parameters																										
pH, Field			--	--	--	6.5-9.0	6.86	7.73	6.82	6.58	6.63	6.88	-	6.07[d]	6.45[d]	6.11[d]	7.46	8.28	7.74	7.05	6.81	7.50	7.83	7.58	7.06	6.8
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	7.0	6.1	6.2	6.0	7	8.7	7.7	9.1	7.0	8.3	8.3	6.9	13.6	6.6	12.3	9.0	10.2	8.1	7.8	10.4
Conductivity		µS/cm	--	--	--	--	1168	1036	1041	1028	1139	429.8	372.8	391.3	421	368.4	722	1080	977	1143	1822	610	614	555	544	598
Turbidity		NTU	--	--	(b)	(b)	50.6	36.2	21.5	16.9	10	21.5	6.98	19.6	44.8	14	7.51	0.66	77.4	7.13	1.5	29.5	36.1	15.0	13.5	28
General Chemistry																										
Conductivity	2.0	µS/cm	--	--	--	--	1370	1370	1470	1270	1370	616	567	559	579	530	990	1630	1180	1610	2290	746	777	745	643	733
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	548	511	494	480	493	289	269	270	326	228	512	988	663	1010	1410	364	386	352	350	337
pH	0.10		--	--	--	6.5-9.0	6.92	6.70	6.70	6.88	6.70	7.75	6.80	7.19	8.22	8.09	8.21	7.43	7.98	8.32	7.98	8.19	7.52	7.98	8.34	8.16
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	720	753	701	618	705	242	247	255	245	192	352	388	338	274	238	399	412	364	282	307
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	701	-	-	-	-	-	-	-	-	-	338	-	-	-	-	364	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.25	<0.250	0.274	<0.250	<0.500	0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.250	<0.250	<0.500	<1.00	<0.25	<0.250	0.132	<0.250	<0.250
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	45.1	34.8	42.0	39.3	39.6	8.52	5.56	6.08	4.84	5.44	26.1	21.9	23.0	17.2	17.4	32.4	32.7	30.6	29.2	31.0
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	<0.10	<0.100	-	<0.100	<0.200	0.038	0.028	0.032	0.035	0.031	<0.10	<0.100	-	<0.200	<0.400	<0.10	<0.100	-	<0.100	<0.100
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	<1.5	<1.50	<1.50	<1.50	<3.00	53.4	43.7	44.3	49.5	40.1	198	616[acd]	330	728[acd]	1260[acd]	1.90	9.05	8.09	36.7	52.4
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	0.032	0.016	<0.075	0.019	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	0.016	<0.010	<0.011	-	0.022	0.013	<0.010	0.020
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	0.025	0.030	0.015	<0.080	0.018	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	0.015	<0.011	<0.010	0.021	0.020	0.012	<0.011	0.019
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	200	229	221	216	258	78.3	77.6	75.6	83.6	98.0	92.7	101	95.8	81.7	71.0	106	108	102	92.4	73.5
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	34.6[e]	32.2[e]	34.4[e]	35.3[e]	33.2[e]	9.49[e]	8.36[e]	7.32[e]	7.91[e]	7.98[e]	2.58	2.88	3.09	2.64	2.29	4.79[e]	4.37[e]	4.29[e]	3.64	3.62
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	-	-	120	-	-	21	-	-	-	-	-	-	13	-	-	-	-	22
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	22.2[b]	25.1[bd]	24.3[bd]	25.2[bd]	23.5[b]	0.0054	<0.0050	<0.0050	0.0085	<0.0050	0.135	0.202	0.224	0.362	0.0371	0.836	0.819	0.713	0.561	0.374
Nitrate (as N)	0.0050	mg/L	10	400	10	3	<0.025	<0.0250	0.0546	0.0454	<0.0500	6.99[d]	5.49[d]	4.9[d]	4.23[d]	5.5[d]	<0.025	0.0264	<0.0250	<0.0500	<0.100	0.0260	0.0350	0.0431	<0.0250	<0.0250
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0050	<0.0050	0.0056	0.0063	<0.0100	0.0013	<0.0010	<0.0010	0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0100	<0.0200	<0.0050	0.0062	<0.0010	<0.0050	<0.0050
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	28.0	27.3	27.1	24.0	23.4	0.805	0.691	0.682	0.916	0.858	0.270	0.312	0.361	0.414	0.128	1.09	0.955	0.890	0.658	0.464
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	162000	153000	144000	139000	145000	86700	81300	80700	96100	67400	163000	292000	200000	325000	536000	115000	123000	111000	107000	105000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	34900	31300	32600	32400	31900	17600	16000	16700	20900	14600	25400	62900	39700	48600	17800	18700	18900	18300	20200	18200
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	33800	32500	30600	28100	28500	4830	4920	4410	5010	4630	2720	3970	3010	3450	2900	3400	3560	3460	3520	2830
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	64100	49200	51900	41600	65500	12100	10900	11700	10500	8630	13400	12300	14800	12700	17900	16600	18500	18000	21200	20800
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	6.1	2.9	3.3	<4.0	2.3	2.1	1.7	<1.0	2.1	1.4	<1.0	<1.0	1.0	16.5	<5.0	4.0	2.8	3.0	3.2	3.0
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.30	0.22	0.24	0.24	0.20	0.22	0.21	0.20	0.22	0.20	<0.10	<0.10	<0.10	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	66.2[ab]	53[ab]	79[ab]	66.8[ab]	52[ab]	1.01	1.01	0.96	0.95	0.76	3.95	4.39	6.07	5.85	5.81	17.6[a]	18.2[a]	13.7[a]	14.2[a]	13.6[a]
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	1420[a]	1560[a]	1600[a]	1490[a]	1520[a]	152	151	139	160	140	26.6	21.1	26.9	15.7	16.4	233	233	196	205	197
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.500	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	767	595	654	613	711	149	123	128	122	126	56	42	63	<50	94	39	40	47	84	92
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.0147	<0.0050	<0.0050	0.0110	<0.0050	0.613[d]	0.226	0.234	0.308	0.203	0.0378	0.262	0.0541	0.117	0.152	0.0051	<0.0050	<0.0050	<0.0050	0.0060
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.556	0.774	0.671	0.816	0.485	<0.010	<0.010	<0.010	0.015	<0.010
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	0.89	0.75	0.00086	0.82	0.90	0.44	0.86	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<2.50	<0.50	0.24	0.18	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	17.5[a]	19[a]	16.1[a]	15.8[a]	18.4[a]	0.14	0.13	0.19	0.11	0.10	0.27	1.6[a]	0.17	1.13[a]	1.41[a]	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	0.38	<0.20	<0.20	<0.20	0.29	3.98	2.10	1.70	2.04	1.84	<0.20	0.21	<0.20	<1.00	<1.00	<0.20	<0.20	<0.20	<0.20	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	115000[ad]	121000[ad]	112000[ad]	109000[ad]	112000[ad]	<10	16	<10	<10	<10	10900[ad]	11400[ad]	11800[ad]	7140[ad]	3700[d]	31900[ad]	30800[ad]	19500[ad]	20100[ad]	21200[ad]
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	0.408	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.353	1.59	0.055	<0.250	1.44	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	5.3	5.0	4.8	4.6	4.4	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.5	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	4060[a]	3480[a]	3280[a]	3140[a]	3500[a]	33.0	6.11	86.9	13.7	2.36	911	1300	1150	935	515	1620[a]	1560[a]	1310	1200	855
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	2.52	2.81	2.15	2.14	2.71	0.437	0.259	0.298	0.232	0.156	0.517	0.572	0.752	0.799	0.387	0.573	0.597	0.570	0.548	0.682
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	15.2	13.1	12.8	11.9	15.2	3.62	3.13	3.20	2.11	1.73	9.34	25.6	7.71	16.5	14.8	1.19	1.40	1.48	2.19	2.24
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<250	<250	78	<50	80	<50	77
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	3.46	3.38	3.12	3.20	3.02	<0.20	<0.20	<0.20	<0.20	<0.20	10.0	13.0	10.3	11.1	6.30	3.98	3.96	3.62	3.60	2.57
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	0.363	0.308	0.373	0.330	0.351	0.080	0.100	0.133	0.116	0.097	<0.050	<0.050	<0.050	<0.250	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	25000	21700	22600	22500	23000	9480	8780	8830	9660	9340	9880	8050	9640	6910	1990	12700	12100	12100	12200	12200
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	1460	1410	1320	1290	1310	551	559	526	578	484	454	759	500	562	458	516	553	481	480	451
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	1120	820	730	740	590	19600	15000	15600	18500	13000	70200	206000	117000	251000	430000	1030	1360	3000	13100	17600
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.00	<1.00	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.024	0.012	<0.050	0.060	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	0.14	<0.10	0.13	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	0.33	<0.30	<0.60	0.34	0.38	<0.30	0.72	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<1.50	<1.50	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.50	0.15	0.15	0.12	0.14	0.13
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	1.99	2.11	1.22	0.932	1.36	2.16	2.24	1.77	2.74	2.10	1.78	4.30	3.23	4.77	5.53	0.123	0.140	0.092	0.196	0.195
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	3.04	3.16	3.54	3.99	3.90	1.03	2.12	1.28	3.03	2.50	<0.50	<0.50	<0.50	<2.50	<2.50	1.51	1.44	1.05	1.12	1.00
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	20.0	2.5	5.1	4.2	10.9	9.9	4.8	4.1	5.8	4.6	2560[b]	9260[ab]	3330[ab]	10200[ab]	15200[ab]	9.8	25.8	3.4	13.0	40.1
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	0.745	0.45	0.46	0.43	0.5	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<1.00	<1.00	0.531	0.48	0.34	0.36	0.32

Table 6

SCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-01A-03 (E254757)	MW-01A-03 (E254757)	MW-01A-03 (E254757)	MW-01A-03 (E254757)	MW-01A-03 (E254757)	MW-01C-03 (E254759)	MW-01C-03 (E254759)	MW-01C-03 (E254759)	MW-01C-03 (E254759)	MW-01C-03 (E254759)	MW-03S-03 (E254760)	MW-03S-03 (E254760)	MW-03S-03 (E254760)	MW-03S-03 (E254760)	MW-03S-03 (E254760)	MW-05-05 (E266350)	MW-05-05 (E266350)	MW-05-05 (E266350)	MW-05-05 (E266350)	MW-05-05 (E266350)
Date Sampled							16-May-2019	07-May-2020	06-May-2021	18-May-2022	10-May-2023	21-May-2019	07-May-2020	10-May-2021	19-May-2022	11-May-2023	22-May-2019	08-May-2020	11-May-2021	19-May-2022	15-May-2023	21-May-2019	05-May-2020	10-May-2021	18-May-2022	11-May-2023
Time Sampled							10:31	09:39	12:19	09:52	09:51	13:12	15:31	15:35	09:13	10:35	9:29	10:55	13:42	10:05	12:18	11:52	11:12	14:42	10:47	09:24
ALS Sample ID							L2275781-6	VA20A6269-011	VA21A8717-011	VA22B0967-011	VA23B0390-001	L2278658-3	VA20A6269-014	VA21A9252-004	VA22B1095-001	VA23B0390-006	L2278658-5	VA20A6269-016	VA21A9252-008	VA22B1095-003	VA23B0769-004	L2278658-2	VA20A6269-002	VA21A9252-003	VA22B0967-012	VA23B0390-005
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d																				
Field Parameters																										
pH, Field			--	--	--	6.5-9.0	8.22	-	7.59	7.92	7.69	7.80	-	9.51[d]	7.13	7.4	8.64	9.36[d]	8.11	7.60	7.06	9.75[d]	8.93	9.26[d]	8.93	8.5
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	11.4	9.1	14.8	8.4	8.7	10.1	9.1	9.1	8.4	9	10.4	10.0	9.9	8.8	10	9.6	8.9	9.5	9.3	9.4
Conductivity		µS/cm	--	--	--	--	355.3	319.9	368.3	324.1	318.2	700	662	668	554	458.4	723	626	543	502	600	282.2	272.8	266.6	283.5	285.4
Turbidity		NTU	--	--	(b)	(b)	3.79	2.02	0.00	5.26	12	1.42	2.08	1.98	983	170	1.82	0.74	1.41	12.9	13	48.5	38.4	204	45.5	70
General Chemistry																										
Conductivity	2.0	µS/cm	--	--	--	--	451	464	449	472	454	962	969	968	600	577	980	887	767	615	783	400	397	381	408	409
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	146	141	148	152	131	458	481	488	379	280	518	443	382	350	394	134	133	129	154	137
pH	0.10		--	--	--	6.5-9.0	8.21	8.18	8.37	8.41	8.48	8.16	7.44	8.01	7.98	7.98	7.89	7.96	8.05	8.14	8.32	8.08	8.38	8.17	8.11	8.15
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	180	191	189	187	183	289	313	289	170	253	71.9	87.1	104	167	255	99.2	106	104	104	89.8
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	289	-	-	-	-	104	-	-	-	-	104	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.250	<0.250	<0.250	<0.050	<0.25	<0.250	0.066	<0.250	<0.250	0.066	0.066	0.072	0.059	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	1.07	1.00	1.01	1.01	1.01	18.9	18.3	18.0	11.2	6.54	11.2	12.1	14.7	23.7	22.7	2.51	2.55	2.65	3.05	3.35
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	0.467	0.466	0.472	0.478	0.523	<0.10	<0.100	-	<0.100	0.074	0.910	0.943	-	0.568	0.144	1.30	1.24	-	1.24	1.29
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	69.7	66.4	69.1	66.1	67.3	220	220	245	112	73.6	451[d]	381	289	132	150	91.6	95.7	87.2	94.6	101
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	0.037	<0.011	-	0.105	0.083	0.020	<0.011	-	0.108	0.265	0.244	0.212
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	0.039	<0.010	0.076	0.099	0.078	0.021	<0.010	0.270	0.102	0.249	0.260	0.199
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	44.8	42.2	45.3	49.8	43.7	79.3	80.3	82.5	77.6	73.6	19.9	20.0	26.1	58.4	93.6	27.6	23.6	26.7	26.6	26.8
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	<0.50	0.51	<0.50	<0.50	<0.50	3.63	3.49	3.50	6.06[c]	4.88[c]	2.71	2.84	2.90	1.92	2.05	4.19[d]	4.07[c]	5.07[c]	3.87	3.96
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.129	0.133	0.138	0.129	0.124	0.832	0.852	0.861	0.341	0.112	1.99[bd]	2.09[bd]	2.11[bd]	2.01[bd]	2.13[d]
Nitrate (as N)	0.0050	mg/L	10	400	10	3	0.0873	0.0732	0.0903	0.102	0.110	<0.025	<0.0250	<0.0250	0.0268	<0.0050	<0.025	<0.0250	<0.0050	<0.0250	<0.0250	<0.0050	0.0116	<0.0050	0.0150	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	0.115	0.067	0.296	0.247	0.274	0.362	0.243	1.17	0.971	1.07	0.441	0.196	2.44	2.23	2.52	2.52	2.48
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	40400	40000	41000	40500	35200	157000	166000	167000	127000	94700	58200	50900	34900	87600	122000	7610	7890	7140	7760	7400
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	10900	10000	11100	12400	10400	16300	16200	17300	15000	10600	90600	76700	71500	32000	21800	28000	27600	26900	32600	28700
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2230	2380	2250	2310	2390	2080	2260	2290	2110	1690	3110	3200	2940	3210	3140	12000	12700	11300	12400	10600
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	46800	46200	44100	45200	41400	22300	23800	24700	21300	17600	3600	3530	3970	9490	13200	15100	15400	15400	14700	14700
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	1.5	<1.0	<1.0	2.3	1.2	1.1	<1.0	1.2	3.2	1.6	1.4	<1.0	<1.0	1.1	<1.0	3.3	3.2	5.1	6.1	2.8
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.14	0.11	0.22	0.15	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.32	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	1.90	1.97	2.14	2.21	1.94	1.13	1.00	1.27	1.40	0.97	0.84	1.15	1.31	2.34	2.40	3.09	3.51	4.22	3.65	3.66
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	41.2	45.0	42.9	46.2	45.2	28.5	32.1	32.3	27.2	24.1	12.4	13.2	13.6	102	128	200	143	203	173	154
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	105	99	108	103	99	74	78	84	86	73	30	29	31	42	54	26	22	26	26	24
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.0077	<0.0050	<0.0050	<0.0100	<0.0050	0.0774	0.0879	0.0849	0.472	0.0509	<0.0050	<0.0050	<0.0050	0.0423	0.0741	0.0088	<0.0100	0.0092	<0.0100	<0.0050
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.169	0.208	0.206	0.149	0.173	<0.010	<0.010	<0.010	<0.010	<0.010	0.074	0.078	0.070	0.034	0.012	0.655	0.665	0.684	0.566	0.605
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	0.38	0.19	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	1.53[a]	1.57[a]	1.6[a]	1.28[a]	0.90	<0.10	<0.10	<0.10	0.66	0.94	0.59	0.60	0.67	0.67	0.67
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	0.47	0.37	0.49	0.63	0.42	0.20	0.36	0.22	0.20	<0.20	<0.20	<0.20	<0.20	0.24	0.33	<0.20	<0.20	<0.20	<0.20	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	<10	<10	<10	<10	<10	373[d]	281	323	358[d]	83	180	306	221	866[d]	1210[d]	59	50	50	47	46
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	0.140	0.119	0.176	0.939	0.150	<0.050	<0.050	<0.050	<0.050	<0.050	0.273	0.304	0.781	0.306	0.054
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	25[a]	28.2[a]	27.5[a]	28.7[a]	28.1[a]	2.2	2.6	2.6	1.8	2.1	8.5[a]	8.9[a]	8.2[a]	4.5	3.7	27.6[a]	28.6[a]	29.9[a]	28.9[a]	26.3[a]
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	1.37	0.94	1.24	1.61	0.70	5060[a]	5300[a]	5460[a]	4420[a]	3100[a]	17.3	15.4	12.5	1040	1800[a]	15.4	15.4	13.8	13.0	11.8
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	5.66	5.35	5.40	5.33	4.43	0.244	0.322	0.276	0.350	0.286	0.754	0.794	0.831	1.21	1.41	8.54	8.06	8.47	7.31	7.19
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	3.45	3.19	3.64	2.59	1.68	<0.50	<0.50	<0.50	1.89	2.76	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	90	78	83	92	75	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	2.05	2.07	2.11	1.98	2.09	0.66	0.69	0.68	0.76	0.64	7.44	7.88	7.01	4.00	2.22	14.6	15.8	15.2	14.6	14.4
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.267	<0.050	<0.050	<0.050	0.140	0.459	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	4730	4900	5240	5640	5330	7280	6660	7630	6940	7100	4940	5240	5960	7630	8900	1790	1670	1790	1790	1930
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	2350	2390	2400	2410	2230	700	745	726	578	416	1400	1380	1180	772	801	575	601	527	572	569
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	21200	21800	23700	23400	22100	78200	70900	90100	46100	25000	160000	124000	106000	44600	48300	34000	32300	31800	33700	33300
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	0.23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	0.011	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.22
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	2.71	2.96	2.76	1.26	0.29	6.62[a]	7.15[a]	6.96[a]	7.38[a]	7.09[a]
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	12.9	14.5	13.4	13.5	13.3	8.67	9.90	8.89	6.15	4.26	0.021	0.032	0.026	5.25	7.04	0.014	0.020	0.019	0.026	0.035
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	1.6	1.8	1.0	1.5	1.4	2.3	3.1	4.9	8.5	6.5	<1.0	2.1	<1.0	3.0	4.1	1.3	2.0	2.4	1.2	<1.0
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 6

SCAZ Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							MW-02-05 (E266346)	MW-02-05 (E266346)	MW-02-05 (E266346)	MW-02-05 (E266346)	MW-02-05 (E266346)	MW-04S-05 (E266349)	MW-04S-05 (E266349)	MW-04S-05 (E266349)	MW-04S-05 (E266349)	MW-04S-05 (E266349)	MW-03S-05 (E266348)	MW-03S-05 (E266348)	MW-03S-05 (E266348)	MW-03S-05 (E266348)	MW-03S-05 (E266348)
Date Sampled							22-May-2019	05-May-2020	12-May-2021	19-May-2022	15-May-2023	21-May-2019	06-May-2020	11-May-2021	18-May-2022	11-May-2023	22-May-2019	06-May-2020	11-May-2021	18-May-2022	11-May-2023
Time Sampled							14:46	13:02	09:26	12:32	13:35	15:07	10:20	09:35	12:10	11:56	13:21	09:04	14:19	12:48	12:47
ALS Sample ID							L2278658-9	VA20A6269-003	VA21A9252-012	VA22B1095-005	VA23B0769-005	L2278658-4	VA20A6269-007	VA21A9252-005	VA22B0967-013	VA23B0390-007	L2278658-8	VA20A6269-006	VA21A9252-009	VA22B0967-014	VA23B0390-008
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d															
Field Parameters																					
pH, Field			--	--	--	6.5-9.0	9.57[d]	8.64	7.97	8.53	7.97	8.77	7.33	7.11	7.45	7.4	8.67	7.92	7.38	7.43	7.24
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	9.3	8.4	8.9	8.5	9.6	9.1	8.8	9.0	8.9	9.5	9.8	7.6	9.1	8.2	8.6
Conductivity		µS/cm	--	--	--	--	246.9	230.3	236.8	245.5	267.7	396.5	384.7	393.6	379.6	397.1	225.3	219.6	224	239	194.1
Turbidity		NTU	--	--	(b)	(b)	111	112	142	77.6	380	4.31	2.09	0.00	7.17	6.4	38.0	76.5	790	1468	>2000
General Chemistry																					
Conductivity	2.0	µS/cm	--	--	--	--	343	349	379	352	375	540	559	541	386	495	303	333	323	353	279
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	167	157	170	186	175	272	288	275	303	250	106	57.4	64.3	175	123
pH	0.10		--	--	--	6.5-9.0	8.41	8.38	8.52	8.44	8.54	8.28	7.81	8.25	8.11	8.17	8.27	8.09	8.29	8.46	8.39
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	191	204	191	200	203	296	322	294	184	240	159	175	169	200	166
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	7.1	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	14.2	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	177	-	-	-	-	294	-	-	-	-	169	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	0.165	0.164	0.176	0.151	0.122	0.087	0.181	0.170	0.103	0.060
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	3.03	3.05	3.21	3.38	3.73	3.03	3.35	3.67	6.19	9.53	0.92	3.40	3.17	0.83	<0.50
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	0.807	0.797	-	0.777	0.712	0.055	0.052	-	0.043	0.040	0.449	0.729	-	0.235	0.179
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	0.32	0.40	0.49	<0.30	1.66	11.2	8.74	9.00	16.2	25.2	1.60	0.36	2.58	<0.30	1.77
Sulfide, total (as H2S)	0.010	mg/L	--	--	--	--	-	0.030	0.021	0.080	0.252	-	<0.018	<0.011	0.030	0.030	-	<0.018	0.039	0.119	0.179
Sulfide, total (as S)	0.011	mg/L	--	--	--	--	0.022	0.028	0.020	0.085	0.237	<0.018	<0.018	<0.010	0.032	0.028	0.022	<0.018	0.037	0.126	0.168
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	48.3	47.6	50.1	53.7	67.2	78.8	75.3	78.4	69.9	67.9	44.8	40.9	49.6	55.6	51.7
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	4.05[e]	4.1[e]	3.57	3.98	6.19[e]	1.57	1.81	1.59	1.36	1.37	2.05	6.04[e]	6.92[e]	2.88	10.3[e]
Chemical Oxygen Demand (COD)	20	mg/L	--	--	--	--	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-
Nutrients																					
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	1.49[bd]	1.67[b]	1.55	1.49[b]	1.50	0.244	0.268	0.316	0.0971	0.0872	2.80[bd]	3.49	3.45	1.65	0.843
Nitrate (as N)	0.0050	mg/L	10	400	10	3	<0.0050	0.0102	<0.0050	0.0050	<0.0050	0.0351	0.0388	0.0147	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0080	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	1.94	1.70	1.76	1.69	1.72	0.384	0.319	0.379	0.144	0.126	3.40	4.77	4.58	1.92	1.08
Dissolved Metals (Semi-Trace)																					
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	--	6640	6400	6750	6930	6780	86900	93500	87200	97100	79000	26100	14100	15900	46900	35800
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	36600	34200	37200	41000	38500	13200	13300	13900	14700	12700	9940	5370	5970	14100	8130
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2720	2870	2650	2760	3510	2840	3220	3070	2960	2850	10900	13000	11900	4610	2360
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	4330	4480	4680	4820	10400	4690	5070	5130	4830	4880	12200	38100	37300	7660	4760
Dissolved Metals (Trace)																					
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	--	--	3.3	3.0	5.9	3.3	4.0	1.6	1.1	1.2	2.5	<1.0	1.6	2.1	3.0	2.5	3.2
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.15	0.20	0.26	0.31	1.39	<0.10	<0.10	<0.10	<0.10	<0.10	0.27	0.41	1.95	9.23[a]	9.76[a]
Arsenic (As)-Dissolved	0.10	ug/L	10	50	--	--	5.25	6.00	6.69	6.41	9.44	3.52	3.65	4.57	1.16	0.72	13.5[a]	11.9[a]	23.4[a]	73.5[ab]	61.5[ab]
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	1450[a]	1580[a]	1710[a]	1850[a]	1820[a]	67.1	73.3	67.4	52.0	49.2	222	145	141	221	136
Beryllium (Be)-Dissolved	0.100	ug/L	8	1.5	--	--	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	--	--	26	23	27	26	25	<10	<10	<10	<10	<10	12	19	20	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	--	[b]	0.0069	<0.0050	<0.0050	<0.0050	0.0085	0.0195	0.0299	0.0127	0.0565	0.0169	<0.0050	<0.0100	<0.0050	<0.0050	<0.0050
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.459	0.495	0.460	0.509	0.451	<0.010	<0.010	0.011	<0.010	<0.010	0.026	0.034	0.032	0.035	0.037
Chromium (Cr)-Dissolved	0.50	ug/L	50	10	--	--	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved [1]	0.10	ug/L	1	40	--	--	<0.10	<0.10	<0.10	<0.10	0.14	1.02[a]	0.89	0.82	0.37	0.40	<0.10	0.10	0.12	0.23	0.16
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	--	[b]	<0.20	<0.20	<0.20	<0.20	0.23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Iron (Fe)-Dissolved [2]	10	ug/L	6500	--	--	350	16	12	17	16	29	2000[d]	2160[d]	2260[d]	453[d]	178	877[d]	74	21	<10	<10
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	--	--	0.302	0.120	0.135	0.159	2.93	0.426	0.243	0.136	0.343	<0.050	0.125	0.320	0.244	4.97	6.46
Lithium (Li)-Dissolved	1.0	ug/L	8	--	--	--	13.4[a]	14[a]	13.2[a]	13.3[a]	12[a]	<1.0	<1.0	<1.0	<1.0	1.0	7.8	11.2[a]	11[a]	6.1	3.1
Manganese (Mn)-Dissolved [3]	0.10	ug/L	1500	--	--	--	20.2	19.7	19.2	20.1	21.2	1940[a]	2020[a]	2340[a]	744	662	258	112	124	649	387
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	--	--	3.06	2.93	2.73	2.84	3.21	1.09	1.19	1.36	0.602	0.515	4.81	21.0	19.7	4.20	3.17
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	--	--	<0.50	<0.50	<0.50	<0.50	0.93	1.43	1.26	1.31	1.60	1.84	<0.50	<0.50	0.91	6.31	4.83
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	83	98	66	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	9.39	9.71	8.88	9.50	9.66	0.83	0.88	0.81	0.70	0.70	8.62	9.24	9.66	6.04	3.33
Selenium (Se)-Dissolved	0.050	ug/L	10	20	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	3220	3090	3480	3570	3890	8580	7780	8860	8570	8230	6040	3670	4250	8190	7750
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	725	738	738	808	786	399	441	451	448	417	159	91.6	96.9	226	169
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	<500	<500	<500	<500	790	4130	2970	3360	6490	8600	1230	3340	3420	<500	540
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.018	0.010	0.012	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.16
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	5.3[a]	5.37[a]	5.57[a]	5.55[a]	5.01[a]	<0.10	<0.10	<0.10	<0.10	<0.10	2.17	6.95[a]	6.65[a]	0.96	0.79
Uranium (U)-Dissolved	0.010	ug/L	20	85	--	--	0.014	0.016	0.018	0.018	0.060	4.86	5.56	5.01	4.92	5.27	0.090	0.100	0.202	0.884	1.02
Vanadium (V)-Dissolved	0.50	ug/L	20	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	--	[b]	1.4	1.7	2.0	1.0	1.8	11.4	12.6	5.4	3.3	1.9	1.7	1.8	<1.0	2.7	2.4
Zirconium (Zr)-Dissolved	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 7

Residential Wells Groundwater Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID							110 Emerald (E252605)	110 Emerald (E252605)	110 Emerald Rd (E252605)	111 Emerald (E252604)	111 Emerald (E252604)	111 Emerald Rd (E252604)	111 Emerald Rd. (E252604)	111 Emerald Rd. (E252604)	1780 AIRPORT (E242840)	1780 Airport (E242840)	1780 Airport Rd (E242840)	1780 Airport Rd. (E242840)	1780 Airport Rd. (E242840)
Date Sampled							22-May-2019	06-May-2020	12-May-2021	22-May-2019	05-May-2020	12-May-2021	24-May-2022	03-May-2023	28-May-2019	05-May-2020	12-May-2021	25-May-2022	03-May-2023
Time Sampled							15:41	13:43	14:50	16:03	14:33	15:07	13:31	15:39	15:08	15:05	15:24	14:28	16:03
ALS Sample ID							L2278658-11	VA20A6269-010	VA21A9252-023	L2278658-12	VA20A6269-004	VA21A9252-022	VA22B1521-005	VA23A9844-002	L2282164-9	VA20A6269-005	VA21A9252-021	VA22B1687-005	VA23A9844-003
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC WQG DW c	BC WQG FAW d													
Field Parameters																			
pH, Field			--	--	--	6.5-9.0	8.06	8.18	8.50	8.29	7.84	8.46	7.54	7.26	8.33	7.68	8.57	7.29	7.26
Temperature		°C	--	--	15 AO	18 (12 spring/fall) (a)	10.0	7.3	8.5	10.3	8.1	9.8	7.8	9.8	8.4	9.8	9.5	8.0	8.2
Conductivity		µS/cm	--	--	--	--	128.4	117.9	120.4	170.7	165.1	177.0	170.3	175.5	218.4	212.2	221.4	211.9	222.8
Turbidity		NTU	--	--	(b)	(b)	1.28	5.29	0.00	1.43	1.31	0.00	-	1.4	1.46	6.41	0.00	2.02	0.85
General Chemistry																			
Conductivity	2.0	µS/cm	--	--	--	--	174	182	177	227	249	251	258	236	304	308	318	306	316
Hardness (as CaCO3)	0.60	mg/L	--	--	--	--	86.7	89.5	82.6	122	135	124	125	118	164	159	159	147	158
pH	0.10		--	--	--	6.5-9.0	8.13	7.70	8.09	8.22	8.18	8.32	8.18	8.28	8.35	7.98	8.34	8.32	8.31
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	80.5	87.3	81.6	116	133	129	122	119	156	164	167	158	158
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	3.1	-	-	-	-	3.9	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	<1.0	-	-	-	-	<1.0	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	<1.0	-	-	6.2	-	-	-	-	7.8	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	81.6	-	-	123	-	-	-	-	159	-	-
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	250 AO	150	2.64	3.67	1.66	0.66	0.80	0.72	0.76	0.64	1.39	3.44	2.67	2.00	2.74
Fluoride (F)	0.020	mg/L	1.5	[b]	1.5	[b]	0.026	0.023	-	0.024	0.021	-	<0.020	0.024	<0.020	<0.020	-	<0.020	0.021
Sulfate (SO4)	0.30	mg/L	500	[b]	500 AO	[a]	5.33	5.85	6.19	6.90	7.89	8.16	6.84	7.70	8.16	7.25	7.54	7.51	8.02
sulfide (as H2S)	0.010	mg/L	--	--	--	--	-	<0.018	<0.011	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011
sulfide (as S)	0.011	mg/L	--	--	--	--	<0.018	<0.018	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	23.6	20.9	21.4	30.9	30.6	32.3	30.0	25.8	43.9	36.8	43.6	42.2	34.5
Total Organic Carbon	0.50	mg/L	--	--	4	(c)	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	<0.50
Nutrients																			
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	400	10	3	0.328	0.366	0.185	0.128	0.111	0.102	0.128	0.120	0.248	0.262	0.246	0.247	0.237
Nitrite (as N)	0.0010	mg/L	1	[c]	1	[b]	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.089	0.060	<0.050	<0.050	<0.050	<0.050	0.057	<0.050	0.114	0.058	<0.050	0.064	<0.050
Total Metals (Semi-Trace)																			
Calcium (Ca)-Total	50	ug/L	--	--	--	--	27600	28800	26000	38700	43900	38900	40100	37900	52100	51800	50300	46700	50900
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	4340	4300	4290	6170	6300	6580	5950	5790	7600	7300	8200	7290	7590
Potassium (K)-Total	50	ug/L	--	--	--	--	824	831	782	988	957	916	960	932	1050	1140	1100	1020	1160
Sodium (Na)-Total	50	ug/L	200000	--	--	--	1340	1480	1270	1470	1470	1380	1420	1320	2570	2650	2720	2420	2400
Total Metals (Trace)																			
Aluminum (Al)-Total	3.0	ug/L	9500	--	9500	[a]	<3.0	9.6	<3.0	3.3	3.2	<3.0	4.9	3.8	4.5	<3.0	<3.0	<3.0	<3.0
Antimony (Sb)-Total	0.10	ug/L	6	90	6	74	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	50	10	5	<0.10	<0.10	<0.10	0.17	0.19	0.18	0.17	0.18	0.15	0.14	0.17	0.14	0.16
Barium (Ba)-Total	0.10	ug/L	1000	10000	--	1000	38.3	35.4	34.3	44.7	45.0	42.2	43.2	42.2	60.8	60.3	59.0	56.2	60.3
Beryllium (Be)-Total	0.100	ug/L	8	1.5	--	0.13	<0.10	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	12000	5000	1200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	ug/L	5	[b]	5	--	0.0873	0.0848	0.0836	0.0442	0.0330	0.0333	0.0413	0.0425	0.0973	0.0723	0.0839	0.0722	0.0894
Cesium (Cs)-Total	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Total	0.50	ug/L	50	10	50	--	0.23	0.26	<0.00050	0.24	0.21	<0.00050	<0.50	<0.50	0.26	0.39	<0.00050	<0.50	<0.50
Cobalt (Co)-Total [1]	0.10	ug/L	1	40	1	4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	ug/L	1500	[b]	1000	--	1.84	1.02	2.20	2.73	3.98	12.1	9.99	13.4	4.35	4.96	4.10	1.80	3.86
Iron (Fe)-Total [2]	10	ug/L	6500	--	300	1000	18	21	12	<10	16	27	55	116	129	83	54	47	126
Lead (Pb)-Total	0.050	ug/L	10	[b]	5	[b]	0.087	0.110	0.064	0.064	0.150	0.152	0.219	0.826	0.253	0.267	0.098	<0.050	0.081
Lithium (Li)-Total	1.0	ug/L	8	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Total [3]	0.10	ug/L	1500	--	20	[b]	1.30	0.85	1.79	0.32	0.66	0.84	2.34	1.35	5.71	3.22	3.01	2.78	2.51
Mercury (Hg)-Total	0.0050	ug/L	1	0.25	1	[f]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	250	10000	88	7600	0.268	0.281	0.268	0.435	0.528	0.425	0.562	0.501	0.395	0.364	0.366	0.614	0.427
Nickel (Ni)-Total	0.50	ug/L	80	[b]	80	[b]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50
Phosphorus (P)-Total	50	mg/L	--	--	10 AO for lakes	5	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]	<50[cd]
Rubidium (Rb)-Total	0.20	ug/L	--	--	--	--	0.28	0.31	0.30	0.24	0.24	<0.20	<0.20	<0.20	0.73	0.82	0.74	0.70	0.71
Selenium (Se)-Total	0.050	ug/L	10	20	10	2	0.347	0.367	0.321	0.384	0.344	0.308	0.307	0.284	0.279	0.297	0.286	0.270	0.295
Silicon (Si)-Total	100	ug/L	--	--	--	--	4830	4570	4730	5200	4760	5120	4950	4640	5510	5200	5690	5010	5410
Silver (Ag)-Total	0.010	ug/L	20	[b]	--	[b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	2500	--	7000	--	75	78	69.8	101	113	104	107	105	143	149	141	138	145
Sulfur (S)-Total	500	ug/L	--	--	--	--	1840	2070	1990	2560	3080	2940	2700	2320	2860	2850	2960	2670	2360
Tellurium (Te)-Total	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	3	--	0.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	1000	--	--	<0.30	0.37	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Total	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	85	20	8.5	0.278	0.301	0.292	0.468	0.534	0.518	0.506	0.588	1.01	0.92	0.902	0.902	1.04
Vanadium (V)-Total	0.50	ug/L	20	--	--	--	<0.50	0.55	<0.50	0.74	0.77	0.69	0.63	0.72	0.78	0.76	0.67	0.58	0.82
Zinc (Zn)-Total	3.0	ug/L	3000	[b]	3000	--	5.2	6.6	7.0	4.3	8.4	22.2	31.8	35.4	8.5	8.2	5.4	25.1	17.0
Zirconium (Zr)-Total	0.20	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Tailings Leachate Source Concentration				Background Overburden									
Client Sample ID							MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)
Date Sampled							2-May-2019	06-May-2020	12-May-2021	25-May-2022	30-Apr-2019	12-May-2020	13-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	07-Mar-2023	17-May-2023	19-Sep-2023	20-Nov-2023
Time Sampled							10:09	11:24	09:52	09:45	9:08	13:29	12:20	12:04	10:30	10:13	11:21	14:28	11:59	10:43
ALS Sample ID							L2267651-8	VA20A6269-008	VA21A9252-017	VA22B1687-002	L2266695-7	VA20A6594-001	VA21A9336-001	VA22B1660-001	VA22C3650-001	VA22C9811-001	VA23A5201-001	VA23B1194-001	VA23C2604-001	VA23C8254-001
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d														
Field Parameters																				
pH, Field			--	--	--	--	6.89	7.36	7.15	6.94	7.32	6.63	6.77	6.96	6.90	7.11	7.37	7.00	8.17	7.74
Temperature		°C	--	--	--	--	7.3	7.1	8.2	7.7	5.2	5.9	6.4	5.6	8.3	6.8	5.0	9.0	8.3	7.6
Conductivity		µS/cm	--	--	--	--	1942	1795	1947	1732	152.6	148.2	156.0	155.9	165.2	164.4	148.5	160.7	168.9	163.2
Turbidity		NTU	--	--	--	--	5.43	64.0	76.0	11.02	22.5	1.28	0.00	44.0	7.0	950	3.3	3.3	6.52	2.04
General Chemistry																				
Conductivity	2.0	mS/cm	--	--	--	--	2790	2680	3070	2420	242	243	240	234	240	247	228	225	241	235
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	1900	1740	1940	1540	119	116	125	116	105	125	114	106	116	109
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	-	-	-	128	122	187	110	114	109	110
pH	0.10		--	--	--	--	7.12	7.26	7.71	8.09	7.85	7.95	7.54	7.95	8.30	8.19	8.20	8.18	8.31	7.70
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-		-	-	-	157	131	171	143	152	156	155
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	324	284	305	237	125	124	123	119	114	112	113	113	115	116
Bromide (Br)	0.050	mg/L	--	--	--	--	<1.0	<1.00	<1.00	<1.00	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	100	600	<10	<10.0	<10.0	<10.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	<0.40	<0.400	-	<0.400	0.206	0.211	0.204	0.195	0.236	0.260	0.216	0.208	0.248	0.244
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	1580*	1570*	1690*	1380*	9.31	9.06	9.74	9.85	12.8	13.6	10.7	10.5	12.3	11.9
sulfide (as H2S)	0.018	mg/L	--	--	--	--		<0.018	0.095	0.087	-	0.026	<0.010	<0.011	<0.011	<0.011	0.0020	<0.0016	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	<0.018	0.101	0.092	<0.018	0.024	<0.011	<0.010	<0.010	<0.010	0.0019	<0.0015	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	84.3	72.7	86.6	72.5	30.4	30.5	32.9	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	6.93	5.75	5.93	21.6	<0.50	0.69	<0.50	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	-	-	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																				
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	0.630	0.449	0.575	1.56	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0095	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	400	--	100	<0.10	<0.100	<0.100	<0.100	0.0084	0.0082	0.0091	0.0087	<0.0050	0.0176	<0.0050	<0.0050	0.0122	0.0100
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	<0.020	<0.0200	<0.0200	<0.0200	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	-	0.0069	0.0065	0.0096	0.0073	0.0014	0.0082	0.0068
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	0.0069	-	0.0078	0.0085	-	0.0095
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	1.21	0.969	1.03	-	<0.050	<0.050	<0.050	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																				
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	-	-	-	-	35000	35000	46700	30100	31900	31100	30100
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	-	-	-	-	9800	8290	17200	8350	8420	7720	8360
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	-	-	-	-	1240	1210	5230	1050	1000	1250	1140
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	-	-	-	-	4850	4800	7290	4490	4410	4870	4700
Total Metals (Trace)											-	-	-							
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	-	-	-	-	338	134	16800*	130	119	257	85.0
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	-	-	-	-	<0.10	<0.10	0.52	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	-	-	-	-	1.10	0.73	16.6*	0.54	0.49	0.91	0.57
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	-	-	-	-	29.4	20.2	257	19.8	21.6	21.2	20.5
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	-	-	-	-	<0.100	<0.100	0.725	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	-	-	-	-	<0.050	<0.050	0.445	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	-	-	-	-	<10	<10	<20	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	-	-	-	-	0.0731	0.0185	0.719	0.0159	0.0139	0.0188	0.0124
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	-	-	-	-	0.166	0.034	3.95	0.034	0.018	0.062	0.013
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	-	-	-	-	1.83	1.24	34*	1.40	0.00149	1.64	1.02
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	-	-	-	-	0.78	0.16	16*	0.14	<0.10	0.25	<0.10
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	-	-	-	-	1.82	0.52	44.2	0.56	0.76	5.24	0.83
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	-	-	-	-	498	185	25600*	170	140	360	78
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	-	-	-	-	1.29	0.232	31*	0.176	0.151	0.661	0.087
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	-	-	-	-	2.9	3.4	21.3*	2.5	2.5	3.0	2.6
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	-	-	-	-	64.6	10.9	877	10.5	12.5	15.0	2.87
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	-	-	-	-	<0.0050	<0.0050	0.0251	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	-	-	-	-	0.547	0.759	1.61	0.729	0.618	0.863	0.739
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	-	-	-	-	1.54	<0.50	35.3	<0.50	<0.50	0.84	<0.50
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	-	-	-	-	93	<50	1060	<50	<50	<50	<50
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	0.90	0.30	25.7	0.29	<0.20	0.53	0.20
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	-	-	-	-	0.200	0.182	0.340	0.164	0.186	0.147	0.172
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	-	-	-	-	9430	8130	34900	8420	8120	8000	8810
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	-	-	-	-	0.013	<0.010	0.218	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	-	-	-	-	356	369	559	295	324	345	316
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	-	-	-	-	3130	4460	5130	3660	3180	4800	4050
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	-	-	-	-	<0.010	<0.010	0.217	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	-	-	-	-	0.20	<0.10	9.57	<0.10	0.10	0.14	<0.10
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	-	-	-	-	<0.10	<0.10	0.38	<0.10	<0.10	0.11	<0.10
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	-	-	-	-	13.0	5.86	872	5.77	4.18	12.1	2.82
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	-	-	-	-	<0.10	<0.10	0.30	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	-	-	-	-	1.69	1.56	3.31	1.74	1.67	1.96	1.64
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	-	-	-	-	1.86	1.14	54.1*	0.94	0.73	1.46	0.74
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	-	-	-	-	5.8	<3.0	141	<3.0	<3.0	4.8	<3.0
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	<0.20	<0.20	0.48	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Tailings Leachate Source Concentration				Background Overburden									
Client Sample ID							MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-06-01 (E252594)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)	MW-05-01 (E252593)
Date Sampled							2-May-2019	06-May-2020	12-May-2021	25-May-2022	30-Apr-2019	12-May-2020	13-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	07-Mar-2023	17-May-2023	19-Sep-2023	20-Nov-2023
Time Sampled							10:09	11:24	09:52	09:45	9:08	13:29	12:20	12:04	10:30	10:13	11:21	14:28	11:59	10:43
ALS Sample ID							L2267651-8	VA20A6269-008	VA21A9252-017	VA22B1687-002	L2266695-7	VA20A6594-001	VA21A9336-001	VA22B1660-001	VA22C3650-001	VA22C9811-001	VA23A5201-001	VA23B1194-001	VA23C2604-001	VA23C8254-001
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW (1) c	BC CSR LW (2) d														
Dissolved Metals (Semi-Trace)																				
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	557000	529000	566000	476000	32800	32600	35100	33100	29500	36500	67200	29400	33400	30800
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	125000	102000	128000	84600	8900	8410	9080	8070	7600	8200	13200	7980	7900	7850
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	12000	10300	12700	16000	1040	1040	1050	1100	1200	1290	2180	1030	1280	1160
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	8740	6590	7140	21800	4270	4350	4880	4370	4190	4590	12700	4100	4820	4660
Dissolved Metals (Trace)																				
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	<5.0	2.6	5.6	2.3	2.9	13.0	6.5	8.4	3.1	3.9	1.6	29.8	3.4	20.8
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.50	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	2.27	1.63	2.32	2.98	0.40	0.48	0.44	0.51	0.60	0.58	0.92	0.37	0.69	0.49
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	6.91	8.40	8.69	36.1	17.6	18.8	20.1	18.5	18.5	17.9	124	19.0	19.4	18.6
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.50	<0.200	<0.200	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.25	<0.100	<0.100	<0.100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	272	130	157	21	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	1.95	2.98	3.09	<0.0100	0.0084	0.0094	0.0128	0.0109	0.0068	<0.0050	0.0059	0.0092	0.0076	0.0117
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.939	0.865	1.25	1.39	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.314	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	<0.50	<0.20	<0.00100	<0.50	1.15	0.81	0.00122	1.09	0.85	0.50	<0.50	0.00115	0.77	0.83
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	3.84*	4.9*	3.53*	0.83	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	<1.0	<0.40	<0.40	<0.40	<0.20	0.52	0.22	0.21	<0.20	<0.20	0.52	0.50	0.75	0.43
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	25200*	17900*	21400*	<20	<10	11	18	<10	<10	<10	<10	24	<10	16
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	2.52	0.434	0.48	<0.100	<0.050	0.065	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	<5.0	4.0	4.2	3.4	2.5	2.6	2.6	2.6	2.7	2.6	15.4*	2.2	2.8	2.7
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	1130	918	1020	752	0.19	5.23	9.51	1.43	0.30	<0.10	7.17	5.76	1.79	0.80
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	0.590	0.458	0.585	0.616	0.682	0.568	0.596	0.660	0.735	0.886	1.93	0.668	0.830	0.686
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	24.7	24.6	21.8	3.32	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<250	<100	<100	<100	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	34.7	27.7	33	30.8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.26	<0.20	<0.20	<0.20
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	<0.25	<0.100	<0.100	<0.100	0.202	0.163	0.170	0.148	0.143	0.201	<0.050	0.178	0.164	0.167
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	9140	6020	8020	4020	7720	8070	8030	8520	7970	6900	9100	8380	8040	8320
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.050	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	856	667	820	708	328	320	332	335	334	358	376	311	348	315
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	590000	548000	631000	486000	3500	2920	3220	3330	4050	3960	28800	3320	4440	3560
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<1.0	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	0.637	0.668	0.723	0.442	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.50	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	1.18	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<1.5	<0.60	<0.60	<0.60	<0.30	0.45	<0.30	<0.30	<0.30	<0.30	<0.30	0.92	<0.30	0.57
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.50	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	3.74	4.12	3.96	2.48	1.54	1.68	1.60	1.64	1.54	1.86	2.19	1.54	1.83	1.57
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	<2.5	<1.00	<1.00	<1.00	0.53	0.53	0.53	0.52	0.69	0.58	<0.50	0.51	0.59	0.60
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	10300*	12500*	9150*	407	<1.0	2.4	4.0	1.2	<1.0	<1.0	3.1	2.3	1.1	<1.0
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.30	<0.40	<0.40	<0.40	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Background Overburden								Background Bedrock							
Client Sample ID							MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-99-2(D) (E240502)	MW-99-2 (D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)
Date Sampled							13-May-2019	28-Apr-2020	03-May-2021	12-May-2022	13-May-2019	28-Apr-2020	03-May-2021	16-May-2022	30-Apr-2019	13-May-2020	18-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	21-Mar-2023	17-May-2023	20-Sep-2023	20-Nov-2023
Time Sampled							15:11	10:30	12:48	13:09	16:13	12:31	14:09	10:04	11:17	15:29	10:31	13:11	13:01	13:21	15:08	16:03	10:53	12:27
ALS Sample ID							L2274410-5	VA20A5832-003	VA21A8717-003	VA22B0631-002	L2274410-4	VA20A5832-004	VA21A8717-004	VA22B0967-002	L2266695-8	VA20A6594-007	VA21A9807-001	VA22B1660-002	VA22C3650-002	VA22C9811-002	VA23A6235-001	VA23B1194-002	VA23C2604-002	VA23C8254-002
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW (1) c	BC CSR LW (2) d																		
Field Parameters																								
pH, Field			--	--	--	--	9.14	8.56	7.66	8.31	8.93	7.67	7.23	7.32	7.39	6.80	7.12	7.25	7.12	7.14	7.48	7.17	8.02	7.62
Temperature		°C	--	--	--	--	11.1	8.9	8.5	9.0	5.0	5.1	4.7	4.8	9.9	8.4	9.6	8.0	8.6	7.1	7.9	8.5	8.1	7.9
Conductivity		µS/cm	--	--	--	--	201.1	260.8	181.5	190.8	184.4	251.9	214.0	185.8	463.9	428.0	448.5	436.3	447.0	429.5	444	444.6	441.1	437.5
Turbidity		NTU	--	--	--	--	10.9	4.72	0.00	5.38	3.41	0.99	0.17	1.61	7.15	8.00	3.43	10.43	31	20	8	9.2	-	11.0
General Chemistry																								
Conductivity	2.0	mS/cm	--	--	--	--	267	267	261	263	291	256	338	292	638	633	636	599	520	632	620	602	558	631
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	103	104	98.7	95.9	63.9	85.4	66.2	75.2	357	327	324	326	313	352	335	321	340	331
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	352	364	351	337	357	327	331
pH	0.10		--	--	--	--	8.31	8.31	8.36	8.32	8.03	7.86	8.17	8.29	7.93	8.18	8.14	8.11	8.16	8.22	8.17	8.17	8.11	8.10
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	389	390	364	405	388	393	383
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	270	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	135	137	144	135	129	114	166	130	301	296	284	265	214	275	270	272	240	294
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	100	600	<0.50	<0.50	0.50	<0.50	9.68	3.93	12.6	8.46	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	1.30	1.31	1.35	1.37	0.895	0.682	1.09	0.817	0.168	0.169	0.155	0.162	0.156	0.164	0.163	0.181	0.148	0.168
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	8.44	8.35	9.35	8.80	7.47	15.9	10.1	10.1	70.5	69.2	71.5	71.8	71.5	71.7	71.1	73.5	65.0	71.6
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.011	-	<0.018	<0.010	<0.011	-	<0.018	<0.010	<0.011	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.010	<0.018	<0.018	<0.011	<0.010	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	34.0	30.7	33.8	35.5	34.2	28.8	39.4	35.1	74.1	66.6	72.8	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	<0.50	<0.50	<0.50	<0.50	0.80	0.86	0.62	<0.50	<0.50	0.80	0.57	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.7	-
Nutrients																								
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	0.0601	0.0670	0.0590	0.0619	0.0119	0.0051	0.0116	0.0068	0.0092	0.0133	<0.0050	0.0194	0.0223	0.0207	0.0113	0.0374	0.0218	0.0202
Nitrate (as N)	0.0050	mg/L	10	400	--	100	0.0171	0.0080	0.0054	0.0176	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0071	0.0111	0.0074	<0.0050	<0.0050	<0.0250	<0.0050	0.0053	0.0117
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	0.0296	0.0210	0.0083	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0052	<0.0010	<0.0010	<0.0010
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	0.0019	0.0052	0.0012	0.0045	<0.0010	<0.0010	<0.0010
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	0.0048	-	0.0056	<0.0020	-	0.0054
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.058	0.086	0.063	-	<0.050	0.051	<0.050	-	<0.050	<0.050	<0.050	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																								
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	-	-	-	-	-	-	-	-	81900	86500	81600	79000	82900	75900	74700
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	35800	35900	35700	34000	36400	33300	35000
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	1180	1110	1150	1150	1100	1100	1040
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	-	-	-	-	-	-	-	-	8690	7930	7520	7030	8250	7170	6410
Total Metals (Trace)																								
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	-	-	-	-	-	-	-	-	19.0	71.8	47.4	29.4	62.2	48.8	24.4
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	-	-	-	-	-	-	-	-	0.20	0.19	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	-	-	-	-	-	-	-	-	1.32	2.15	1.03	0.49	0.79	0.93	0.70
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	-	-	-	-	-	-	-	-	62.2	61.9	55.7	54.8	70.4	58.0	56.1
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	-	-	-	-	-	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	0.076	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	-	-	-	-	-	-	-	-	0.0101	0.0242	0.0103	0.0062	0.0076	0.0218	0.0101
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	0.763	0.698	0.703	0.829	0.870	0.739	0.776
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	-	-	-	-	-	-	-	-	<0.50	0.68	<0.50	<0.50	<0.00050	<0.50	<0.50
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	-	-	-	-	-	-	-	-	0.30	0.43	0.30	0.23	0.23	0.25	0.20
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	-	-	-	-	-	-	-	-	0.50	1.04	0.56	<0.50	<0.50	<0.50	<0.50
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	-	-	-	-	-	-	-	-	2380	3880	1720	729	1500	1740	1500
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	-	-	-	-	-	-	-	-	0.393	0.909	0.283	0.109	0.376	0.532	0.293
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	-	-	-	-	-	-	-	-	6.8	6.8	6.5	6.6	6.8	6.8	6.1
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	-	-	-	-	-	-	-	-	141	158	165	133	114	136	115
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	-	-	-	-	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	-	-	-	-	-	-	-	-	0.502	0.372	0.389	0.268	0.365	0.323	0.228
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	-	-	-	-	-	-	-	-	<0.50	0.67	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	94	131	65	<50	50	62	60
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	1.88	1.95	2.02	1.91	2.16	1.94	1.77
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	11600	11100	11800	10700	11200	11000	11000
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	-	-	-	-	-	-	-	-	0.013	0.020	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	-	-	-	-	-	-	-	-	636	652	639	629	656	640	597
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	24100	25300	24700	26000	25100	26000	25100
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	-	-	-	-	-	-	-	-	0.20	0.54	0.28	0.18	0.27	0.32	0.19
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	-	-	-	-	-	-	-	-	0.67	1.83	2.60	0.96	1.94	1.41	0.87
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	-	-	-	-	-	-	-	-	0.10	0.15	0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	-	-	-	-	-	-	-	-	1.99	1.96	1.95	1.91	2.05	2.08	1.92
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	-	-	-	-	-	-	-	-	3.2	3.7	<3.0	5.6	<3.0	3.4	4.1
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Background Overburden								Background Bedrock							
Client Sample ID							MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-03A-01 (E252592)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-02A-01 (E252591)	MW-99-2(D) (E240502)	MW-99-2 (D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)	MW-99-2(D) (E240502)
Date Sampled							13-May-2019	28-Apr-2020	03-May-2021	12-May-2022	13-May-2019	28-Apr-2020	03-May-2021	16-May-2022	30-Apr-2019	13-May-2020	18-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	21-Mar-2023	17-May-2023	20-Sep-2023	20-Nov-2023
Time Sampled							15:11	10:30	12:48	13:09	16:13	12:31	14:09	10:04	11:17	15:29	10:31	13:11	13:01	13:21	15:08	16:03	10:53	12:27
ALS Sample ID							L2274410-5	VA20A5832-003	VA21A8717-003	VA22B0631-002	L2274410-4	VA20A5832-004	VA21A8717-004	VA22B0967-002	L2266695-8	VA20A6594-007	VA21A9807-001	VA22B1660-002	VA22C3650-002	VA22C9811-002	VA23A6235-001	VA23B1194-002	VA23C2604-002	VA23C8254-002
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW (1) c	BC CSR LW (2) d																		
Dissolved Metals (Semi-Trace)																								
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	26700	26600	25600	25500	19100	25700	19600	22900	83200	75600	75700	77400	70900	85200	77600	72600	80000	76600
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	8760	9140	8450	7820	3930	5150	4180	4380	36300	33600	32800	32200	33000	33800	34200	34000	34100	34000
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	1370	1410	1430	1350	889	854	958	843	1170	1180	1090	1150	1100	1100	1100	1150	1140	1120
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	23400	22900	22200	23000	45800	26500	56000	36100	7050	6820	6800	8260	7050	7260	6900	7460	6920	6420
Dissolved Metals (Trace)																								
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	1.5	1.7	1.6	2.1	1.7	1.4	1.1	2.0	<1.0	<1.0	1.0	1.3	1.1	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.10	<0.10	<0.10	<0.10	0.11	0.11	0.11	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	9.72	9.47	8.47	9.23	2.68	2.59	3.38	2.78	<0.10	0.14	0.14	0.24	0.17	0.16	0.12	0.32	0.20	0.19
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	63.3	55.2	57.8	56.3	53.8	62.1	59.4	59.2	54.0	55.1	49.4	51.4	53.5	49.8	50.2	54.6	53.9	53.0
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.10	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	73	65	70	71	362	165	476	311	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0109	0.0137	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	0.0083	0.0067
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.017	<0.010	0.011	0.014	<0.010	<0.010	<0.010	<0.010	0.898	0.816	0.627	0.762	0.631	0.640	0.780	0.856	0.675	0.706
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	<0.10	<0.10	<0.00050	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	<0.10	<0.10	<0.10	<0.10	0.22	0.31	0.22	0.22	0.33	0.34	<0.10	0.23	0.29	0.23	0.18	0.19	0.22	0.18
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	<0.20	<0.20	0.45	<0.20	<0.20	<0.20	<0.20	0.37	0.46	0.22	0.34	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	91	114	64	<10	700	832	863	840	13	246	<10	342	163	<10	76	832	443	481
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	9.4*	11.2*	9.5*	8.9*	10.2*	10.5*	10.9*	9.8*	6.7	6.9	6.0	6.9	6.4	6.3	6.5	6.5	6.8	6.4
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	141	174	146	48.7	519	614	644	554	152	182	3.60	124	136	141	119	106	129	110
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	0.511	0.927	0.951	0.507	0.732	0.495	0.814	0.622	0.239	0.265	0.231	0.498	0.345	0.378	0.277	0.383	0.309	0.231
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<50	<50	<50	<50	62	<50	112	73	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.65	0.72	0.63	0.63	<0.20	<0.20	<0.20	<0.20	1.93	1.87	1.78	1.86	1.97	1.81	1.87	1.91	1.88	1.79
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	<0.050	<0.050	<0.050	<0.050	0.241	0.275	0.268	0.29	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5600	5410	5690	5490	5750	5810	6260	6540	10400	10400	10600	10900	10600	10200	10400	11200	11200	10800
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	681	684	643	662	123	156	130	133	621	600	584	600	588	610	618	612	618	596
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	2750	2460	2620	2840	2290	4900	3090	3680	27100	23700	26500	25300	23100	23200	25000	24600	23800	25100
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	0.50	0.47	0.50	0.49	0.68	0.57	0.81	0.65	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	0.424	0.463	0.411	0.421	0.270	0.249	0.249	0.285	1.79	2.05	1.73	1.97	1.86	1.89	1.84	1.86	1.89	1.82
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	<0.50	<0.50	<0.50	<0.50	0.87	0.69	0.62	0.69	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	<1.0	1.3	<1.0	<1.0	<1.0	1.6	<1.0	2.0	1.6	3.7	3.7	2.1	<1.0	1.2	1.1	<1.0	1.3	2.8
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Overburden									
Client Sample ID							MW-99-2(S) (E275543)	MW-99-2 (S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)
Date Sampled							30-Apr-2019	13-May-2020	18-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	21-Mar-2023	17-May-2023	20-Sep-2023	20-Nov-2023
Time Sampled							12:31	15:29	11:55	13:29	13:28	13:41	15:31	15:48	11:21	12:52
ALS Sample ID							L2266695-9	VA20A6594-008	VA21A9807-002	VA22B1660-003	VA22C3650-003	VA22C9811-003	VA23A6235-002	VA23B1194-003	VA23C2604-003	VA23C8254-003
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW (1) c	BC CSR LW (2) d										
Field Parameters																
pH, Field			--	--	--	--	6.97	6.29	6.26	6.92	6.33	6.39	7.15	6.66	7.17	7.31
Temperature		°C	--	--	--	--	7.0	7.4	9.4	6.9	11.7	8.2	5.5	7.3	11.7	9.6
Conductivity		µS/cm	--	--	--	--	426.3	431.1	405.4	341.9	515	552	500	441.6	593	578
Turbidity		NTU	--	--	--	--	0.89	1.34	0.00	4.30	9.9	25	4.6	3.4	-	2.26
General Chemistry																
Conductivity	2.0	mS/cm	--	--	--	--	639	655	577	502	624	800	745	638	737	781
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	330	316	270	248	322	440	379	318	404	395
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	272	367	477	393	342	387	399
pH	0.10		--	--	--	--	7.01	7.29	7.31	8.06	8.20	7.82	7.19	8.07	8.27	7.14
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	353	452	556	538	462	535	530
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	209	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	119	118	123	154	224	236	209	177	271	261
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.250	<0.050	<0.050	<0.250
Chloride (Cl)	0.50	mg/L	250	1500	100	600	<0.50	0.61	<0.50	0.90	1.27	<2.50	2.53	1.64	1.62	<2.50
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	0.043	0.039	0.041	0.050	0.049	<0.100	<0.100	0.044	0.052	<0.100
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	219	226	179	113	121	178	218	169	137	171
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.011	<0.011	<0.011	<0.011	0.0018	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.010	0.0017	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	0.0	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	35.5	36.9	39.7	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	2.67	2.73	2.52	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	56.5	-
Nutrients																
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	0.0440	0.0417	0.0350	0.0450	0.0647	0.0734	0.0578	0.0549	0.0720	0.0634
Nitrate (as N)	0.0050	mg/L	10	400	--	100	<0.0050	<0.0050	<0.0050	0.0078	<0.0050	<0.0250	<0.0250	0.0064	<0.0050	<0.0250
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-	-	<0.0020	-	0.0257	<0.0020	-	0.0335
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.113	0.128	0.122	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	84200	115000	148000	122000	106000	121000	123000
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	15000	19300	26200	21500	18900	20700	22300
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	1830	2260	2920	2170	1930	2630	2510
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	2970	3960	4590	3400	3370	4140	3980
Total Metals (Trace)																
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	52.8	60.3	14.2	9.8	17.9	5.5	4.4
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	8.72	13.3*	13.6*	9.28	8.69	14*	12.9*
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	39.6	55.3	71.3	56.3	58.9	59.8	62.2
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	0.0177	0.0343	0.0239	0.0150	0.0208	0.0182	0.0142
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	0.092	0.130	0.146	0.096	0.095	0.149	0.144
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.00050	<0.50	<0.50
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	7.06*	9.29*	11.8*	8.59*	6.84*	8.04*	8.09*
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	0.51	0.70	<0.50	<0.50	<0.50	<0.50	<0.50
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	3740	5300	6290	5160	3960	5560	5690
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	0.230	0.279	0.249	0.084	0.136	0.160	0.084
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	1.1	2.0	1.9	1.3	1.5	1.8	1.9
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	2620*	4020*	4870*	4100*	3670*	4170*	4600*
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	0.588	0.777	0.790	0.596	0.597	0.791	0.677
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	5.91	6.82	8.11	6.10	5.46	5.99	5.58
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	<50	<50	100	<50	<50	52	52
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	0.86	1.24	1.45	0.96	0.91	1.41	1.21
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	<0.050	<0.050	0.063	<0.050	0.053	<0.050	0.050
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	7560	8930	10000	7750	7390	9550	9310
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	275	400	548	435	382	463	434
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	38000	42800	72700	77200	57300	54900	61100
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	0.15	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	2.68	0.37	0.41	0.44	0.58	<0.30	<0.30
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	1.12	2.88	4.46	2.82	1.93	4.27	3.97
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	7.5	8.0	6.5	7.0	14.0	5.5	8.7
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Overburden									
Client Sample ID							MW-99-2(S) (E275543)	MW-99-2 (S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)	MW99-2(S) (E275543)	MW-99-2(S) (E275543)	MW-99-2(S) (E275543)
Date Sampled							30-Apr-2019	13-May-2020	18-May-2021	26-May-2022	26-Sep-2022	06-Dec-2022	21-Mar-2023	17-May-2023	20-Sep-2023	20-Nov-2023
Time Sampled							12:31	15:29	11:55	13:29	13:28	13:41	15:31	15:48	11:21	12:52
ALS Sample ID							L2266695-9	VA20A6594-008	VA21A9807-002	VA22B1660-003	VA22C3650-003	VA22C9811-003	VA23A6235-002	VA23B1194-003	VA23C2604-003	VA23C8254-003
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d										
Dissolved Metals (Semi-Trace)																
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	101000	96400	83100	77700	99600	141000	118000	97700	127000	123000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	19000	18200	15100	13000	17700	21400	20600	18100	21100	21300
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	1880	2040	1740	1740	2250	2410	2000	2060	2630	2580
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	2390	2680	2630	2770	3470	3730	3240	3240	3860	3820
Dissolved Metals (Trace)																
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	1.9	7.9	1.6	2.2	1.2	1.0	1.3	1.9	1.8	1.9
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.10	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	7.03	6.76	6.31	8.16	11.7*	10.3*	8.30	8.50	13.3*	12.9*
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	46.5	51.3	39.6	33.8	49.3	58.5	49.6	48.3	59.0	59.5
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	0.0192	0.0204	0.0201	0.0093	0.0110	0.0097	0.0099	0.0152	0.0150	0.0114
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.084	0.088	0.075	0.076	0.126	0.112	0.091	0.091	0.150	0.140
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	9.55*	9.23*	7.16*	6.02*	7.56*	9.1*	7.94*	6.65*	7.77*	7.3*
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	0.70	0.90	0.91	<0.20	<0.20	<0.20	<0.20	0.24	<0.20	<0.20
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	4090	4010	3060	3010	3680	4350	4820	3980	5360	5460
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	0.091	0.324	0.074	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	1.4	1.4	1.2	1.2	1.6	1.6	1.3	1.2	1.7	1.6
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	2460*	2430*	2060*	2340*	3020*	4140*	3790*	3300*	4150*	4330*
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	0.378	0.367	0.348	0.540	0.674	0.627	0.543	0.608	0.788	0.686
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	8.29	8.19	6.31	4.92	5.71	6.19	5.75	5.24	5.84	5.58
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.88	0.86	0.79	0.82	1.15	1.02	0.97	0.91	1.32	1.22
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	6730	6990	7080	7100	8630	8440	7360	7630	9440	9040
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	307	314	270	253	357	421	418	354	448	426
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	80300	74500	65400	38700	38800	59000	73800	55300	49600	59200
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	0.53	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	0.455	0.570	0.491	1.11	2.80	3.70	2.70	1.78	3.96	3.71
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	10.0	16.6	8.5	5.9	5.6	4.1	6.0	16.3	4.6	7.6
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-01-2004(S) (E303722)	MW-01-2004 (S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)
Date Sampled							30-Apr-2019	13-May-2020	18-May-2021	30-May-2022	27-Sep-2022	06-Dec-2022	07-Mar-2023	23-May-2023	21-Sep-2023	22-Nov-2023	30-Apr-2019	13-May-2020	18-May-2021	30-May-2022	27-Sep-2022	06-Dec-2022	07-Mar-2023	23-May-2023	21-Sep-2023	22-Nov-2023
Time Sampled							14:15	15:29	14:50	09:17	12:46	11:20	13:51	11:24	13:18	12:36	14:40	15:29	15:07	09:34	13:07	11:45	14:15	11:14	13:34	12:57
ALS Sample ID							L2266695-10	VA20A6594-009	VA21A9807-007	VA22B1955-001	VA22C3650-004	VA22C9811-006	VA23A5201-002	VA23B1614-004	VA23C2649-004	VA23C8401-001	L2266695-11	VA20A6594-010	VA21A9807-008	VA22B1955-002	VA22C3650-005	VA22C9811-005	VA23A5201-003	VA23B1614-005	VA23C2649-005	VA23C8401-002
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d																				
Field Parameters																										
pH, Field			--	--	--	--	7.03	8.21	6.96	7.00	6.36	6.65	7.2	7.54	7.52	7.98	7.94	8.47	7.01	7.46	6.83	7.12	7.37	7.3	7.52	7.66
Temperature		°C	--	--	--	--	5.5	5.1	5.3	5.3	8.4	7.6	5.2	9.4	8.6	7.8	6.8	6.6	6.5	6.4	7.3	5.8	6.4	13.5	7.2	7.1
Conductivity		µS/cm	--	--	--	--	126.2	88.0	96.3	73.6	127.7	125.9	94	97.7	115.4	106.1	315.2	300.9	298.9	312.8	322.6	312.2	317.1	379.7	326.4	329.2
Turbidity		NTU	--	--	--	--	128	24.8	66.7	18.5	60	80	45	45	32.7	58.4	10.56	4.59	4.25	7.33	15	13	9	6.8	6.3	5.92
General Chemistry																										
Conductivity	2.0	mS/cm	--	--	--	--	196	147	156	118	181	192	145	136	164	150	475	474	472	485	483	479	462	485	484	472
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	90.7	62.4	65.1	49.2	74.8	86.2	64.5	57.1	70.0	66.8	227	204	202	204	188	231	222	212	215	214
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	53.5	82.7	100	68.7	62	82.2	73.0	-	-	-	208	232	232	218	219	227	228
pH	0.10		--	--	--	--	7.52	7.58	7.73	7.86	8.09	7.95	7.90	7.61	7.57	7.86	8.07	8.25	8.31	8.43	8.34	8.35	8.37	8.31	8.18	8.34
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	94.0	134	126	102	88	112	109	-	-	-	334	288	302	312	308	325	335
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	107	76.2	76.8	59.6	87.8	92.5	74.3	69.1	84.6	81.2	160	160	164	167	159	149	159	160	162	169
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	100	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.92	2.80	2.84	2.79	2.83	2.81	2.84	2.83	2.68	2.70
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	0.191	0.172	0.142	0.146	0.158	0.170	0.144	0.172	0.161	0.150	0.204	0.214	0.211	0.219	0.207	0.196	0.199	0.209	0.201	0.202
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	2.09	1.66	1.94	1.76	5.15	3.25	2.03	2.17	2.09	2.07	92.8	87.5	87.4	84.6	87.9	88.9	89.4	90.6	88.2	92.5
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011	<0.011	-	<0.018	<0.010	<0.011	<0.010	<0.011	<0.0016	<0.011	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010	<0.010	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	25.0	19.2	21.0	-	-	-	-	-	-	-	37.8	38.5	40.9	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	1.56	1.73	1.92	-	-	-	-	-	-	-	1.24	1.02	0.66	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	0.249	0.200	0.203	0.166	0.248	0.244	0.179	0.199	0.242	0.188	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	400	--	100	0.0103	0.0142	0.0133	0.0828	0.0127	0.0368	0.111	0.0589	0.0209	0.0269	0.0915	0.0824	0.0915	0.122	0.0945	0.0824	0.0581	0.0898	0.0777	0.0700
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	<0.0010	0.0088	0.0027	<0.0010	0.0034	<0.0010	<0.0010	0.0042	0.0013	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	0.0547	0.0686	0.0601	0.0557	0.0658	0.0549	0.0559	-	-	-	0.0359	0.0347	0.0274	0.0188	0.0266	0.0287	0.0286
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-	-	0.0705	-	0.0565	0.0648	-	0.0631	-	-	-	-	0.0318	-	0.0334	0.0293	-	0.0354
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.317	0.114	0.352	-	-	-	-	-	-	-	0.063	<0.050	0.065	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																										
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	15300	23800	27900	19300	17200	23000	20800	-	-	-	61800	70600	70600	64800	64800	68300	69400
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	3710	5660	7380	4990	4620	6020	5110	-	-	-	13000	13600	13600	13700	13900	13700	13300
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	1120	1490	1900	1270	1550	1700	1540	-	-	-	2510	2170	2320	2240	2440	2360	2340
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	2030	2860	3360	2580	2480	3020	2840	-	-	-	16200	15700	11800	13600	12200	13000	11800
Total Metals (Trace)																										
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	1140	1450	3200	1500	2060	2940	1670	-	-	-	27.6	33.6	40.3	29.6	27.3	13.6	10.7
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	0.22	0.56	0.33	<0.20	0.18	0.41	0.28	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	10.4*	13*	12.9*	9.40	5.93	12.4*	7.62	-	-	-	2.62	3.07	2.11	1.94	1.47	1.58	1.36
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	59.9	104	98.4	49.6	48.6	120	65.9	-	-	-	160	168	142	146	130	139	134
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	<0.100	<0.100	0.187	<0.100	0.111	0.154	<0.100	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	<0.100	<0.250	0.101	<0.100	0.064	<0.100	<0.100	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	<20	<50	<20	<20	<10	<20	<20	-	-	-	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	0.544	0.810	0.748	0.496	0.460	0.943	0.599	-	-	-	0.0285	0.0340	0.0286	0.0141	0.0106	0.0321	0.0373
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	0.159	0.204	0.443	0.192	0.332	0.422	0.228	-	-	-	0.434	0.403	0.271	0.318	0.326	0.357	0.290
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	2.20	2.93	6.38	2.76	3.48	5.60	3.18	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	2.59*	6.24*	4.12*	1.66*	1.67*	5.64*	2.17*	-	-	-	<0.10	0.11	0.14	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	5.14	6.66	11.9	17.4	7.12	10.5	6.55	-	-	-	1.11	1.48	1.90	1.36	1.02	0.89	0.78
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	2790	4130	5860*	2680	2770	5600*	2890	-	-	-	1000	1160	696	676	350	398	348
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	2.68	4.22	6.65	2.72	3.84	9.17	3.81	-	-	-	0.240	0.753	0.317	0.291	0.160	0.896	0.721
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	2.8	<5.0	4.6	2.5	3.2	4.7	3.0	-	-	-	22.6*	22.5*	16.2*	17.1*	16.4*	17.5*	15.8*
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	7550[M]	12000[M]	7720[M]	6460[M]	5160[M]	10900[M]	5070[M]	-	-	-	177	244[I]	247[I]	141	47.4	106	63.7
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	<0.0050	<0.0050	<0.0050	0.0059	<0.0050	0.0078	0.0091	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	8.00	15.5*	12.3*	8.00	7.86	14.9*	6.38	-	-	-	2.05	2.03	2.19	1.78	1.82	2.03	1.85
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	3.08	3.62	7.01	3.55	4.29	6.94	3.56	-	-	-	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	432	543	498	274	234	454	319	-	-	-	186	148	131	102	90	198	95
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	1.60	2.14	4.30	2.23	2.56	3.86	2.34	-	-	-	1.69	1.54	1.29	1.33	1.30	1.52	1.18
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	<0.100	<0.250	0.144	0.109	0.073	0.129	<0.100	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	13300	14700	18300	14700	15100	17700	16700	-	-	-	10000	9450	10000	9780	9870	9510	9960
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	0.074	0.087	0.150	0.068	0.118	0.178	0.096	-	-	-	<0.010	0.017	0.012	0.016	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	97.5	167	191	118	110	153	142	-	-	-	362	398	388	329	348	371	372
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	<1000	<2500	1110	<1000	<500	<1000	<1000	-	-	-	29900	30900	31700	31800	32200	30300	32500
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.40	<1.00	<0.40	<0.40	<0.20	<0.40	<0.40	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	<0.020	<0.050	0.047	0.023	0.025	0.056	0.025	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	0.47	0.71	1.50	0.63	1.00	1.39	0.87	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	0.59	<0.50	0.27	0.59	0.40	0.76	0.36	-	-	-	0.18	0.41	0.70	0.36	0.18	0.26	0.34
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	32.7	41.8	97.0	44.2	52.0	88.9	51.2	-	-	-	0.96	1.66	1.59	1.75	<1.20	0.58	<0.60
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	<0.20	<0.50	0.21	<0.20	0.15	0.27	<0.20	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	1.31	2.56	2.95	1.42	1.49	2.51	1.70	-	-	-	2.00	2.11	2.28	2.21	2.34	2.20	2.38
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	8.09	11.8	18.7	8.30	9.04	17.1	9.68	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	16.6	20.0	29.6	19.2	20.0	36.9	24.0	-	-	-	5.9	7.9	5.3	14.9	<3.0	6.1	5.6
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.40	<1.00	<0.40	<0.40	0.28	<0.40	0.42	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-01-2004(S) (E303722)	MW-01-2004 (S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(S) (E303722)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)	MW-01-2004(D) (E303723)
Date Sampled							30-Apr-2019	13-May-2020	18-May-2021	30-May-2022	27-Sep-2022	06-Dec-2022	07-Mar-2023	23-May-2023	21-Sep-2023	22-Nov-2023	30-Apr-2019	13-May-2020	18-May-2021	30-May-2022	27-Sep-2022	06-Dec-2022	07-Mar-2023	23-May-2023	21-Sep-2023	22-Nov-2023
Time Sampled							14:15	15:29	14:50	09:17	12:46	11:20	13:51	11:24	13:18	12:36	14:40	15:29	15:07	09:34	13:07	11:45	14:15	11:14	13:34	12:57
ALS Sample ID							L2266695-10	VA20A6594-009	VA21A9807-007	VA22B1955-001	VA22C3650-004	VA22C9811-006	VA23A5201-002	VA23B1614-004	VA23C2649-004	VA23C8401-001	L2266695-11	VA20A6594-010	VA21A9807-008	VA22B1955-002	VA22C3650-005	VA22C9811-005	VA23A5201-003	VA23B1614-005	VA23C2649-005	VA23C8401-002
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d																				
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	25800	18000	18600	14200	21300	25100	18600	16300	20300	19500	67600	60800	60300	60700	55000	70400	67200	62600	63900	64500
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	6390	4240	4530	3350	5250	5720	4380	3980	4700	4390	14200	12500	12500	12800	12300	13500	13200	13600	13400	12900
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	1110	955	938	874	1110	1160	926	1080	1090	1790	2240	2380	2280	2420	2140	2160	2180	2360	2200	2290
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	2860	2210	2380	2010	2610	2920	2340	2370	2820	2570	11800	15300	16300	16300	13800	11200	12700	12300	13000	11200
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	2.9	3.6	4.8	8.2	2.1	3.2	4.2	15.6	3.2	4.6	<1.0	<1.0	1.3	1.8	1.8	1.3	1.6	1.2	<1.0	1.2
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	1.17	1.01	1.41	0.78	0.93	0.87	0.81	0.92	0.89	0.76	1.08	1.02	0.92	1.03	0.89	0.92	0.92	0.89	0.88	0.80
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	9.31	7.03	6.63	3.72	8.84	10.8	6.14	7.16	8.11	10.1	135	145	148	145	131	118	124	125	137	131
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	0.271	0.211	0.220	0.207	0.315	0.298	0.256	0.252	0.321	0.295	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	0.0118	0.0059	<0.0050	0.0085	0.0151
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.047	<0.010	<0.010	0.249	0.392	0.398	0.414	0.357	0.252	0.314	0.300	0.350	0.274
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	0.24	0.19	0.22	0.14	0.24	0.22	0.17	0.16	0.20	0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	1.00	0.82	0.73	0.85	0.81	0.92	6.17	1.13	0.75	0.88	0.30	0.37	0.42	0.40	0.34	0.70	0.52	0.53	0.20	0.35
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	<10	<10	<10	<10	<10	<10	<10	14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	1.0	<1.0	1.1	1.0	<1.0	<1.0	<1.0	1.3	1.3	1.3	**17.1***	**24.4***	**22.8***	**23.6***	**20.6***	**14.5***	**15.4***	**16.1***	**18.5***	**15.6***
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	**4510****	**3200****	**3450****	**2530****	**3590****	**3730****	**3390****	**3130****	**3130****	**2810****	5.79	5.94	5.80	3.98	5.78	13.2	7.17	6.48	4.27	6.38
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	7.82	6.04	5.32	5.25	6.96	7.84	4.44	5.77	6.27	4.34	2.00	1.84	2.00	1.96	1.81	1.91	1.93	1.96	2.03	1.79
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	0.54	<0.50	<0.50	<0.50	0.51	0.54	<0.50	<0.50	0.52	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	70	61	54	84	67	58	56	80	66	52	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.21	<0.20	<0.20	<0.20	0.26	0.20	<0.20	0.21	0.24	0.25	1.13	1.47	1.57	1.41	1.38	1.17	1.26	1.27	1.23	1.21
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	11500	10900	11100	11200	12300	11800	11200	12100	12400	13100	9300	9220	9080	9310	9170	9080	9100	9870	9470	10200
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	156	115	122	89.3	147	150	133	108	138	128	341	344	372	356	331	344	376	345	374	355
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	1020	500	590	<500	1680	680	600	<500	960	<500	34500	29100	29600	28100	27700	27900	28800	30900	31400	31600
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.34	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	1.17	0.814	0.728	0.421	1.14	1.42	0.644	0.650	0.807	0.632	1.86	1.99	1.88	1.96	1.90	2.22	2.19	2.27	2.32	2.27
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	1.13	1.06	0.99	1.13	1.43	1.29	0.96	1.23	1.36	1.18	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	4.4	5.8	3.2	3.9	3.5	2.5	5.2	4.0	4.5	6.4	2.8	2.6	2.3	1.5	1.9	1.2	3.1	1.1	1.1	2.4
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-99-1(S) (E275563)	MW-99-1 (S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(D) (E240501)	MW-99-1 (D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)
Date Sampled							1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	20-Mar-2023	23-May-2023	21-Sep-2023	21-Nov-2023	1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	21-Mar-2023	23-May-2023	21-Sep-2023	21-Nov-2023
Time Sampled							12:47	13:04	12:52	12:19	13:38	13:01	13:00	13:44	10:19	14:04	14:53	14:31	14:50	13:51	15:04	13:45	13:50	14:27	11:40	15:33
ALS Sample ID							L2267651-3	VA20A6594-018	VA21A9807-005	VA22B1660-006	VA22C3640-003	VA22C9929-002	VA23A6235-005	VA23B1614-002	VA23C2649-002	VA23C8254-006	L2267651-4	VA20A6594-019	VA21A9807-006	VA22B1660-007	VA22C3640-004	VA22C9929-003	VA23A6235-006	VA23B1614-003	VA23C2649-003	VA23C8254-007
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d																				
Field Parameters																										
pH, Field		--	--	--	--	--	6.8	11.62	6.64	6.88	6.38	6.73	6.84	6.91	7.53	7.27	7.49	9.50	7.46	7.46	6.94	7.07	7.4	7.09	7.21	7.64
Temperature		°C	--	--	--	--	7.7	6.9	12.7	10.1	10.3	6.4	7.8	6.1	7.6	8.7	8.7	9.6	13.5	8.6	9.9	6.4	5.6	7.7	7.8	8.3
Conductivity		µS/cm	--	--	--	--	226.5	199.1	213.7	209.0	210.5	178.6	179.1	164.4	179.6	187.3	568	558	621	568	595	537	527	552	565	569
Turbidity		NTU	--	--	--	--	129	195	68.3	35.4	70	160	65	290	109.6	6.69	2.73	1.00	0.00	2.19	2.9	15	3.9	6.1	5.53	3.79
General Chemistry																										
Conductivity	2.0	mS/cm	--	--	--	--	332	313	269	261	259	241	235	235	243	240	815	805	795	789	811	796	796	818	817	805
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	155	140	119	117	117	106	104	105	108	106	175	176	165	173	178	166	174	176	173	173
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	123	127	113	109	114	122	106	-	-	-	195	186	175	179	178	186	177
pH	0.10		--	--	--	--	7.43	7.50	7.46	7.88	7.86	7.73	7.56	7.81	7.43	7.28	8.14	8.25	8.43	8.51	8.50	8.34	8.02	8.33	8.23	8.03
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	181	185	188	239	152	176	169	-	-	-	472	488	472	515	492	492	499
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	89.6	-	-	-	-	-	-	-	-	-	394	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	84.6	90.0	82.5	86.9	87.5	84.3	89.6	92.2	95.2	92	403	406	404	389	394	368	394	407	405	405
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
Chloride (Cl)	0.50	mg/L	250	1500	100	600	1.62	1.45	1.19	1.13	1.30	1.10	1.09	1.09	1.16	1.20	7.20	7.13	7.43	7.36	8.50	8.10	7.88	7.90	7.80	7.65
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	0.089	0.100	0.098	0.110	0.118	0.122	0.123	0.125	0.124	0.121	0.550	0.540	0.483	0.478	0.543	0.546	0.535	0.520	0.526	0.542
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	76.1	67.2	51.0	42.0	43.7	36.6	31.8	28.6	29.7	32.8	36.6	39.0	40.2	40.2	42.8	43.8	40.8	42.5	37.5	42.4
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	-	<0.018	<0.010	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	22.2	20.5	23.3	-	-	-	-	-	-	-	100.0	92.4	106	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	1.40	2.89	1.50	-	-	-	-	-	-	-	<0.50	<0.50	0.78	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	0.0849	0.104	0.262	0.315	0.437	0.389	0.435	0.362	0.459	0.463	1.38	1.32	0.700	0.407	1.38[b]	1.48	1.37	1.39	1.57	1.43
Nitrate (as N)	0.0050	mg/L	10	400	--	100	0.0792	0.119	0.130	0.0112	0.0100	0.0255	0.0059	0.0274	0.0315	<0.0050	0.212	0.325	0.984	1.20	0.145	0.0768	0.229	0.0822	<0.0250	<0.0250
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	0.0010	<0.0010	<0.0010	0.0011	0.0021	0.0040	0.0020	<0.0010	0.0027	<0.0010	0.0117	0.0805	0.0297	0.0154	0.0111	0.0056	0.0187	0.0321	0.0071	<0.0050
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	0.0092	0.0082	0.0208	0.0062	0.0355	0.0316	0.0301	-	-	-	0.104	0.0956	0.0840	0.102	0.0946	0.0807	0.0940
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-		0.0052	-	<0.864	0.216	-	1.63	-	-	-	-	0.106	-	0.100	0.0988	-	0.109
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.177	0.216	0.305	-	-	-	-	-	-	-	1.5	1.26	1.07	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																										
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	35000	36900	32800	31600	32700	36100	30000	-	-	-	55100	52200	48400	50000	48600	51800	48800
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	8750	8550	7630	7340	7920	7720	7580	-	-	-	14000	13600	13200	13200	13700	13700	13400
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	1110	1090	1060	1060	1100	1100	1040	-	-	-	4340	4300	3930	4040	4380	4150	3760
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	4950	4870	4480	4220	4430	4480	4550	-	-	-	128000	123000	116000	112000	124000	122000	114000
Total Metals (Trace)																										
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	9.9	10.0	43.5	9.0	38.6	29.3	3.1	-	-	-	24.0	42.9	160	34.4	79.2	46.9	129
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	<0.10	<0.10	0.22	<0.10	0.18	0.14	<0.10	-	-	-	<0.10	<0.10	0.29	0.27	0.21	0.14	0.12
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	0.67	0.70	1.21	0.56	1.75	1.35	0.45	-	-	-	0.38	0.50	0.57	0.34	0.40	0.46	0.35
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	287	302	565	234	681	808	101	-	-	-	81.9	74.9	86.0	76.7	76.5	82.6	81.2
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	0.101	<0.100	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	28	28	32	28	28	30	33	-	-	-	161	137	166	163	170	161	151
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	0.0192	0.0188	0.0297	0.0110	0.0352	0.0366	0.0064	-	-	-	0.0108	0.0165	0.0315	0.0113	0.0104	0.0246	0.0057
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	0.019	0.024	0.028	0.020	0.025	0.027	0.023	-	-	-	4.37	4.68	4.68	4.52	4.65	4.94	4.64
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	0.62	0.52	0.96	<0.50	2.56	1.29	<0.50	-	-	-	0.53	2.93	1.04	<0.50	1.49	<0.50	2.72
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	0.10	0.10	0.24	<0.10	0.15	0.15	<0.10	-	-	-	<0.10	<0.10	0.63	0.20	0.22	0.33	0.33
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	0.63	<0.50	1.36	0.72	2.04	1.45	1.31	-	-	-	<0.50	<0.50	1.31	0.60	1.01	0.80	2.80
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	15700[#]	16000[#]	25600[#]	11600[#]	40000[#]	33000[#]	7570[#]	-	-	-	80	82	682	63	208	256	165
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	0.147	0.148	0.612	0.108	0.615	1.10	<0.050	-	-	-	0.104	0.076	1.26	0.124	0.419	1.24	0.174
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	19[#]	19.6[#]	19.2[#]	18.9[#]	19[#]	19.9[#]	19.4[#]	-	-	-	235[#]	224[#]	236[#]	226[#]	226[#]	244[#]	213[#]
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	341[4]	343[4]	539[4]	271[4]	346[4]	370[4]	260[4]	-	-	-	44.9	152	305[4]	142	178	202[4]	160
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	0.253	0.201	0.331	0.224	0.368	0.291	0.230	-	-	-	0.445	0.491	0.480	0.412	0.400	0.462	0.451
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	<0.50	0.80	<0.50	<0.50	0.86	0.54	<0.50	-	-	-	<0.50	2.38	1.06	<0.50	1.18	0.67	1.67
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	3500	3380	5820	2890	9750	7780	1650	-	-	-	165	123	218	108	154	160	138
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	0.55	0.55	0.50	0.48	0.51	0.53	0.44	-	-	-	9.81	9.48	9.44	8.73	9.23	9.94	8.54
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	<0.050	<0.050	0.073	<0.050	0.069	0.069	<0.050	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	16500	15800	17600	15700	16300	17100	17200	-	-	-	8680	7800	8930	8430	8740	8410	8940
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	0.012	<0.010	0.014	<0.010	0.017	0.021	<0.010	-	-	-	<0.010	0.025	0.027	<0.010	0.011	0.014	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	259	254	256	218	252	281	205	-	-	-	795	769	754	767	725	780	730
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	13300	13700	12400	10600	9610	10100	11100	-	-	-	14600	14900	15300	15400	15800	15400	15700
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	<0.10	0.17	<0.10	0.13	<0.10	0.16
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	<0.10	<0.10	0.40	<0.10	0.36	0.32	<0.10	-	-	-	<0.10	<0.10	0.63	<0.10	0.26	0.29	0.28
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	0.62	0.69	2.64	0.57	2.79	1.87	0.35	-	-	-	0.44	0.60	4.38	0.62	1.84	<1.50	1.70
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	0.62	0.71	1.39	0.59	1.23	1.13	0.57	-	-	-	0.28	0.60	0.97	0.61	0.75	0.79	0.71
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	0.105	0.094	0.256	0.070	0.259	0.223	0.028	-	-	-	0.616	0.618	0.652	0.552	0.600	0.624	0.599
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	1.44	1.54	3.28	1.19	4.80	4.28	0.53	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	3.5	3.4	5.4	4.1	7.1	8.7	<3.0	-	-	-	<3.0	3.4	8.6	3.1	4.0	5.4	<3.0
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	0.21	<0.20	0.27	0.25	<0.20	-	-	-	<0.20	<0.20	0.23	<0.20	<0.20	<0.20	0.23

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-99-1(S) (E275563)	MW-99-1 (S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(S) (E275563)	MW-99-1(D) (E240501)	MW-99-1 (D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)	MW-99-1(D) (E240501)
Date Sampled							1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	20-Mar-2023	23-May-2023	21-Sep-2023	21-Nov-2023	1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	21-Mar-2023	23-May-2023	21-Sep-2023	21-Nov-2023
Time Sampled							12:47	13:04	12:52	12:19	13:38	13:01	13:00	13:44	10:19	14:04	14:53	14:31	14:50	13:51	15:04	13:45	13:50	14:27	11:40	15:33
ALS Sample ID							L2267651-3	VA20A6594-018	VA21A9807-005	VA22B1660-006	VA22C3640-003	VA22C9929-002	VA23A6235-005	VA23B1614-002	VA23C2649-002	VA23C8254-006	L2267651-4	VA20A6594-019	VA21A9807-006	VA22B1660-007	VA22C3640-004	VA22C9929-003	VA23A6235-006	VA23B1614-003	VA23C2649-003	VA23C8254-007
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d																				
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	44200	40000	34200	34000	34100	30500	29800	29900	31200	30700	48200	48700	46000	48800	50300	46100	48500	48100	48200	47500
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	10800	9650	8270	7740	7790	7240	7200	7470	7360	7270	13400	13200	12200	12500	12700	12400	12800	13600	12900	13200
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	1510	1350	1080	1050	1090	1100	1010	1060	1060	1100	4180	4190	3860	3900	4200	4160	3770	4300	4040	3900
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	4300	4160	4390	4490	4310	4620	4280	4370	4450	4370	125000	121000	118000	120000	114000	117000	111000	122000	121000	116000
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	<1.0	<1.0	9.8	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	1.3	<1.0	1.0	<1.0	<1.0
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	0.15	0.19	0.28	0.36	0.34	0.34	0.28	0.23	0.36	0.40	0.42	0.46	0.38	0.37	0.36	0.34	0.28	0.34	0.36	0.29
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	58.7	65.0	55.0	73.6	68.7	36.2	38.7	36.3	80.0	82.9	72.1	69.4	65.3	70.9	73.0	71.7	69.2	72.3	79.9	77.1
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	21	19	24	29	27	30	24	26	29	33	159	146	153	155	144	155	132	158	151	157
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	<0.0050	<0.0050	0.0086	0.0057	0.0153	<0.0050	<0.0050	<0.0050	0.0082	<0.0050	0.0121	0.0059	0.0063	0.0079	0.0108	0.0112	0.0087	0.0097	0.0122	<0.0050
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	0.014	0.018	0.022	0.022	0.018	0.020	0.026	0.022	4.51	4.54	4.06	4.36	4.79	4.53	4.28	4.63	4.63	4.40
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.10	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	0.17	0.24	0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.16	0.10	<0.10	0.11	<0.10	<0.10	<0.10	0.15	0.11	0.18	0.28
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	0.36	0.23	0.29	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.55	<0.20	0.25	0.39	0.35	0.30	0.32	<0.20
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	581	417	3220	7310 [#]	6980 [#]	3910	3900	2140	6140 [#]	6860 [#]	28	17	<10	<10	12	<10	<10	<10	<10	42
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	11 [#]	12.6 [#]	17.8 [#]	20.2 [#]	20.2 [#]	19.7 [#]	18.9 [#]	19.4 [#]	20.5 [#]	20.5 [#]	221 [#]	239 [#]	218 [#]	228 [#]	237 [#]	219 [#]	224 [#]	228 [#]	227 [#]	231 [#]
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	125	227 [#]	210 [#]	277 [#]	278 [#]	308 [#]	234 [#]	214 [#]	275 [#]	254 [#]	132	113	70.5	33.1	143	142	114	153	159	158
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	0.435	0.413	0.314	0.198	0.157	0.197	0.233	0.234	0.185	0.210	0.463	0.443	0.438	0.420	0.434	0.421	0.402	0.408	0.419	0.382
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	207	201	598	1200	1280	440	684	284	1290	1480	141	127	103	120	100	79	95	121	97	127
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.39	0.33	0.42	0.46	0.45	0.45	0.45	0.45	0.52	0.49	9.21	8.85	8.66	8.86	9.78	8.76	8.07	9.26	9.15	8.52
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	0.123	0.126	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	11800	11400	14700	15700	15600	16000	15200	15600	15900	16300	8420	8000	7800	8210	7760	8190	7960	8630	8100	8320
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	212	212	212	218	231	193	187	183	218	203	678	671	706	708	785	701	723	732	764	723
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	24400	22600	17200	13800	13800	11800	10100	9290	11000	10600	14300	14100	15000	14700	14400	15200	15200	15600	16000	15400
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	0.18	0.17	0.32	0.42	0.46	0.48	0.44	0.40	0.49	0.52	0.63	0.54	0.41	0.26	0.61	0.61	0.54	0.60	0.68	0.63
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	0.188	0.100	0.037	0.029	0.027	0.033	0.020	0.030	0.025	0.022	0.623	0.685	0.576	0.592	0.618	0.536	0.506	0.552	0.612	0.522
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	<1.0	1.6	5.2	1.0	1.4	<1.0	1.1	<1.0	1.8	3.4	1.4	1.8	2.1	<1.0	1.3	1.8	2.2	1.7	1.8	1.4
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-02-2004(S) (E303724)	MW-02-2004 (S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)
Date Sampled							1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	06-Dec-2022	20-Mar-2023	18-May-2023	20-Sep-2023	21-Nov-2023	1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	20-Mar-2023	18-May-2023	20-Sep-2023	21-Nov-2023
Time Sampled							9:14	10:13	09:50	09:39	10:45	15:01	09:46	10:46	13:57	10:27	10:57	11:23	11:11	10:54	12:15	12:10	12:11	11:55	16:12	12:08
ALS Sample ID							L2267651-1	VA20A6594-016	VA21A9807-003	VA22B1660-004	VA22C3640-001	VA22C9811-004	VA23A6235-003	VA23B1194-004	VA23C2604-004	VA23C8254-004	L2267651-2	VA20A6594-017	VA21A9807-004	VA22B1660-005	VA22C3640-002	VA22C9929-001	VA23A6235-004	VA23B1194-005	VA23C2604-005	VA23C8254-005
Parameter	Lowest Detection Limit	Units	BC CSR DW a	BC CSR FAW b	BC CSR IW [1] c	BC CSR LW [2] d																				
Field Parameters																										
pH, Field			--	--	--	--	6.94	6.43	6.67	7.10	6.48	6.92	7.09	6.88	7.07	6.88	7.71	7.50	8.68	7.69	7.16	7.27	7.54	7.6	7.68	7.67
Temperature		°C	--	--	--	--	4.9	6.0	8.9	7.5	9.7	8.1	4.4	10.5	10.1	10	7.7	12.2	12.8	9.3	11.3	5.9	7.7	8.7	8.7	8.4
Conductivity		µS/cm	--	--	--	--	319.6	242.4	316.7	220.0	261.1	314.1	363.4	248.6	361.4	479.9	482.2	519	522	501	529	455.9	487.1	499.8	476	469.1
Turbidity		NTU	--	--	--	--	1.12	0.00	0.00	0.27	3.0	210	1.9	2.3	-	0.77	7.88	0.35	0.00	1.78	2.1	17	1.9	2.4	-	2.95
General Chemistry																										
Conductivity	2.0	mS/cm	--	--	--	--	513	380	462	318	361	453	563	329	488	645	718	700	692	696	697	685	690	699	637	662
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	249	174	205	148	162	217	275	145	237	313	124	116	114	116	110	116	115	117	132	120
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	151	179	241	282	158	224	314	-	-	-	129	125	119	122	128	124	118
pH	0.10		--	--	--	--	7.48	7.70	7.56	7.89	8.04	8.04	7.48	8.01	8.20	7.27	8.13	8.34	8.43	8.52	8.51	8.30	8.20	8.47	8.44	8.11
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	199	239	287	451	204	333	430	-	-	-	421	426	422	493	430	399	398
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	110	-	-	-	-	-	-	-	-	-	347	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	74.5	76.9	84.3	86.7	109	107	110	83.4	108	162	344	347	342	338	338	312	347	345	306	327
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.071	<0.250	0.064	<0.250	<0.250	<0.250	<0.250	<0.250	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250	1500	100	600	2.34	2.12	2.49	2.53	2.54	3.98	7.58	3.14	4.69	3.35	14.5	13.7	14.2	13.9	15.5	14.8	15.3	15.5	12.8	13.1
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1	0.070	0.084	0.072	0.088	0.098	0.073	0.059	0.081	0.066	0.066	0.656	0.655	0.627	0.561	0.632	0.608	0.626	0.644	0.621	0.624
Sulfate (SO4)	0.30	mg/L	500	[b]	--	1000	176	108	146	67.8	78.9	114	187	78.6	135	186	25.1	24.0	25.5	23.2	24.6	24.8	21.0	23.3	24.3	26.1
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	0.025	<0.010	<0.011	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011	-	<0.018	<0.010	<0.010	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011
Sulphide (as S)	0.018	mg/L	--	--	--	--	<0.018	0.024	<0.011	<0.010	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010	<0.018	<0.018	<0.011	<0.010	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	0.05	0.02	--	--	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	18.1	17.6	22.8	-	-	-	-	-	-	-	87.2	76.8	89.1	-	-	-	-	-	-	-
Total Organic Carbon	0.50	mg/L	--	--	--	--	0.91	1.42	1.03	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	-	-	-	-	-	-	-
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-
Turbidity	0.10	NTU	--	--	--	--	-	-	-	-	-	-	-	-	0.76	-	-	-	-	-	-	-	-	-	0.60	-
Nutrients																										
Ammonia, Total (as N)	0.0050	mg/L	--	[a]	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0060	<0.0050	<0.0050	<0.0050	<0.0050	0.0895	0.0438	0.0061	0.0157	<0.0050	<0.0050	0.0439	0.284	0.138	0.0591
Nitrate (as N)	0.0050	mg/L	10	400	--	100	0.0381	0.0280	0.0190	0.0466	0.0924	0.133	0.290	0.0262	0.148	0.0517	0.217	0.300	0.265	0.197	0.172	0.184	0.185	0.0568	0.152	0.203
Nitrite (as N)	0.0010	mg/L	1	[c]	--	10	<0.0010	<0.0010	<0.0010	<0.0010	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0031	<0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	0.0139	0.0042	<0.0010
phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	0.0062	0.0062	0.0050	0.0067	<0.0010	0.0050	0.0063	-	-	-	0.0168	0.0162	0.02	0.0170	0.0050	0.0074	0.0142
phosphorus, total dissolved	0.0020	mg/L	--	--	--	--	-	-	-	-	0.0061	-	0.0071	0.0066	-	0.0088	-	-	-	-	0.0163	-	0.0161	0.0126	-	0.0191
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.054	<0.050	<0.050	-	-	-	-	-	-	-	0.207	0.135	<0.050	-	-	-	-	-	-	-
Total Metals (Semi-Trace)																										
Calcium (Ca)-Total	50	µg/L	--	--	--	1000000	-	-	-	42900	52200	67000	81800	45100	65100	89500	-	-	-	38900	38400	36300	37300	38900	38200	35300
Magnesium (Mg)-Total	5.0	µg/L	--	--	--	--	-	-	-	10600	11900	18000	18900	11000	15000	22100	-	-	-	7750	7140	6950	6920	7550	7000	7270
Potassium (K)-Total	50	µg/L	--	--	--	--	-	-	-	2080	2240	4230	2460	1920	2500	3160	-	-	-	4830	4590	4350	4590	4380	4220	4090
Sodium (Na)-Total	50	µg/L	200000	--	--	--	-	-	-	4170	4510	5220	5080	4810	5440	6160	-	-	-	127000	122000	116000	115000	118000	106000	104000
Total Metals (Trace)																										
Aluminum (Al)-Total	3.0	µg/L	9500	--	5000	5000	-	-	-	5.0	67.0	8640 [d]	8.3	6.4	28.1	8.2	-	-	-	5.8	9.4	157	8.8	12.5	11.6	16.0
Antimony (Sb)-Total	0.10	µg/L	6	90	--	--	-	-	-	0.60	0.25	0.46	0.26	0.55	0.21	0.52	-	-	-	0.14	0.11	0.40	0.10	0.11	0.75	1.61
Arsenic (As)-Total	0.10	µg/L	10	50	100	25	-	-	-	0.20	0.36	7.00	0.18	0.19	0.25	0.21	-	-	-	0.76	0.89	1.15	0.84	1.01	1.09	1.04
Barium (Ba)-Total	0.10	µg/L	1000	10000	--	--	-	-	-	28.1	32.7	159	50.6	29.3	44.5	70.1	-	-	-	75.3	71.0	94.2	81.6	110	93.9	92.0
Beryllium (Be)-Total	0.100	µg/L	8	1.5	100	100	-	-	-	<0.100	<0.100	0.390	<0.100	<0.100	<0.100	<0.100	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	µg/L	--	--	--	--	-	-	-	<0.050	<0.050	0.191	<0.050	<0.050	<0.050	<0.050	-	-	-	<0.050	<0.050	0.067	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	µg/L	5000	12000	500 (a)	5000	-	-	-	17	17	23	13	14	19	17	-	-	-	94	77	94	93	85	84	77
Cadmium (Cd)-Total	0.0050	µg/L	5	[b]	5	80	-	-	-	0.0476	0.0444	0.408	0.0828	0.0321	0.0705	0.0952	-	-	-	0.0072	0.0080	0.0858	0.0243	0.0520	0.0655	0.0627
Cesium (Cs)-Total	0.010	µg/L	--	--	--	--	-	-	-	<0.010	0.015	1.42	<0.010	<0.010	<0.010	<0.010	-	-	-	0.072	0.077	0.114	0.095	0.099	0.098	0.090
Chromium (Cr)-Total	0.50	µg/L	50	10	8	50	-	-	-	<0.50	2.23	17.1 [e]	<0.50	<0.00050	4.55	<0.50	-	-	-	<0.50	0.58	3.49	<0.50	<0.00050	0.73	1.65
Cobalt (Co)-Total	0.10	µg/L	1	40	50	1000	-	-	-	<0.10	<0.10	6.66 [e]	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	<0.10	0.64	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	µg/L	1500	[b]	200	300	-	-	-	1.12	0.73	26.2	0.61	0.88	1.13	1.21	-	-	-	<0.50	<0.50	3.77	<0.50	0.64	0.96	10.7
Iron (Fe)-Total	10	µg/L	6500	--	5000	--	-	-	-	<10	94	11900 [e]	<10	<10	67	12	-	-	-	<10	20	383	11	23	34	37
Lead (Pb)-Total	0.050	µg/L	10	[b]	200	100	-	-	-	<0.050	0.117	11 [e]	<0.050	<0.050	0.057	<0.050	-	-	-	0.091	0.144	2.06	0.059	0.113	0.136	0.240
Lithium (Li)-Total	1.0	µg/L	8	--	2500	5000	-	-	-	<1.0	1.2	11.4 [e]	<1.0	<1.0	<1.0	1.0	-	-	-	144 [e]	132 [e]	141 [e]	148 [e]	146 [e]	131 [e]	120 [e]
Manganese (Mn)-Total	0.10	µg/L	1500	--	200	--	-	-	-	1.82	4.00	287 [e]	0.49	4.88	3.50	1.40	-	-	-	62.1	57.4	906 [e]	48.1	345 [e]	281 [e]	227 [e]
Mercury (Hg)-Total	0.0050	µg/L	1	0.25	1	2	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	µg/L	250	10000	10 (b)	50	-	-	-	1.22	0.960	1.27	0.532	0.933	0.852	0.652	-	-	-	1.74	1.61	1.94	1.91	1.79	1.88	1.91
Nickel (Ni)-Total	0.50	µg/L	80	[b]	200	1000	-	-	-	<0.50	1.81	18.3	0.60	<0.50	2.76	0.93	-	-	-	<0.50	0.72	2.18	<0.50	0.54	0.99	1.36
Phosphorus (P)-Total	50	µg/L	--	--	--	--	-	-	-	<50	<50	564	<50	<50	<50	<50	-	-	-	52	<50	99	<50	<50	<50	<50
Rubidium (Rb)-Total	0.20	µg/L	--	--	--	--	-	-	-	0.58	0.65	13.5	0.58	0.54	0.65	0.93	-	-	-	3.13	2.95	3.27	3.21	3.16	3.23	2.96
Selenium (Se)-Total	0.050	µg/L	10	20	20 (a)	30	-	-	-	0.144	0.300	0.412	0.374	0.208	0.386	0.314	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Total	100	µg/L	--	--	--	--	-	-	-	5740	5760	18900	5280	5250	6040	7880	-	-	-	8440	7600	8580	8030	8130	7950	8230
Silver (Ag)-Total	0.010	µg/L	20	[b]	--	--	-	-	-	<0.010	0.012	0.318	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	<0.010	0.029	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	µg/L	2500	--	--	--	-	-	-	168	210	318	323	168	296	340	-	-	-	845	831	825	840	882	875	812
Sulfur (S)-Total	500	µg/L	--	--	--	--	-	-	-	22000	25200	41400	62500	26400	48300	68400	-	-	-	9080	8910	9590	8720	7760	9530	9280
Tellurium (Te)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	µg/L	--	3	--	--	-	-	-	<0.010	<0.010	0.104	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	µg/L	--	--	--	--	-	-	-	<0.10	<0.10	2.72	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	µg/L	2500	--	--	--	-	-	-	<0.10	<0.10	0.36	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	<0.10	1.75	<0.10	0.12	0.17	0.30
Titanium (Ti)-Total	0.30	µg/L	--	1000	--	--	-	-	-	<0.30	2.61	344	<0.30	<0.30	0.99	0.42	-	-	-	<0.30	0.37	8.43	<0.30	0.42	0.71	0.82
Tungsten (W)-Total	0.10	µg/L	3	--	--	--	-	-	-	<0.10	<0.10	0.38	<0.10	<0.10	<0.10	<0.10	-	-	-	0.17	0.15	1.26	0.15	0.65	0.57	0.57
Uranium (U)-Total	0.010	µg/L	20	85	10	200	-	-	-	1.20	2.01	3.21	2.66	1.00	2.50	3.52	-	-	-	2.05	2.04	2.14	1.89	1.87	1.92	1.84
Vanadium (V)-Total	0.50	µg/L	20	--	100	100	-	-	-	<0.50	0.70	31.8 [e]	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	<0.50	0.69	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	µg/L	3000	[b]	[a]	2000	-	-	-	4.0	3.2	71.2	<3.0	<3.0	<3.0	<3.0	-	-	-	<3.0	<3.0	16.6	4.2	6.3	5.8	9.4
Zirconium (Zr)-Total	0.20	µg/L	--	--	--	--	-	-	-	<0.20	<0.20	0.34	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 8

Groundwater Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF Downgradient															
Client Sample ID							MW-02-2004(S) (E303724)	MW-02-2004 (S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(S) (E303724)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)	MW-02-2004(D) (E303725)
Date Sampled							1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	06-Dec-2022	20-Mar-2023	18-May-2023	20-Sep-2023	21-Nov-2023	1-May-2019	14-May-2020	17-May-2021	26-May-2022	28-Sep-2022	07-Dec-2022	20-Mar-2023	18-May-2023	20-Sep-2023	21-Nov-2023
Time Sampled							9:14	10:13	09:50	09:39	10:45	15:01	09:46	10:46	13:57	10:27	10:57	11:23	11:11	10:54	12:15	12:10	12:11	11:55	16:12	12:08
ALS Sample ID							L2267651-1	VA20A6594-016	VA21A9807-003	VA22B1660-004	VA22C3640-001	VA22C9811-004	VA23A6235-003	VA23B1194-004	VA23C2604-004	VA23C8254-004	L2267651-2	VA20A6594-017	VA21A9807-004	VA22B1660-005	VA22C3640-002	VA22C9929-001	VA23A6235-004	VA23B1194-005	VA23C2604-005	VA23C8254-005
Parameter	Lowest Detection Limit	Units	BC CSR DW	BC CSR FAW	BC CSR IW [1]	BC CSR LW [2]																				
			a	b	c	d																				
Dissolved Metals (Semi-Trace)																										
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	72700	50900	59900	43700	47400	64800	79300	41000	69400	90800	37700	35100	34900	35400	33500	35300	34900	35100	40700	36200
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	16500	11500	13500	9470	10600	13500	18700	10400	15400	20900	7380	6830	6600	6610	6520	6910	6740	7140	7310	7090
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2390	2130	2220	1980	2260	2410	2350	2050	2510	3170	4630	4560	4240	4330	4290	4600	4380	4560	4430	4360
Sodium (Na)-Dissolved	50	ug/L	200000	--	--	--	3780	3330	3870	3930	4040	4210	4990	4610	4920	5990	126000	122000	115000	119000	110000	121000	113000	113000	105000	107000
Dissolved Metals (Trace)																										
Aluminum (Al)-Dissolved	1.0	ug/L	9500	--	5000	5000	<1.0	<1.0	<1.0	1.2	<1.0	1.0	<1.0	<1.0	1.2	<1.0	2.1	1.2	<1.0	1.0	1.6	1.7	<1.0	<1.0	1.3	1.2
Antimony (Sb)-Dissolved	0.10	ug/L	6	90	--	--	0.36	0.33	0.56	0.56	0.23	0.17	0.21	0.54	0.20	0.52	<0.10	0.11	0.11	0.11	<0.10	<0.10	<0.10	<0.10	0.69	1.33
Arsenic (As)-Dissolved	0.10	ug/L	10	50	100	25	0.13	0.18	0.17	0.19	0.21	0.17	0.15	0.17	0.19	0.18	0.77	0.75	0.74	0.83	0.75	0.83	0.86	0.96	1.00	0.96
Barium (Ba)-Dissolved	0.10	ug/L	1000	10000	--	--	41.6	31.2	37.3	26.6	31.0	37.9	47.5	29.2	43.6	66.1	67.7	63.1	61.4	67.3	67.1	71.8	75.4	89.3	89.8	82.4
Beryllium (Be)-Dissolved	0.10	ug/L	8	1.5	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	5000	12000	500 (a)	5000	14	12	16	16	16	20	11	13	19	17	89	83	87	89	74	91	76	77	86	80
Cadmium (Cd)-Dissolved	0.0050	ug/L	5	[b]	5	80	0.057	0.0389	0.0488	0.0417	0.0408	0.0553	0.0695	0.0320	0.0602	0.0995	0.0120	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0129	0.0498	0.0610	0.0511
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.073	0.069	0.067	0.070	0.068	0.076	0.089	0.099	0.099	0.083
Chromium (Cr)-Dissolved	0.10	ug/L	50	10	8	50	0.19	0.17	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.00050	0.90	<0.50	0.14	0.22	<0.00050	<0.50	<0.50	<0.50	<0.50	<0.00050	<0.50	<0.50
Cobalt (Co)-Dissolved	0.10	ug/L	1	40	50	1000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	1500	[b]	200	300	0.73	0.58	0.71	0.67	0.50	0.80	0.52	0.81	0.58	0.84	<0.20	0.33	0.43	<0.20	0.31	0.33	0.37	0.32	0.41	5.12
Iron (Fe)-Dissolved	10	ug/L	6500	--	5000	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Lead (Pb)-Dissolved	0.050	ug/L	10	[b]	200	100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.074	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	8	--	2500	5000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	131*	136*	127*	136*	127*	138*	144*	139*	145*	132*
Manganese (Mn)-Dissolved	0.10	ug/L	1500	--	200	--	0.58	3.35	3.54	1.02	1.11	1.05	0.28	6.24	2.13	1.02	108	33.8	1.71	51.3	11.1	0.35	24.7	282*	209*	121
Mercury (Hg)-Dissolved	0.0050	ug/L	1	0.25	1	2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	250	10000	10 (b)	50	0.703	0.761	1.01	1.16	0.887	0.628	0.519	0.959	0.758	0.666	1.77	1.62	1.66	1.63	1.60	1.69	1.64	1.95	2.02	1.96
Nickel (Ni)-Dissolved	0.50	ug/L	80	[b]	200	1000	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	0.64	<0.50	1.27	0.76	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	0.66
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.62	0.50	0.62	0.52	0.52	0.64	0.50	0.52	0.56	0.93	2.83	2.84	2.80	2.85	2.85	3.04	2.88	3.13	3.40	3.00
Selenium (Se)-Dissolved	0.050	ug/L	10	20	20 (a)	30	0.190	0.180	0.164	0.132	0.230	0.276	0.432	0.200	0.322	0.292	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5050	4860	5450	5480	5670	5790	5220	5460	6070	7440	7780	7520	7480	7890	7660	7920	7770	8170	8250	8060
Silver (Ag)-Dissolved	0.010	ug/L	20	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	2500	--	--	--	261	194	215	155	201	251	324	153	286	347	753	718	748	739	774	795	803	839	899	806
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	58400	36900	53300	22400	25200	35700	62700	25900	45100	62500	8660	8670	9090	8930	8960	8950	8380	7910	8630	8950
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	3	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	2500	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	1000	--	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	3	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.28	0.14	<0.10	0.16	<0.10	<0.10	0.11	0.52	0.47	0.38
Uranium (U)-Dissolved	0.010	ug/L	20	85	10	200	1.41	1.14	1.30	1.17	1.99	1.92	2.57	0.952	2.22	3.46	2.08	2.19	1.95	2.03	1.95	1.97	1.77	1.78	1.87	1.77
Vanadium (V)-Dissolved	0.50	ug/L	20	--	100	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	3000	[b]	[a]	2000	1.1	3.1	4.2	1.3	1.2	1.3	1.9	2.7	1.4	1.8	1.3	1.8	1.3	1.2	1.0	<1.0	3.4	5.6	4.7	7.4
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 9

Seep Water Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID					SLIDE AREA	SEEP A (E242832)	SEEP A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)
Date Sampled					12-May-2021	13-May-2019	23-Oct-2019	30-Apr-2020	02-Nov-2020	04-May-2021	16-Dec-2021	02-May-2022	05-Dec-2022	02-May-2023	15-Nov-2023	13-May-2019	23-Oct-2019	01-May-2020	02-Nov-2020	04-May-2021	16-Dec-2021	02-May-2022	05-Dec-2022	02-May-2023	15-Nov-2023
Time Sampled					11:26	12:43	13:45	11:42	10:09	12:04	12:19	15:19	11:26	10:21	13:55	13:08	14:37	08:52	09:37	12:53	12:50	13:45	11:53	10:51	14:23
ALS Sample ID					VA21A9252-020	L2274410-8	L2371872-1	VA20A5832-016	VA20B9944-001	VA21A8717-018	VA21C8340-001	VA22A9542-008	VA22C9735-001	VA23A9648-005	VA23C7858-004	L2274410-9	L2371872-2	VA20A5832-019	VA20B9944-002	VA21A8717-019	VA21C8340-002	VA22A9542-007	VA22C9735-002	VA23A9648-006	VA23C7858-005
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b																					
Field Parameters																									
pH, Field			--	6.5-9.0	7.25	8.41	11.69[b]	8.32	-	7.06	8.29	8.00	7.59	7.73	7.86	7.26	11.4[b]	7.11	-	6.52	7.44	7.07	6.78	6.84	7.72
Temperature		°C	15 AO	18 (12 spring/fall) (a)	7.4	11.8	5.7	8.1	3.4	7.8	1.8	8.5	1.1	9	3.9	9.2	6.8	6.5	5.1	7.4	0.0	8.1	2.2	9.8	4.3
Conductivity		µS/cm	--	--	488.4	1020	1069	672	864	867	841	684	867	971	953	1091	1078	918	860	949	683	1000	758	975	867
Turbidity		NTU	(b)	(b)	9.84	13.3	57.3	8.76	22.8	38.0	23.1	3.94	40	9.2	162	30.3	155.0	57.6	152	44.7	64.8	14.1	500	27	51
General Chemistry																									
Conductivity	2.0	µS/cm	--	--	722	1200	1470	961	1410	1120	1370	913	1420	1210	1480	1410	1400	294	1310	1270	1170	1330	1180	1230	1330
Hardness (as CaCO3)	0.60	mg/L	--	--	328	591	680	432	639	536	633	373	630	541	616	574	571	542000	506	532	479	536	453	482	486
pH	0.10		--	6.5-9.0	8.18	7.93	7.98	8.13	7.94	7.97	7.99	8.29	8.12	8.09	7.89	7.37	7.33	7.58	7.47	8.08	7.56	8.18	7.81	7.60	6.94
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	296	440	580	372	549	431	560	343	549	474	585	619	616	124	536	586	528	578	511	561	585
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	296	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	0.050	mg/L	--	--	0.340	0.540	0.710	0.416	0.718	0.525	0.634	0.354	0.726	0.610	<0.500	0.640	0.690	0.674	0.655	0.617	0.523	0.613	0.533	0.593	0.511
Chloride (Cl)	0.50	mg/L	250 AO	150	53.8	121	150	85.9	135	112	133	74.1	132	124	134	113	120	113	96.3	107	88.6	95.2	77.3	94.4	95.5
Fluoride (F)	0.020	mg/L	1.5	[b]	-	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	9.30	30.3	31.7	26.6	38.2	35.8	31.8	37.8	31.3	34.5	25.1	4.00	6.60	4.70	7.97	5.62	7.77	6.02	6.70	4.33	4.00
Sulfide, total (as H2S)	0.010	mg/L	--	--	<0.011	-	-	<0.018	0.020	<0.011	<0.011	<0.010	<0.010	<0.011	<0.011	-	-	<0.018	0.028	<0.011	<0.011	<0.010	<0.010	<0.011	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	<0.010	<0.018	<0.018	<0.018	0.019	<0.010	<0.010	<0.011	<0.011	<0.010	<0.010	<0.018	<0.018	<0.018	0.026	<0.010	<0.010	<0.011	<0.011	<0.010	<0.010
Sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	86.6	135	156	90.5	142	131	147	96.8	147	110	145	176	181	151	156	162	144	162	145	140	162
Total Organic Carbon	0.50	mg/L	4	(c)	5.72[a]	10.5[a]	13[a]	7.41[a]	11.7[a]	10.5[a]	14.1[a]	4.85[a]	13[a]	12.4[a]	14.4[a]	17.1[a]	18.2[a]	16.6[a]	15.6[b]	16.4[a]	14.2[a]	12[a]	15.1[a]	15.8[a]	16.5[a]
Chemical Oxygen Demand (COD)	20	mg/L	--	--	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	63	-	-	-	-	-
Nutrients																									
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	0.0377	0.538	0.858[b]	0.480	0.660	0.757	0.793	0.210	0.748	0.441	0.821	5.57	5.86[b]	4.99	5.76[b]	5.13	4.68	5.51	5.23	4.97	5.64
Nitrate (as N)	0.0050	mg/L	10	3	0.475	0.371	0.279	0.302	0.243	0.302	0.289	0.420	0.414	0.434	0.299	<0.025	<0.025	0.224	<0.0250	0.180	0.0252	0.194	<0.0250	0.0754	<0.0250
Nitrite (as N)	0.0010	mg/L	1	[b]	<0.0050	0.0054	0.0057	<0.0050	<0.0050	<0.0050	0.0118	0.0118	<0.0050	0.0082	<0.0100	<0.0050	<0.0050	0.0091	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0087	<0.0050
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	0.343	1.16	1.57	0.891	1.26	1.27	1.44	0.790	1.43	0.857	1.64	5.52	5.70	5.85	6.54	6.03	5.27	10.9	6.42	5.20	6.91
Total Metals (Semi-Trace)																									
Calcium (Ca)-Total	50	ug/L	--	--	93700	163000	187000	124000	170000	150000	173000	106000	171000	149000	180000	159000	162000	152000	142000	151000	135000	150000	127000	138000	137000
Magnesium (Mg)-Total	5.0	ug/L	--	--	22900	44800	51500	29900	51800	39200	48900	26400	49200	42400	49900	42700	40600	39700	36800	37700	34500	39200	33000	37500	36300
Potassium (K)-Total	50	ug/L	--	--	10900	7260	7600	5830	6360	6180	6170	4920	5970	5990	6530	16500	18700	17000	16100	15700	15000	14200	15000	15000	15600
Sodium (Na)-Total	50	ug/L	--	--	36300	74300	93300	51900	87400	72600	90600	46700	100000	87300	98300	80100	88900	86200	76900	76400	65200	73300	71300	70100	72100
Total Metals (Trace)																									
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	151	<3.0	21.0	<3.0	<3.0	17.5	10.0	<3.0	3.9	<3.0	61.5	<3.0	5.9	<3.0	5.1	3.8	<3.0	<3.0	7.1	<3.0	5.7
Antimony (Sb)-Total	0.10	ug/L	6	74	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	0.91	6.46[b]	29.9[ab]	5.1[b]	6.7[b]	26.4[ab]	16.9[ab]	1.25	8.06[b]	5.37[b]	97.6[ab]	58[ab]	222[ab]	59.3[ab]	139[ab]	49.1[ab]	73.4[ab]	7.09[b]	100[ab]	29.1[ab]	92.4[ab]
Barium (Ba)-Total	0.10	ug/L	--	1000	86.8	220	314	150	218	215	232	121	198	167	445	421	532	339	492	352	322	226	338	319	380
Beryllium (Be)-Total	0.100	ug/L	--	0.13	<0.100	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	276	562	572	340	598	544	566	359	666	644	585	528	529	559	519	575	416	570	467	537	493
Cadmium (Cd)-Total	0.0050	ug/L	5	--	0.0386	0.124	0.284	0.118	0.262	0.172	0.510	0.134	0.412	0.362	0.61	<0.0050	0.0067	<0.0050	<0.0050	<0.0050	<0.0050	0.0083	0.0055	0.0081	<0.0050
Cesium (Cs)-Total	0.010	ug/L	--	--	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.024	<0.010
Chromium (Cr)-Total	0.50	ug/L	50	--	0.00081	0.28	0.53	0.22	0.27	<0.00050	<0.50	<0.50	<0.50	<0.50	0.91	0.52	0.84	0.49	0.6	<0.00050	<0.50	<0.50	0.69	<0.50	0.52
Cobalt (Co)-Total	0.10	ug/L	1	4	0.36	3.98[a]	6.59[ab]	2.92[a]	5.81[ab]	5.01[ab]	6.7[ab]	2.15[a]	5.9[ab]	4.42[ab]	10.4[ab]	17.6[ab]	17.5[ab]	12.6[ab]	13.4[ab]	13.9[ab]	10.6[ab]	13.9[ab]	12.7[ab]	16.9[ab]	15.9[ab]
Copper (Cu)-Total	0.50	ug/L	1000	--	0.96	<0.50	0.91	<0.50	<0.50	0.78	1.16	<0.50	1.34	0.82	1.15	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.08	1.34	<0.50
Iron (Fe)-Total	10	ug/L	300	1000	661[a]	1950[ab]	13800[ab]	1490[ab]	2250[ab]	8540[ab]	8130[ab]	198	3830[ab]	1600[ab]	47400[ab]	45200[ab]	73100[ab]	30100[ab]	53800[ab]	29700[ab]	32900[ab]	4340[ab]	36000[ab]	25000[ab]	45000[ab]
Lead (Pb)-Total	0.050	ug/L	5	[b]	0.639	0.054	0.138	<0.050	0.078	0.089	0.117	<0.050	0.090	0.075	0.335	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.105	<0.050	<0.050
Lithium (Li)-Total	1.0	ug/L	--	--	3.0	2.8	3.6	2.2	3	2.9	3.2	2.1	3.4	3.2	3.6	4.5	5.3	5.2	4.7	6.0	4.5	4.5	4.6	4.7	5.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	154[a]	1610[a]	2740[a]	1090[a]	2360[a]	1630[a]	2550[a]	457[a]	1920[a]	1330[a]	4230[ab]	3670[ab]	3480[ab]	2740[ab]	3020[ab]	2780[a]	2600[a]	2440[a]	2620[ab]	2900[ab]	2670[ab]
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	0.374	1.55	2.05	1.11	2.15	1.66	2.16	0.998	1.87	1.82	2.67	2.98	3.38	2.66	2.57	2.50	2.30	2.66	2.28	2.64	2.64
Nickel (Ni)-Total	0.50	ug/L	80	[b]	5.83	15.6	20.7	10.5	18.1	15.5	20.4	9.38	21.4	17.3	23.3	15.4	17.4	14.8	13.9	14.9	12.4	16.0	13.2	14.3	14.7
Phosphorus (P)-Total	50	ug/L	10 AO for lakes	5	<50[ab]	<50[ab]	98[ab]	<50[ab]	<50[ab]	73[ab]	51[ab]	<50[ab]	68[ab]	<50[ab]	294[ab]	<50[ab]	269[ab]	55[ab]	148[ab]	54[ab]	61[ab]	<50[ab]	121[ab]	<50[ab]	92[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	0.32	0.39	0.40	0.33	0.33	0.34	0.25	0.29	0.37	0.35	0.41	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.32	<0.20	<0.20	<0.20
Selenium (Se)-Total	0.050	ug/L	10	2	0.061	0.156	0.179	0.282	0.105	0.208	0.168	0.351	0.107	0.165	0.182	0.094	0.146	0.124	0.105	0.106	0.071	0.097	0.068	0.071	0.097
Silicon (Si)-Total	100	ug/L	--	--	11500	12300	14400	9740	11900	12200	12800	9850	12900	12000	18100	20200	24600	19100	20900	19500	18300	16700	19600	17900	19800
Silver (Ag)-Total	0.010	ug/L	--	[b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	678	1330	1410	921	1210	1160	1180	795	1290	1130	1400	1550	1410	1310	1210	1380	1120	1350	1160	1310	1310
Sulfur (S)-Total	500	ug/L	--	--	4310	12600	14300	10400	14200	13000	11700	13600	13900	12200	12300	2580	3740	2890	3450	2600	3240	2770	3510	2400	2880
Tellurium (Te)-Total	0.20	ug/L	--	--	<0.20	0.32	0.42	<0.20	0.26	0.28	<0.20	<0.20	<0.20	<0.20	<0.20	0.28	0.30	0.21	0.27	0.27	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	<0.10	<0.10	0.28	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.12	0.18	0.18	0.17	0.15	0.15	0.15	0.16	0.14	0.16	0.16
Titanium (Ti)-Total	0.30	ug/L	--	--	<3.90	<0.30	0.93	<0.30	<0.30	0.86	<0.60	<0.30	<0.30	<0.30	2.94	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	0.818	18.2[b]	22.5[ab]	10.6[b]	22[ab]	17.4[b]	20.8[ab]	10.1[b]	25.2[ab]	20.2[ab]	23.6[ab]	2.34	2.81	2.25	1.84	2.16	1.24	3.43	1.54	2.43	2.06
Vanadium (V)-Total	0.50	ug/L	--	--	0.96	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.15	0.67	0.80	0.57	0.64	0.59	0.54	<0.50	0.50	0.51	0.59
Zinc (Zn)-Total	3.0	ug/L	3000	--	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Zirconium (Zr)-Total	0.20	ug/L	--	--	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 9

Seep Water Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID					SLIDE AREA	SEEP A (E242832)	SEEP A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep A (E242832)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)	Seep E (E242833)
Date Sampled					12-May-2021	13-May-2019	23-Oct-2019	30-Apr-2020	02-Nov-2020	04-May-2021	16-Dec-2021	02-May-2022	05-Dec-2022	02-May-2023	15-Nov-2023	13-May-2019	23-Oct-2019	01-May-2020	02-Nov-2020	04-May-2021	16-Dec-2021	02-May-2022	05-Dec-2022	02-May-2023	15-Nov-2023
Time Sampled					11:26	12:43	13:45	11:42	10:09	12:04	12:19	15:19	11:26	10:21	13:55	13:08	14:37	08:52	09:37	12:53	12:50	13:45	11:53	10:51	14:23
ALS Sample ID					VA21A9252-020	L2274410-8	L2371872-1	VA20A5832-016	VA20B9944-001	VA21A8717-018	VA21C8340-001	VA22A9542-008	VA22C9735-001	VA23A9648-005	VA23C7858-004	L2274410-9	L2371872-2	VA20A5832-019	VA20B9944-002	VA21A8717-019	VA21C8340-002	VA22A9542-007	VA22C9735-002	VA23A9648-006	VA23C7858-005
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b																					
Dissolved Metals (Trace)																									
Aluminum, dissolved	1.0	µg/L	--	--	-	-	-	-	-	-	-	-	-	<1.0	<1.0	-	-	-	-	-	-	-	<1.0	1.4
Antimony, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.10	<0.10	-	-	-	-	-	-	-	<0.10	<0.10
Arsenic, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	3.75	3.67	-	-	-	-	-	-	-	26.9	61.3
Barium, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	160	160	-	-	-	-	-	-	-	310	338
Beryllium, dissolved	0.100	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.100	<0.020	-	-	-	-	-	-	-	<0.100	<0.020
Bismuth, dissolved	0.050	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.050	<0.050	-	-	-	-	-	-	-	<0.050	<0.050
Boron, dissolved	10	µg/L	--	--	-	-	-	-	-	-	-	-	-	616	607	-	-	-	-	-	-	-	502	486
Cadmium, dissolved	0.0050	µg/L	--	[b]	-	-	-	-	-	-	-	-	-	0.307	0.314	-	-	-	-	-	-	-	0.0064	<0.0050
Calcium, dissolved	50	µg/L	--	--	-	-	-	-	-	-	-	-	-	146000	166000	-	-	-	-	-	-	-	132000	136000
Cesium, dissolved	0.010	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.010	<0.010	-	-	-	-	-	-	-	0.021	<0.010
Chromium, dissolved	0.50	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.50	<0.50	-	-	-	-	-	-	-	<0.50	<0.50
Cobalt, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	4.19	5.65	-	-	-	-	-	-	-	16.6	15.0
Copper, dissolved	0.20	µg/L	--	[b]	-	-	-	-	-	-	-	-	-	0.76	0.77	-	-	-	-	-	-	-	0.79	<0.20
Iron, dissolved	10	µg/L	--	350	-	-	-	-	-	-	-	-	-	30	35	-	-	-	-	-	-	-	**21900[b]**	**34300[b]**
Lead, dissolved	0.050	µg/L	--	--	-	-	-	-	-	-	-	-	-	0.068	0.08	-	-	-	-	-	-	-	<0.050	<0.050
Lithium, dissolved	1.0	µg/L	--	--	-	-	-	-	-	-	-	-	-	3.0	3.4	-	-	-	-	-	-	-	4.5	4.7
Magnesium, dissolved	5.0	µg/L	--	--	-	-	-	-	-	-	-	-	-	42800	49000	-	-	-	-	-	-	-	37100	35600
Manganese, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	1310	2440	-	-	-	-	-	-	-	2860	2570
Mercury, dissolved	0.0050	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	
Molybdenum, dissolved	0.050	µg/L	--	--	-	-	-	-	-	-	-	-	-	1.79	2.31	-	-	-	-	-	-	-	2.64	2.55
Nickel, dissolved	0.50	µg/L	--	--	-	-	-	-	-	-	-	-	-	16.8	20.5	-	-	-	-	-	-	-	13.9	13.9
Phosphorus, dissolved	50	µg/L	--	--	-	-	-	-	-	-	-	-	-	<50	<50	-	-	-	-	-	-	-	<50	<50
Potassium, dissolved	50	µg/L	--	--	-	-	-	-	-	-	-	-	-	6080	6250	-	-	-	-	-	-	-	15200	15400
Rubidium, dissolved	0.20	µg/L	--	--	-	-	-	-	-	-	-	-	-	0.33	0.33	-	-	-	-	-	-	-	<0.20	<0.20
Selenium, dissolved	0.050	µg/L	--	--	-	-	-	-	-	-	-	-	-	0.155	0.141	-	-	-	-	-	-	-	0.054	0.090
Silicon, dissolved	50	µg/L	--	--	-	-	-	-	-	-	-	-	-	12100	11400	-	-	-	-	-	-	-	18400	18900
Silver, dissolved	0.010	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.010	<0.010	-	-	-	-	-	-	-	<0.010	<0.010
Sodium, dissolved	50	µg/L	--	--	-	-	-	-	-	-	-	-	-	86900	94300	-	-	-	-	-	-	-	69200	69500
Strontium, dissolved	0.20	µg/L	--	--	-	-	-	-	-	-	-	-	-	1120	1270	-	-	-	-	-	-	-	1300	1290
Sulfur, dissolved	500	µg/L	--	--	-	-	-	-	-	-	-	-	-	11600	11500	-	-	-	-	-	-	-	1950	2820
Tellurium, dissolved	0.20	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.20	<0.20	-	-	-	-	-	-	-	<0.20	<0.20
Thallium, dissolved	0.010	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.010	<0.010	-	-	-	-	-	-	-	<0.010	<0.010
Thorium, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.10	<0.10	-	-	-	-	-	-	-	<0.10	<0.10
Tin, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.10	0.1	-	-	-	-	-	-	-	0.16	0.14
Titanium, dissolved	0.30	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.30	<0.30	-	-	-	-	-	-	-	<0.30	<0.30
Tungsten, dissolved	0.10	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.10	<0.10	-	-	-	-	-	-	-	<0.10	<0.10
Uranium, dissolved	0.010	µg/L	--	--	-	-	-	-	-	-	-	-	-	19.6	23.3	-	-	-	-	-	-	-	2.35	1.98
Vanadium, dissolved	0.50	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.50	<0.50	-	-	-	-	-	-	-	<0.50	<0.50
Zinc, dissolved	1.0	µg/L	--	[b]	-	-	-	-	-	-	-	-	-	<1.0	<1.0	-	-	-	-	-	-	-	2.6	<1.0
Zirconium, dissolved	0.30	µg/L	--	--	-	-	-	-	-	-	-	-	-	<0.20	<0.30	-	-	-	-	-	-	-	<0.20	<0.30

Table 9

Seep Water Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID					Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)
Date Sampled					13-May-2019	30-Apr-2020	04-May-2021	02-May-2022	01-May-2023	13-May-2019	30-Apr-2020	04-May-2021	02-May-2022	01-May-2023
Time Sampled					12:09	13:05	10:53	12:00	14:42	11:03	13:43	10:31	11:02	14:19
ALS Sample ID					L2274410-7	VA20A5832-017	VA21A8717-017	VA22A9542-005	VA23A9648-004	L2274410-6	VA20A5832-018	VA21A8717-016	VA22A9542-004	VA23A9648-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b										
Field Parameters														
pH, Field			--	6.5-9.0	8.32	7.59	6.85	7.17	6.98	8.42	7.22	6.87	7.37	6.75
Temperature		°C	15 AO	18 (12 spring/fall) (a)	6.8	7.0	6.4	6.2	5.3	6.5	6.3	6.5	6.3	6.3
Conductivity		µS/cm	--	--	356.1	304.3	399.7	411.9	306.1	161.2	128.4	157.4	164.4	210.2
Turbidity		NTU	(b)	(b)	4.19	0.74	0.01	2.24	2.8	1.22	0.58	0.00	1.29	1.6
General Chemistry														
Conductivity	2.0	µS/cm	--	--	539	477	600	611	312	241	205	250	248	311
Hardness (as CaCO3)	0.60	mg/L	--	--	248	217	271	275	138	115	97.9	119	113	149
pH	0.10		--	6.5-9.0	8.13	8.04	8.26	8.23	8.17	7.90	7.84	7.94	8.00	7.87
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	167	172	200	184	116	108	90.4	112	98.4	141
Alkalinity, Phenolphthalein (as CaCO3)	1.0	mg/L	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as CaCO3)	1.0	mg/L	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as CaCO3)	1.0	mg/L	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	1.0	mg/L	--	--	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	0.050	mg/L	--	--	0.362	0.252	0.492	0.418	0.111	0.057	<0.050	0.104	0.098	0.076
Chloride (Cl)	0.50	mg/L	250 AO	150	63.0	50.1	77.5	75.8	25.6	9.17	5.94	15.0	13.6	10.5
Fluoride (F)	0.020	mg/L	1.5	[b]	0.044	0.050	0.052	0.046	0.053	0.035	0.043	0.040	0.046	0.038
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	16.8	13.9	17.0	16.5	11.0	6.98	6.46	7.72	7.59	11.6
Sulfide, total (as H2S)	0.010	mg/L	--	--	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011
Sulfide, total (as S)	0.011	mg/L	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010
Sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	-	-	-	0.0	-	-	-	-	0.0	-
Total Inorganic Carbon	0.50	mg/L	--	--	42.3	39.3	48.9	49.2	26.7	29.6	23.6	27.5	26.9	33.1
Total Organic Carbon	0.50	mg/L	4	(c)	1.60	1.54	1.72	1.61	15.9[a]	0.63	0.79	0.62	<0.50	0.85
Chemical Oxygen Demand (COD)	20	mg/L	--	--	-	-	104	-	-	-	-	<20	-	-
Nutrients														
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	<0.0050
Nitrate (as N)	0.0050	mg/L	10	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.117	0.0732	0.107	0.0953	0.191
Nitrite (as N)	0.0010	mg/L	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	<0.050	0.103	0.133	0.300	0.547	<0.050	<0.050	<0.050	<0.050	<0.050
Total Metals (Semi-Trace)														
Calcium (Ca)-Total	50	ug/L	--	--	82500	73600	92600	92800	48700	34900	30200	36800	34400	44900
Magnesium (Mg)-Total	5.0	ug/L	--	--	10200	8120	9620	10500	5520	6860	5490	6670	6510	8400
Potassium (K)-Total	50	ug/L	--	--	1370	1320	1570	1610	1130	1180	1140	1310	1300	1450
Sodium (Na)-Total	50	ug/L	--	--	11100	9510	11200	10500	6330	4050	2930	4050	4030	4880
Total Metals (Trace)														
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	83.8	13.2	54.9	28.9	51.6	11.0	16.3	6.9	11.3	7.0
Antimony (Sb)-Total	0.10	ug/L	6	74	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	0.31	0.20	0.24	0.22	0.20	0.27	0.25	0.25	0.26	0.21
Barium (Ba)-Total	0.10	ug/L	--	1000	39.7	34.9	38.8	45.8	22.7	37.5	31.6	38.4	39.0	48.4
Beryllium (Be)-Total	0.100	ug/L	--	0.13	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	18	19	20	18	13	16	13	16	16	25
Cadmium (Cd)-Total	0.0050	ug/L	5	--	0.170	0.0760	0.152	0.172	0.110	0.0239	0.0185	0.0236	0.0300	0.0356
Cesium (Cs)-Total	0.010	ug/L	--	--	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Total	0.50	ug/L	50	--	1.20	0.53	0.00093	0.54	0.87	0.29	0.30	<0.00050	<0.50	<0.50
Cobalt (Co)-Total	0.10	ug/L	1	4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	ug/L	1000	--	<0.50	<0.50	<0.50	<0.50	1.51	<0.50	<0.50	<0.50	<0.50	<0.50
Iron (Fe)-Total	10	ug/L	300	1000	75	13	47	18	49	<10	17	<10	<10	<10
Lead (Pb)-Total	0.050	ug/L	5	[b]	0.684	0.132	0.448	0.456	0.678	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Total	1.0	ug/L	--	--	2.1	1.8	2.6	2.5	1.7	<1.0	<1.0	1.1	<1.0	1.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	22[a]	4.02	12.6	10.5	13.7	0.90	1.15	0.13	0.45	1.25
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	0.236	0.206	0.238	0.178	0.223	0.122	0.127	0.115	0.124	0.123
Nickel (Ni)-Total	0.50	ug/L	80	[b]	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Total	50	ug/L	10 AO for lakes	5	53[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	0.23	0.20	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)-Total	0.050	ug/L	10	2	0.138	0.094	0.089	0.103	0.090	0.054	0.055	<0.050	<0.050	0.068
Silicon (Si)-Total	100	ug/L	--	--	7140	6700	7380	8590	6890	7780	7460	7860	8040	8200
Silver (Ag)-Total	0.010	ug/L	--	[b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	305	249	345	340	168	145	116	143	138	177
Sulfur (S)-Total	500	ug/L	--	--	6040	4900	5670	5180	3570	2410	2110	2600	2440	3520
Tellurium (Te)-Total	0.20	ug/L	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	2.82	0.45	1.74	0.65	1.64	0.32	0.56	<0.30	<0.60	<0.30
Tungsten (W)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	1.48	1.16	1.76	1.39	0.677	0.340	0.238	0.317	0.313	0.670
Vanadium (V)-Total	0.50	ug/L	--	--	1.00	0.60	0.82	0.73	0.66	0.72	0.53	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	ug/L	3000	--	<3.0	<3.0	<3.0	<3.0	3.6	<3.0	<3.0	<3.0	<3.0	<3.0
Zirconium (Zr)-Total	0.20	ug/L	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 9

Seep Water Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID					Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep G (E242835)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)	Seep I (E242836)
Date Sampled					13-May-2019	30-Apr-2020	04-May-2021	02-May-2022	01-May-2023	13-May-2019	30-Apr-2020	04-May-2021	02-May-2022	01-May-2023
Time Sampled					12:09	13:05	10:53	12:00	14:42	11:03	13:43	10:31	11:02	14:19
ALS Sample ID					L2274410-7	VA20A5832-017	VA21A8717-017	VA22A9542-005	VA23A9648-004	L2274410-6	VA20A5832-018	VA21A8717-016	VA22A9542-004	VA23A9648-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b										
Dissolved Metals (Trace)														
Aluminum, dissolved	1.0	µg/L	--	--	-	-	-	-	3.3	-	-	-	-	<1.0
Antimony, dissolved	0.10	µg/L	--	--	-	-	-	-	<0.10	-	-	-	-	<0.10
Arsenic, dissolved	0.10	µg/L	--	--	-	-	-	-	0.14	-	-	-	-	0.21
Barium, dissolved	0.10	µg/L	--	--	-	-	-	-	21.2	-	-	-	-	48.6
Beryllium, dissolved	0.100	µg/L	--	--	-	-	-	-	<0.100	-	-	-	-	<0.100
Bismuth, dissolved	0.050	µg/L	--	--	-	-	-	-	<0.050	-	-	-	-	<0.050
Boron, dissolved	10	µg/L	--	--	-	-	-	-	12	-	-	-	-	23
Cadmium, dissolved	0.0050	µg/L	--	[b]	-	-	-	-	0.0368	-	-	-	-	0.0336
Calcium, dissolved	50	µg/L	--	--	-	-	-	-	46400	-	-	-	-	45500
Cesium, dissolved	0.010	µg/L	--	--	-	-	-	-	<0.010	-	-	-	-	<0.010
Chromium, dissolved	0.50	µg/L	--	--	-	-	-	-	<0.50	-	-	-	-	<0.50
Cobalt, dissolved	0.10	µg/L	--	--	-	-	-	-	<0.10	-	-	-	-	<0.10
Copper, dissolved	0.20	µg/L	--	[b]	-	-	-	-	0.94	-	-	-	-	0.33
Iron, dissolved	10	µg/L	--	350	-	-	-	-	<10	-	-	-	-	<10
Lead, dissolved	0.050	µg/L	--	--	-	-	-	-	<0.050	-	-	-	-	<0.050
Lithium, dissolved	1.0	µg/L	--	--	-	-	-	-	1.6	-	-	-	-	1.1
Magnesium, dissolved	5.0	µg/L	--	--	-	-	-	-	5380	-	-	-	-	8560
Manganese, dissolved	0.10	µg/L	--	--	-	-	-	-	0.30	-	-	-	-	0.94
Mercury, dissolved	0.0050	µg/L	--	--	-	-	-	-	<0.0050	-	-	-	-	<0.0050
Molybdenum, dissolved	0.050	µg/L	--	--	-	-	-	-	0.216	-	-	-	-	0.111
Nickel, dissolved	0.50	µg/L	--	--	-	-	-	-	<0.50	-	-	-	-	<0.50
Phosphorus, dissolved	50	µg/L	--	--	-	-	-	-	<50	-	-	-	-	<50
Potassium, dissolved	50	µg/L	--	--	-	-	-	-	1100	-	-	-	-	1470
Rubidium, dissolved	0.20	µg/L	--	--	-	-	-	-	<0.20	-	-	-	-	<0.20
Selenium, dissolved	0.050	µg/L	--	--	-	-	-	-	0.074	-	-	-	-	0.068
Silicon, dissolved	50	µg/L	--	--	-	-	-	-	6930	-	-	-	-	8260
Silver, dissolved	0.010	µg/L	--	--	-	-	-	-	<0.010	-	-	-	-	<0.010
Sodium, dissolved	50	µg/L	--	--	-	-	-	-	6160	-	-	-	-	4670
Strontium, dissolved	0.20	µg/L	--	--	-	-	-	-	164	-	-	-	-	179
Sulfur, dissolved	500	µg/L	--	--	-	-	-	-	3250	-	-	-	-	3320
Tellurium, dissolved	0.20	µg/L	--	--	-	-	-	-	<0.20	-	-	-	-	<0.20
Thallium, dissolved	0.010	µg/L	--	--	-	-	-	-	<0.010	-	-	-	-	<0.010
Thorium, dissolved	0.10	µg/L	--	--	-	-	-	-	<0.10	-	-	-	-	<0.10
Tin, dissolved	0.10	µg/L	--	--	-	-	-	-	<0.10	-	-	-	-	<0.10
Titanium, dissolved	0.30	µg/L	--	--	-	-	-	-	<0.30	-	-	-	-	<0.30
Tungsten, dissolved	0.10	µg/L	--	--	-	-	-	-	<0.10	-	-	-	-	<0.10
Uranium, dissolved	0.010	µg/L	--	--	-	-	-	-	0.553	-	-	-	-	0.642
Vanadium, dissolved	0.50	µg/L	--	--	-	-	-	-	<0.50	-	-	-	-	<0.50
Zinc, dissolved	1.0	µg/L	--	[b]	-	-	-	-	2.6	-	-	-	-	1.2
Zirconium, dissolved	0.30	µg/L	--	--	-	-	-	-	<0.20	-	-	-	-	<0.20

Table 10

Sheep Creek Surface Water Quality Monitoring Results - Landfill EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Client Sample ID					SW-C (E242837)	SW-C (E242837)	SW-C (E242837)	SW-C (E242837)	SW-C (E242837)	SW-A (E242838)	SW-A (E242838)	SW-A (E242838)	SW-A (E242838)	SW- A (E242839)	SW-B (E242839)	SW-B (E242839)	SW-B (E242839)	SW-B (E242839)	SW-B (E242838)
Date Sampled					2-May-2019	29-Apr-2020	04-May-2021	02-May-2022	15-Nov-2023	2-May-2019	29-Apr-2020	04-May-2021	02-May-2022	15-Nov-2023	2-May-2019	29-Apr-2020	04-May-2021	02-May-2022	15-Nov-2023
Time Sampled					13:17	08:44	09:13	09:13	11:22	13:40	09:19	09:43	09:54	12:11	14:23	10:38	11:53	14:58	11:45
ALS Sample ID					L2267652-1	VA20A5832-013	VA21A8717-013	VA22A9542-010	VA23C7858-001	L2267652-2	VA20A5832-014	VA21A8717-014	VA22A9542-011	VA23C7858-003	L2267652-3	VA20A5832-015	VA21A8717-015	VA22A9542-012	VA23C7858-002
Parameter	Lowest Detection Limit	Units	BC WQG DW	BC WQG FAW															
			a	b															
Field Parameters																			
pH, Field			--	6.5-9.0	8.13	7.49	7.63	7.95	9.23[b]	8.08	7.79	7.34	8.05	6.14[b]	8.08	7.81	7.06	7.88	8.62
Temperature		°C	15 AO	18 (12 spring/fall) (a)	5.2	4.0	4.2	4.1	2.1	5.4	4.2	4.4	4.4	2.1	5.6	4.4	5.3	6.2	2.1
Conductivity		µS/cm	--	--	57.6	56.8	43.7	71.9	56.1	58.3	57.2	44.2	72.8	57	61.9	59.4	47.6	82.7	57.8
Turbidity		NTU	(b)	(b)	0.99	0.74	0.00	1.36	0.58	0.76	0.54	0.00	1.37	0.99	0.71	1.01	0.00	4.54	0.58
General Chemistry																			
Conductivity	2.0	µS/cm	--	--	88.4	97	70.5	118	97.3	88.5	97.6	72.2	118	100	91.2	99.4	76.3	136	101
Hardness (as CaCO3)	0.60	mg/L	--	--	43.8	46.1	34.4	55.2	44.4	43.5	47.1	35.7	54.8	47.0	44.7	47.3	36.5	62.8	45.2
pH	0.10		--	6.5-9.0	7.73	7.85	7.74	7.78	7.86	7.68	7.86	7.75	7.80	7.89	7.74	7.86	7.78	7.85	7.89
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	44.5	43.5	37.1	53.2	45.3	44.3	44.7	37.7	53.8	46.0	45.8	44.9	39.3	58.5	46.4
Bromide (Br)	0.050	mg/L	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250 AO	150	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.58	<0.50
Fluoride (F)	0.020	mg/L	1.5	[b]	0.029	0.029	0.026	0.044	0.033	0.029	0.032	0.026	0.031	0.033	0.029	0.033	0.026	0.045	0.036
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	3.76	4.22	3.10	5.58	4.95	3.80	4.26	3.13	3.84	5.02	3.88	4.30	5.48	6.33	5.01
sulfide (as H2S)	0.010	mg/L	--	--	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011	-	<0.018	<0.011	<0.010	<0.011
sulfide (as S)	0.011	mg/L	--	--	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010	<0.018	<0.018	<0.010	<0.011	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-
Total Inorganic Carbon	0.50	mg/L	--	--	10.6	14.2	9.79	16.0	10.9	10.5	10.4	9.00	15.1	11.1	10.8	11.4	9.13	15.9	11.3
Total Organic Carbon	0.50	mg/L	4	(c)	1.10	1.54	1.50	0.80	1.12	1.00	1.66	1.67	0.58	1.05	1.16	1.58	1.43	0.73	1.12
Chemical Oxygen Demand (COD)	20	mg/L	--	--	-	-	<20	-	-	-	-	<20	-	-	-	-	<20	-	-
Nutrients																			
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	3	<0.0050	0.106	0.0730	0.0059	0.0074	0.0058	0.0994	0.0713	<0.0050	<0.0050	<0.0050	0.100	0.0674	0.0117	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[b]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	<0.050	0.067	<0.050	<0.050	<0.050	<0.050	0.066	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.103	<0.050
Total Metals (Semi-Trace)																			
Calcium (Ca)-Total	50	ug/L	--	--	14200	15000	11200	18000	14200	14100	15300	11700	17800	15200	14400	15400	11800	20100	14300
Magnesium (Mg)-Total	5.0	ug/L	--	--	2020	2100	1560	2490	2180	1990	2170	1580	2520	2210	2110	2170	1700	3070	2310
Potassium (K)-Total	50	ug/L	--	--	461	467	394	554	461	465	482	398	552	475	482	474	424	670	499
Sodium (Na)-Total	50	ug/L	--	--	658	628	534	708	691	661	632	544	712	720	844	687	753	1730	831
Total Metals (Trace)																			
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	18.7	37.1	39.8	14.6	9.6	18.8	35.0	41.8	14.1	9.9	18.8	32.6	37.8	18.1	9.7
Antimony (Sb)-Total	0.10	ug/L	6	74	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	0.12	0.14	0.15	0.17	0.10	0.13	0.13	0.16	0.16	0.11	0.13	0.13	0.15	1.19	0.12
Barium (Ba)-Total	0.10	ug/L	--	1000	19.6	19.2	15.6	22.0	19.0	19.1	19.4	16.1	22.3	18.6	18.6	19.4	16.2	27.8	19.2
Beryllium (Be)-Total	0.100	ug/L	--	0.13	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.10	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	11	<10
Cadmium (Cd)-Total	0.0050	ug/L	5	--	0.122	0.155	0.0953	0.117	0.0789	0.124	0.159	0.0972	0.122	0.0833	0.124	0.151	0.0975	0.126	0.0751
Cesium (Cs)-Total	0.010	ug/L	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Total	0.50	ug/L	50	--	<0.70	0.17	<0.00050	<0.50	<0.50	<1.0	0.16	<0.00050	<0.50	<0.50	<1.0	0.19	<0.00050	<0.50	<0.50
Cobalt (Co)-Total	0.10	ug/L	1	4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	ug/L	1000	--	<0.50	0.59	<0.50	<0.50	<0.50	<0.50	0.76	<0.50	<0.50	<0.50	<0.50	1.07	<0.50	<0.50	<0.50
Iron (Fe)-Total	10	ug/L	300	1000	<10	38	30	<10	<10	<10	31	29	<10	<10	13	36	31	651[a]	<10
Lead (Pb)-Total	0.050	ug/L	5	[b]	0.050	0.297	0.267	0.076	<0.050	0.065	0.191	0.252	0.071	<0.050	0.058	0.254	0.213	0.124	<0.050
Lithium (Li)-Total	1.0	ug/L	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	0.57	1.32	1.19	0.46	0.20	0.42	1.05	1.04	0.24	0.18	2.07	1.81	3.04	16.6	0.84
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	0.645	0.624	0.471	0.848	0.652	0.645	0.620	0.492	0.847	0.651	0.640	0.608	0.484	0.864	0.637
Nickel (Ni)-Total	0.90	ug/L	80	[b]	<0.90	<0.50	<0.50	<0.50	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50	<2.0	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Total	50	ug/L	10 AO for lakes	5	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	0.62	0.63	0.49	0.59	0.45	0.58	0.62	0.50	0.58	0.44	0.52	0.68	0.52	0.66	0.53
Selenium (Se)-Total	0.050	ug/L	10	2	<0.20	0.254	0.162	0.227	0.179	<0.30	0.227	0.132	0.229	0.169	0.172	0.188	0.119	0.206	0.159
Silicon (Si)-Total	100	ug/L	--	--	3580	3330	3090	3750	3180	3530	3370	3110	3880	3260	3600	3370	3130	3980	3360
Silver (Ag)-Total	0.010	ug/L	--	[b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	39.4	40.9	33.0	49.7	44.5	43.4	38.3	33.6	50.6	44.9	45.0	39.8	35.6	68.9	45.8
Sulfur (S)-Total	500	ug/L	--	--	1310	1410	1080	1470	1570	1010	1240	1150	1490	1760	1320	1280	1180	1610	1520
Tellurium (Te)-Total	0.20	ug/L	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	<0.30	0.62	0.84	<0.30	<0.30	<0.30	0.61	0.95	<0.30	<0.30	<0.30	0.54	0.65	<0.30	<0.30
Tungsten (W)-Total	0.10	ug/L	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	0.344	0.362	0.235	0.521	0.433	0.343	0.372	0.242	0.519	0.446	0.382	0.406	0.286	0.741	0.454
Vanadium (V)-Total	0.50	ug/L	--	--	<0.50	0.50	0.53	0.62	<0.50	0.51	0.53	0.53	0.64	<0.50	0.51	0.52	0.53	0.67	<0.50
Zinc (Zn)-Total	3.0	ug/L	3000	--	6.3	9.6	4.9	5.2	3.2	6.2	9.6	5.0	4.7	3.2	6.0	9.1	6.1	5.2	3.3
Zirconium (Zr)-Total	0.20	ug/L	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.060	0.21	<0.20	<0.20	<0.20	<0.060	<0.20	<0.20	<0.20	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Background - Upstream									
Client Sample ID							SW3-07 (E303732)	SW3-07 (E303732)	SW03-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW5-19 (RDHBDS02)	SW5-19 (RDHBDS02)	SW5-19 (RDHBDS02)
Date Sampled							1-May-2019	12-May-2020	18-May-2021	16-Dec-2021	09-May-2022	07-Mar-2023	03-May-2023	09-May-2022	07-Mar-2023	3-May-2023
Time Sampled							16:15	14:57	15:56	09:52	12:12	11:12	9:21	12:32	11:59	9:49
ALS Sample ID							L2267651-5	VA20A6594-003	VA21A9807-011	VA21C8342-002	VA22B0122-001	VA23A5201-006	VA23A9835-001	VA22B0122-002	VA23A5201-007	VA23A9835-002
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d										
Field Parameters																
pH, Field		--	--	6.5-9.0	5-9.5	5-9.5	7.50	6.51	7.07	7.86	7.65	8.00	7.97	7.68	7.79	7.62
Temperature		°C	15 AO	18 (12 spring/fall) (a)	(d)	(d)	6.0	6.7	7.4	2.9	6.0	1.1	6.6	5.6	2.8	6.9
Conductivity		µS/cm	--	--	700 (e)	--	68.7	71.9	84.0	66.0	69.4	74.4	69.1	74.8	92.1	75.3
Turbidity		NTU	(b)	(b)	(b)	(b)	1.13	0.71	0.00	4.04	4.36	4.70	0.00	7.32	20	4.2
General Chemistry																
Conductivity	2.0	µS/cm	--	--	700 (e)	--	110	115	129	110	107	130	105	120	154	111
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	47.0	50.9	60.0	52.7	50.2	61.1	47.2	57.1	70.5	50.7
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	51.2	61.3	46.3	59.4	71.5	49.6
pH	0.10		--	6.5-9.0	5-9.5	5-9.5	7.80	7.85	8.00	7.72	7.80	7.97	7.79	7.86	7.85	7.86
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-	-			-	-	-
solids, total suspended [TSS]	3.0	mg/L	--	--	--	--	-	-	-	-	<3.0	14.8	<3.0	<3.0	24.8	<3.0
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	46.3	51.0	55.1	47.6	48.5	56.0	45.8	53.1	60.7	49.9
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250 AO	150	100	600	<0.50	<0.59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L	1.5	[h]	1	1 (e)	0.042	0.043	0.033	0.043	0.049	0.041	0.046	0.050	0.036	0.054
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	--	1000	6.74	7.60	8.50	8.09	6.59	10.2	6.62	8.67	15.5	7.18
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.010	<0.011	<0.0016	<0.011	<0.011	<0.0016	<0.011
Sulphide as S	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.011	<0.010	<0.0015	<0.010	<0.010	<0.0015	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	--	--	-	-	-	-	0.0	0.0	<0.0015	0.0	0.0	<0.0015
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	12.2	12.1	14.7	14.9	12.4	15.4	10.6	14.2	17.4	11.1
Total Organic Carbon	0.50	mg/L	4	(c)	--	--	1.32	1.83	1.09	2.2	1.56	1.49	1.86	1.32	1.05	1.81
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-
anion sum	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
cation sum (total)	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-
ion balance (cations/anions ratio)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-
ion balance (cation-anion difference)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Nutrients																
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	3	--	100	0.0083	0.0052	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	0.0010	mg/L	1	[b]	--	10	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.054	<0.050	<0.050	0.067	<0.050	<0.050	0.052	<0.050	<0.050	<0.050
Phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	4.9	-	-	8.1
phosphorus, total	2.0	µg/L	10 AO for lakes	5	--	--	-	-	-	-	7.1[b]	0.0134	<0.0010	12.8[ab]	0.0310	0.0025
Total Metals (Semi-Trace)																
Calcium (Ca)-Total	50	ug/L	--	--	--	--	14600	16300	19100	16600	16100	18900	14700	18900	22100	15800
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	2590	2500	2990	2730	2680	3420	2340	2960	3970	2470
Potassium (K)-Total	50	ug/L	--	--	--	--	1090	1070	1170	1100	1160	1080	1150	1320	1310	1220
Sodium (Na)-Total	50	ug/L	--	--	--	--	1320	1330	1520	1350	1370	1710	1290	1580	2370	1400
Total Metals (Trace)																
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	5000	5000	13.9	9.7	9.1	195	116	252	25.7	481	808	144
Antimony (Sb)-Total	0.10	ug/L	6	74	--	--	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	100	25	0.14	0.17	0.15	0.24	0.20	0.29	0.18	0.35	0.47	0.28
Barium (Ba)-Total	0.10	ug/L	--	1000	--	--	8.23	8.25	9.92	11.0	9.98	12.9	8.42	15.5	23.2	11.1
Beryllium (Be)-Total	0.10	ug/L	--	0.13	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	500 (e)	5000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Total	0.0050	ug/L	5	--	5.1	80	0.0120	0.0118	0.0086	0.0157	0.0161	0.0207	0.0135	0.0168	0.0366	0.0155
Cesium (Cs)-Total	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	0.041	0.032	0.052	<0.010	0.076	0.140	0.023
Chromium (Cr)-Total	0.10	ug/L	50	--	--	--	<0.10	0.10	<0.00050	<0.00050	<0.50	<0.50	<0.50	0.67	1.19	<0.50
chromium, hexavalent [Cr VI], total	0.50	µg/L	--	1	8	50	-	-	-	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050
chromium, trivalent [Cr III], total	0.50	µg/L	--	8.9	4.9	50	-	-	-	-	-	<0.00050		-	0.00119	-
Cobalt (Co)-Total	0.10	ug/L	1	4	50	1000	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	<0.10	0.16	0.41	<0.10
Copper (Cu)-Total	0.50	ug/L	1000	--	200	300	<0.50	<0.50	<0.50	0.69	0.58	0.98	0.74	0.80	1.41	0.59
Iron (Fe)-Total	10	ug/L	300	1000	--	--	14	<10	<10	173	125	255	27	373[a]	890[a]	127
Lead (Pb)-Total	0.050	ug/L	5	[b]	200 (e)	100	<0.050	<0.050	<0.050	0.224	0.223	0.447	0.056	0.276	0.817	0.103
Lithium (Li)-Total	1.0	ug/L	--	--	750 (e)	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	200	--	1.96	0.97	1.34	6.00	6.39	8.96	2.34	7.50	23.4[a]	2.82
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	2	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	10 (e)	16	0.159	0.164	0.151	0.206	0.167	0.168	0.207	0.182	0.092	0.208
Nickel (Ni)-Total	0.50	ug/L	80	[b]	200	1000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	1.10	<0.50
Phosphorus (P)-Total	50	µg/L	10 AO for lakes	5	--	--	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	57[ab]	53[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	--	--	0.51	0.50	0.48	0.78	0.67	0.80	0.52	1.25	1.76	0.63
Selenium (Se)-Total	0.050	ug/L	10	2	10	30	<0.15	0.059	<0.050	0.085	0.076	0.080	0.078	0.115	0.178	0.076
Silicon (Si)-Total	100	ug/L	--	--	--	--	6160	6250	6440	6480	6640	6650	6180	6730	7080	6110
Silver (Ag)-Total	0.010	ug/L	--	[b]	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	--	--	77.4	88.8	106	84.0	84.3	91.3	77.1	91.5	102	82.7
Sulfur (S)-Total	500	ug/L	--	--	--	--	2420	2510	2780	2390	2370	3440	1840	3050	5340	2300
Tellurium (Te)-Total	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	0.33	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	--	--	0.47	<0.30	<0.30	6.37	4.22	8.26	0.76	12.4	30.1	3.94
Tungsten (W)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	10	200	0.116	0.129	0.178	0.174	0.169	0.243	0.148	0.185	0.214	0.120
Vanadium (V)-Total	0.50	ug/L	--	--	100	100	<0.50	<0.50	<0.50	0.67	<0.50	0.78	<0.50	0.86	2.00	0.56
Zinc (Zn)-Total	3.0	ug/L	3000	--	[a]	2000	<3.0	<3.0	<3.0	<3.0	<3.0	6.7	4.4	<3.0	5.0	<3.0
Zirconium (Zr)-Total	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.24	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Background - Upstream									
Client Sample ID							SW3-07 (E303732)	SW3-07 (E303732)	SW03-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW3-07 (E303732)	SW5-19 (RDHBDS02)	SW5-19 (RDHBDS02)	SW5-19 (RDHBDS02)
Date Sampled							1-May-2019	12-May-2020	18-May-2021	16-Dec-2021	09-May-2022	07-Mar-2023	03-May-2023	09-May-2022	07-Mar-2023	3-May-2023
Time Sampled							16:15	14:57	15:56	09:52	12:12	11:12	9:21	12:32	11:59	9:49
ALS Sample ID							L2267651-5	VA20A6594-003	VA21A9807-011	VA21C8342-002	VA22B0122-001	VA23A5201-006	VA23A9835-001	VA22B0122-002	VA23A5201-007	VA23A9835-002
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d										
Dissolved Metals (Semi-Trace)																
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	-	-	-	-	15800	19500	15100	18100	22700	16200
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	-	-	-	-	2620	3020	2320	2890	3360	2490
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	1120	1000	1100	1210	1170	1160
Sodium (Na)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	1300	1500	1190	1520	2210	1330
Dissolved Metals (Trace)																
Aluminum (Al)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	15.4	12.8	3.2	21.5	11.5	2.8
Antimony (Sb)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	0.16	0.16	0.15	0.16	0.13	0.16
Barium (Ba)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	8.75	10.3	8.02	10.4	14.2	9.45
Beryllium (Be)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	--	--	--	--	-	-	-	-	<10	<10	<10	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	--	[b]	--	--	-	-	-	-	0.0084	0.0131	0.0089	0.0117	0.0179	0.0072
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium (Cr)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium, hexavalent [Cr VI], dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	0.50	<0.00050	<0.00050	<0.50	<0.00050	<0.00050
chromium, trivalent [Cr III], dissolved	0.00050	mg/L	--	--	--	--	-	-	-	-	-	<0.00050	-	-	<0.00050	-
Cobalt (Co)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	--	[b]	--	--	-	-	-	-	0.37	0.38	0.38	0.34	0.22	0.32
Iron (Fe)-Dissolved	10	ug/L	--	350	--	--	-	-	-	-	14	<10	<10	16	<10	<10
Lead (Pb)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	2.51	0.79	1.54	1.06	0.53	0.56
Mercury (Hg)-Dissolved	0.0050	ug/L	--	--	--	--	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	0.162	0.159	0.185	0.181	0.081	0.170
Nickel (Ni)-Dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phosphorus (P)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	0.52	0.35	0.45	0.44	0.39	0.34
Selenium (Se)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	<0.050	0.088	<0.050	0.133	0.170	0.067
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	6140	5970	6550	5860	5560	6280
Silver (Ag)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	84.3	105	79.6	95.6	118	82.4
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	-	-	-	-	1900	3130	2130	2600	4740	2150
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	--	--	--	-	-	-	-	0.41	0.35	<0.30	0.56	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	0.145	0.226	0.127	0.141	0.130	0.100
Vanadium (V)-Dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	1.4	3.9	2.5	<1.0	<1.0	<1.0
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Landfill - Upstream														
Client Sample ID							SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)
Date Sampled							2-May-2019	14-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021	09-May-2022	26-Sep-2022	21-Mar-2023	3-May-2023	22-Nov-2023	2-May-2019	23-Oct-2019	12-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021
Time Sampled							11:26	08:53	11:13	13:43	11:00	13:14	11:35	11:39	12:25	14:17	8:52	9:36	15:30	12:41	13:12	10:29
ALS Sample ID							L2267651-9	VA20A6594-015	VA20B9937-001	VA21A9336-003	VA21C8342-004	VA22B0122-008	VA22C3650-010	VA23A6235-012	VA23A9835-006	VA23C8416-004	L2267651-7	L2371873-1	VA20A6594-004	VA20B9937-002	VA21A9336-002	VA21C8342-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d																
Field Parameters																						
pH, Field			--	6.5-9.0	5-9.5	5-9.5	7.62	6.61	7.80	6.84	7.70	7.67	6.94	7.08	7.61	7.64	7.84	**10.05[b]**	6.72	8.50	6.89	8.01
Temperature		°C	15 AO	18 (12 spring/fall) (a)	(d)	(d)	9.2	11.6	5.1	10.9	1.0	9.9	9.7	0.7	13.6	3.0	5.0	3.7	10.8	1.7	12.3	0.0
Conductivity		µS/cm	--	--	700 (e)	--	562	577	593	655	371.3	571	662	335.8	607	416.2	88.1	460.5	95.8	141.0	112.5	142.7
Turbidity		NTU	(b)	(b)	(b)	(b)	13.6	9.74	3.53	0.00	3.57	5.10	6.2	4.5	2.1	2.09	46.3	7.17	49.1	10.85	12.2	37.6
General Chemistry																						
Conductivity	2.0	µS/cm	--	--	700 (e)	--	797	781	970	869	644	774	783	582	725	674	144	704	138	260	145	258
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	351	363	467	381	315	321	387	267	336	305	64.8	367	64.0	124	71.5	126.0
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	-	340	460	280	320	283	-	-	-	-	-	-
pH	0.10		--	6.5-9.0	5-9.5	5-9.5	8.18	8.21	7.84	7.64	7.80	8.42	8.19	8.05	8.35	8.43	7.98	8.32	7.98	8.00	7.95	7.97
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-	-	-	605	-	-	-	-	-	-	-	-	-
solids, total suspended [TSS]	3.0	mg/L	--	--	--	--	-	-	-	-	-	5.0	3.1	<3.0	<3.0	<3.0	-	-	-	-	-	-
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	231	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	335	327	327	367	241	314	295	231	286	234	64.7	191	65.4	88.0	67.3	89.2
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.25	<0.250	<0.250	0.262	0.105	<0.250	<0.250	0.062	<0.250	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250 AO	150	100	600	38.8	40.0	51.2	50.4	24.6	40.5	52.6	17.2	34.1	37.6	1.75	5.05	0.93	1.94	0.56	1.15
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1 (e)	<0.10	<0.100	<0.100	<0.100	0.074	<0.100	<0.100	0.072	<0.100	<0.100	0.079	0.125	0.072	0.060	0.069	0.119
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	--	1000	54.2	49.2	148	56.7	79.4	38.3	58.0	66.3	75.5	92.0	7.86	202	5.05	42.4	7.33	41.5
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.019	<0.010	0.011	0.0114	<0.011	0.023	0.013	<0.011	-	-	<0.018	<0.019	<0.010	<0.010
Sulphide as S	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.018	<0.011	0.012	0.0107	<0.010	0.022	0.012	<0.010	<0.018	0.022	<0.018	<0.018	<0.011	<0.011
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	--	--	-	-	-	-	-	**0.0029[b]**	0.0	**0.0146[b]**	**0.0032[b]**	**<0.0049[b]**	-	-	-	-	-	-
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	72.8	72.7	87.8	99.5	61.6	80.2	92.6	53.3	59.2	58.6	15.0	44.8	14.6	22.1	18.0	24.7
Total Organic Carbon	0.50	mg/L	4	(c)	--	--	**21.8[a]**	**18[a]**	**7.99[a]**	**15.1[a]**	**14.2[a]**	**14.1[a]**	**6.06[a]**	**10.1[a]**	**15.3[a]**	**12.2[a]**	2.65	2.41	3.27	2.71	2.68	3.3
COD	20	mg/L	--	--	--	--	-	-	-	38	-	-	-	-	-	-	-	-	-	-	26	-
anion sum	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cation sum (total)	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ion balance (cations/anions ratio)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ion balance (cation-anion difference)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																						
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	--	--	0.539	0.0470	0.0086	0.0246	0.7950	2.98	0.0104	0.266	0.0484	0.0187	<0.0050	<0.0050	<0.0050	<0.0050	0.0085	0.0573
Nitrate (as N)	0.0050	mg/L	10	3	--	100	1.22	0.0900	<0.0250	0.214	1.12	2.80	<0.0250	2.12	0.213	0.0270	<0.0050	0.0140	0.0114	<0.0050	0.0688	0.263
Nitrite (as N)	0.0010	mg/L	1	[b]	--	10	0.0877	0.0113	<0.0050	<0.0050	0.0090	0.105	<0.0050	0.0442	0.0112	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	3.12	1.68	0.469	1.06	1.92	3.79	0.350	1.29	0.992	0.793	0.082	0.162	0.148	0.190	0.143	0.183
Phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	89.1	-	-	-	-	-	-	-
phosphorus, total	2.0	µg/L	10 AO for lakes	5	--	--	-	-	-	-	-	**124[ab]**	**92.6[ab]**	-	0.0232	**47.4[ab]**	-	-	-	-	-	-
Total Metals (Semi-Trace)																						
Calcium (Ca)-Total	50	ug/L	--	--	--	--	91300	98000	134000	98000	87900	82000	134000	77200	86400	76900	18000	101000	19000	36400	21300	36700
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	29500	28800	31900	33100	23100	32800	30500	21300	25300	22200	4430	27900	4020	8130	4450	8290
Potassium (K)-Total	50	ug/L	--	--	--	--	10400	8720	2770	8600	5980	12400	2440	6470	7860	5980	1280	2640	1030	1230	1470	2080
Sodium (Na)-Total	50	ug/L	--	--	--	--	31000	33200	32900	41000	18000	41100	34500	14700	25700	26700	2480	7020	2390	2980	3010	3540
Total Metals (Trace)																						
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	5000	5000	21.1	18.9	3.0	9.6	77.0	166	61.5	35.5	32.2	22.6	1610	438	448	321	1120	2540
Antimony (Sb)-Total	0.10	ug/L	6	74	--	--	0.26	0.23	<0.10	0.18	0.30	0.24	0.13	0.24	0.25	0.26	<0.10	0.12	<0.10	<0.10	0.11	0.12
Arsenic (As)-Total	0.10	ug/L	10	5	100	25	4.25	3.68	0.46	1.67	2.38	1.94	1.20	1.24	2.12	0.98	0.97	0.64	0.55	0.53	0.76	1.80
Barium (Ba)-Total	0.10	ug/L	--	1000	--	--	73.9	58.6	96.6	75.3	59.4	87.6	57.8	52.0	75.5	67.0	41.5	106	39.1	40.9	43.8	76.7
Beryllium (Be)-Total	0.10	ug/L	--	0.13	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.10	<0.100	<0.100	<0.100	0.122
Bismuth (Bi)-Total	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	500 (e)	5000	260	246	208	290	129	367	241	159	177	159	<10	73	10	<10	12	<10
Cadmium (Cd)-Total	0.0050	ug/L	5	--	5.1	80	0.332	0.252	0.0539	0.115	0.245	0.139	0.184	0.101	0.246	0.180	0.0273	0.0555	0.0316	0.0180	0.0208	0.0530
Cesium (Cs)-Total	0.010	ug/L	--	--	--	--	0.010	<0.010	<0.010	<0.010	0.014	0.035	0.014	<0.010	<0.010	<0.010	0.295	0.061	0.074	0.051	0.156	0.367
Chromium (Cr)-Total	0.10	ug/L	50	--	--	--	0.88	0.51	0.16	<0.00050	0.00108	0.81	<0.50	<0.50	0.54	<0.50	1.78	0.57	0.71	0.39	0.00106	0.00280
chromium, hexavalent [Cr VI], total	0.50	µg/L	--	1	8	50	-	-	-	-	-	-	<0.50	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-
chromium, trivalent [Cr III], total	0.50	µg/L	--	8.9	4.9	50	-	-	-	-	-	-	<0.50	<0.00050	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	0.10	ug/L	1	4	50	1000	**1.6[a]**	**1.32[a]**	**1.5[a]**	**1.13[a]**	0.88	0.78	**1.86[a]**	0.45	0.83	0.63	0.48	0.19	0.32	0.12	0.22	**1.17[a]**
Copper (Cu)-Total	0.50	ug/L	1000	--	200	300	4.27	2.83	0.90	1.71	5.52	3.62	1.19	2.94	3.12	3.97	2.29	1.78	1.76	1.36	1.57	3.48
Iron (Fe)-Total	10	ug/L	300	1000	--	--	**1650[ab]**	**1110[ab]**	139	294	**402[a]**	**450[a]**	**701[a]**	179	**368[a]**	182	**1420[ab]**	**321[a]**	**411[a]**	283	**597[a]**	**2680[ab]**
Lead (Pb)-Total	0.050	ug/L	5	[b]	200 (e)	100	**8[a]**	**6[a]**	1.38	2.51	2.92	2.26	**11.6[a]**	1.22	**5.17[a]**	2.62	1.07	0.290	1.06	0.279	0.495	1.88
Lithium (Li)-Total	1.0	ug/L	--	--	750 (e)	--	2.2	1.9	3.1	2.6	1.9	2.3	3.1	1.8	2.1	2.0	1.6	1.7	1.5	1.1	2.0	2.2
Manganese (Mn)-Total	0.10	ug/L	20	[b]	200	--	**786[a]**	**914[a]**	**208[a]**	**237[a]**	**260[a]**	**189[a]**	**311[a]**	**187[a]**	**232[a]**	**148[a]**	**26.7[a]**	13.6	17.0	6.9	12.6	**495[a]**
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	2	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	10 (e)	16	1.41	1.45	0.467	0.730	1.10	1.18	0.242	0.949	1.18	0.866	0.439	1.09	0.127	0.480	0.368	2.56
Nickel (Ni)-Total	0.50	ug/L	80	[b]	200	1000	6.72	6.83	4.92	6.90	4.51	7.59	5.09	2.86	5.20	4.33	1.86	0.90	1.10	0.59	1.16	3.05
Phosphorus (P)-Total	50	µg/L	10 AO for lakes	5	--	--	**202[ab]**	**208[ab]**	**<50[ab]**	**97[ab]**	**229[ab]**	**156[ab]**	**123[ab]**	**67[ab]**	**85[ab]**	**<50[ab]**	**51[ab]**	**<50[ab]**	**<50[ab]**	**<50[ab]**	**<50[ab]**	**73[ab]**
Rubidium (Rb)-Total	0.20	ug/L	--	--	--	--	4.08	2.20	0.43	2.07	1.56	2.91	0.72	1.41	2.12	0.86	2.72	1.05	0.78	0.76	2.26	4.13
Selenium (Se)-Total	0.050	ug/L	10	2	10	30	<0.25	0.150	<0.050	0.109	0.146	0.146	<0.050	0.073	0.117	0.113	<0.10	2.00	0.074	0.072	0.085	0.494
Silicon (Si)-Total	100	ug/L	--	--	--	--	5960	5500	9660	4840	6650	5710	11200	4950	4560	6020	9300	5830	8220	6960	8600	9100
Silver (Ag)-Total	0.010	ug/L	--	[b]	--	--	0.011	<0.010	<0.010	<0.010	0.017	0.012	<0.010	0.011	0.014	0.016	0.012	<0.010	<0.010	<0.010	0.012	0.017
Strontium (Sr)-Total	0.20	ug/L	7000	--	--	--	552	586	610	653	415	607	650	455	510	409	110	624	119	190	129	188
Sulfur (S)-Total	500	ug/L	--	--	--	--	21800	19700	51600	20400	26900	16600	21700	23300	27100	36600	2320	79700	1460	13500	2250	12800
Tellurium (Te)-Total	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	<0.010	<0.010	0.013	0.025
Thorium (Th)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.01	0.24	0.42	0.23	0.37	1.72
Tin (Sn)-Total	0.10	ug/L	--	--	--	--	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	--	--	1.47	1.07	<0.30	0.39	<2.70	5.62	2.42	1.25	1.41	0.74	31.0	8.95	6.45	6.02	22.7	58.1
Tungsten (W)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	10	200	**8.75[b]**	6.78	**15.2[b]**	**10.2[b]**	7.82	6.08	**11.8[b]**	6.76	**8.69[b]**	8.08	1.74	**24.5[ab]**	1.50	4.43	1.13	5.97
Vanadium (V)-Total	0.50	ug/L	--	--	100	100	1.09	1.15	<0.50	<0.50	0.88	0.92	0.59	0.52	0.97	<0.50	2.03	0.80	1.22	0.53	1.47	4.11
Zinc (Zn)-Total	3.0	ug/L	3000	--	[a]	2000	66.5	45.6	12.6	25.0	56.8	27.5	29.0	21.2	38.3	38.6	13.9	9.6	10.1	5.1	8.0	10.9
Zirconium (Zr)-Total	0.060	ug/L	--	--	--	--	0.180	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.206	<0.20	<0.20	<0.20	0.48	0.34

Client Sample ID							SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)
Date Sampled							09-May-2022	26-Sep-2022	21-Mar-2023	10-May-2023	20-Nov-2023	2-May-2019	23-Oct-2019	12-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021	09-May-2022	26-Sep-2022	21-Mar-2023	10-May-2023	20-Nov-2023
Time Sampled							13:14	11:35	11:39	12:25	14:17	8:52	9:36	15:30	12:41	13:12	10:29	12:50	11:39	08:46	14:15	
ALS Sample ID							VA22B0122-003	VA22C3650-011	VA23A6235-011	VA23B0397-001	VA23C8258-001	L2267651-7	L2371873-1	VA20A6594-004	VA20B9937-002	VA21A9336-002	VA21C8342-003	VA22B0122-003	VA22C3650-011	VA23A6235-011	VA23B0397-001	VA23C8258-001
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d																
Field Parameters																						
pH, Field			--	6.5-9.0	5-9.5	5-9.5	7.88	7.99	7.89	7.49		7.84	**10.05[b]**	6.72	8.50	6.89	8.01	7.88	7.99	7.89	7.49	
Temperature		°C	15 AO	18 (12 spring/fall) (a)	(d)	(d)	11.4	0.40	10.3	0.0		5.0	3.7	10.8	1.7	12.3	0.0	11.4	0.40	10.3	0.0	
Conductivity		µS/cm	--	--	700 (e)	--	102.8	92.1	132.1	150.2		88.1	460.5	95.8	141.0	112.5	142.7	102.8	92.1	132.1	150.2	
Turbidity		NTU	(b)	(b)	(b)	(b)	140	310	17	23.8		46.3	7.17	49.1	10.85	12.2	37.6	140	310	17	23.8	
General Chemistry																						
Conductivity	2.0	µS/cm	--	--	700 (e)	--	137	191	185	278		144	704	138	260	145	258	137	191	185	278	
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	61.5	84.6	83.0	133		64.8	367	64.0	124	71.5	126.0	61.5	84.6	83.0	133	
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	73.4	98.8	82.2	137		-	-	-	-	-	-	73.4	98.8	82.2	137	
pH	0.10		--	6.5-9.0	5-9.5	5-9.5	7.79	7.84	8.03	8.09		7.98	8.32	7.98	8.00	7.95	7.97	7.79	7.84	8.03	8.09	
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
solids, total suspended [TSS]	3.0	mg/L	--	--	--	--	100	79.0	3.2	10.4		-	-	-	-	-	-	100	79.0	3.2	10.4	
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	65.2	-	-		-	-	-	-	-	-	-	65.2	-	-	
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	<1.0	-	-		-	-	-	-	-	-	-	<1.0	-	-	
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	<1.0	-	-		-	-	-	-	-	-	-	<1.0	-	-	
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	<1.0	-	-		-	-	-	-	-	-	-	<1.0	-	-	
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	55.8	65.2	70.9	116		64.7	191	65.4	88.0	67.3	89.2	55.8	65.2	70.9	116	
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Chloride (Cl)	0.50	mg/L	250 AO	150	100	600	0.72	1.18	1.30	1.12		1.75	5.05	0.93	1.94	0.56	1.15	0.72	1.18	1.30	1.12	
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1 (e)	0.112	0.125	0.194	0.160		0.079	0.125	0.072	0.060	0.069	0.119	0.112	0.125	0.194	0.160	
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	--	1000	13.3	28.3	16.9	33.1		7.86	202	5.05	42.4	7.33	41.5	13.3	28.3	16.9	33.1	
sulfide (as H2S)	0.018	mg/L	--	--	--	--	<0.011	<0.011	<0.011	<0.011		-	-	<0.018	<0.019	<0.010	<0.010	<0.011	<0.011	<0.011	<0.011	
Sulphide as S	0.018	mg/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010		<0.018	0.022	<0.018	<0.018	<0.011	<0.011	<0.010	<0.010	<0.010	<0.010	
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	--	--	0.0	0.0	<0.0015	**<0.0049[b]**		-	-	-	-	-	-	0.0	0.0	<0.0015	**<0.0049[b]**	
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	14.4	15.8	18.8	28.2		15.0	44.8	14.6	22.1	18.0	24.7	14.4	15.8	18.8	28.2	
Total Organic Carbon	0.50	mg/L	4	(c)	--	--	**4.81[a]**	3.12	**4.24[a]**	2.77		2.65	2.41	3.27	2.71	2.68	3.3	**4.81[a]**	3.12	**4.24[a]**	2.77	
COD	20	mg/L	--	--	--	--	-	-	-	-		-	-	-	-	26	-	-	-	-	-	
anion sum	0.10	meq/L	--	--	--	--	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
cation sum (total)	0.10	meq/L	--	--	--	--	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
ion balance (cations/anions ratio)	0.010	%	--	--	--	--	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
ion balance (cation-anion difference)	0.010	%	--	--	--	--	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
Nutrients																						
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	--	--	0.0082	0.0720	<0.0050	0.0092		<0.0050	<0.0050	<0.0050	<0.0050	0.0085	0.0573	0.0082	0.0720	<0.0050	0.0092	
Nitrate (as N)	0.0050	mg/L	10	3	--	100	0.132	0.887	0.637	0.0171		<0.0050	0.0140	0.0114	<0.0050	0.0688	0.263	0.132	0.887	0.637	0.0171	
Nitrite (as N)	0.0010	mg/L	1	[b]	--	10	0.0019	0.0024	0.0027	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	0.0019	0.0024	0.0027	<0.0010	
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.284	0.331	0.182	0.113		0.082	0.162	0.148	0.190	0.143	0.183	0.284	0.331	0.182	0.113	
Phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	172	-		-	-	-	-	-	-	-	-	172	-	
phosphorus, total	2.0	µg/L	10 AO for lakes	5	--	--	**192[ab]**	-	0.141	**78[ab]**		-	-	-	-	-	-	**192[ab]**	-	0.141	**78[ab]**	
Total Metals (Semi-Trace)																						
Calcium (Ca)-Total	50	ug/L	--	--	--	--	19700	27700	24200	41200		18000	101000	19000	36400	21300	36700	19700	27700	24200	41200	
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	5890	7190	5280	8260		4430	27900	4020	8130	4450	8290	5890	7190	5280	8260	
Potassium (K)-Total	50	ug/L	--	--	--	--	4300	3200	1610	1670		1280	2640	1030	1230	1470	2080	4300	3200	1610	1670	
Sodium (Na)-Total	50	ug/L	--	--	--	--	3470	2810	3010	3400		2480	7020	2390	2980	3010	3540	3470	2810	3010	3400	
Total Metals (Trace)																						
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	5000	5000	**9890[a]**	6810	891	1020		1610	438	448	321	1120	2540	**9890[a]**	6810	891	1020	
Antimony (Sb)-Total	0.10	ug/L	6	74	--	--	0.22	0.24	0.11	0.11		<0.10	0.12	<0.10	<0.10	0.11	0.12	0.22	0.24	0.11	0.11	
Arsenic (As)-Total	0.10	ug/L	10	5	100	25	4.12	4.56	2.13	1.37		0.97	0.64	0.55	0.53	0.76	1.80	4

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Landfill - Upstream															
Client Sample ID							SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW1-07 (E303730)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)
Date Sampled							2-May-2019	14-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021	09-May-2022	26-Sep-2022	21-Mar-2023	3-May-2023	22-Nov-2023	2-May-2019	23-Oct-2019	12-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021
Time Sampled							11:26	08:53	11:13	13:43	11:00	13:14	11:35	11:39	12:25	14:17	8:52	9:36	15:30	12:41	13:12	10:29
ALS Sample ID							L2267651-9	VA20A6594-015	VA20B9937-001	VA21A9336-003	VA21C8342-004	VA22B0122-008	VA22C3650-010	VA23A6235-012	VA23A9835-006	VA23C8416-004	L2267651-7	L2371873-1	VA20A6594-004	VA20B9937-002	VA21A9336-002	VA21C8342-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW (1) c	BC WQG LW (2) d																
Dissolved Metals (Semi-Trace)																						
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	92800	-	-	-	-	79600	108000	72500	91400	82600	18600	-	-	-	-	-
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	29000	-	-	-	-	29600	28600	20800	26200	24000	4450	-	-	-	-	-
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	9780	-	-	-	-	11300	2490	6240	7670	6380	881	-	-	-	-	-
Sodium (Na)-Dissolved	50	ug/L	--	--	--	--	29500	-	-	-	-	37500	31800	14100	26000	27100	2430	-	-	-	-	-
Dissolved Metals (Trace)																						
Aluminum (Al)-Dissolved	1.0	ug/L	--	--	--	--	5.4	-	-	-	-	12.4	1.6	8.0	3.0	7.7	75.1	-	-	-	-	-
Antimony (Sb)-Dissolved	0.10	ug/L	--	--	--	--	0.24	-	-	-	-	0.22	<0.10	0.21	0.22	0.25	<0.10	-	-	-	-	-
Arsenic (As)-Dissolved	0.10	ug/L	--	--	--	--	2.94	-	-	-	-	1.55	0.71	1.13	1.91	0.88	0.34	-	-	-	-	-
Barium (Ba)-Dissolved	0.10	ug/L	--	--	--	--	70.1	-	-	-	-	82.1	52.6	47.3	77.9	64.2	20.8	-	-	-	-	-
Beryllium (Be)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	-	-	-	-	-
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-
Boron (B)-Dissolved	10	ug/L	--	--	--	--	290	-	-	-	-	331	198	126	176	164	11	-	-	-	-	-
Cadmium (Cd)-Dissolved	0.0050	ug/L	--	[b]	--	--	0.231	-	-	-	-	0.0813	0.0783	0.0832	0.146	0.158	0.0106	-	-	-	-	-
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	-	-	-	-	0.012	<0.010	<0.010	<0.010	<0.010	0.011	-	-	-	-	-
Chromium (Cr)-Dissolved	0.10	ug/L	--	--	--	--	0.65	-	-	-	-	0.51	<0.50	<0.50	<0.50	<0.50	0.18	-	-	-	-	-
Chromium, hexavalent [Cr VI], dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	-	<0.50	-	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-
chromium, trivalent [Cr III], dissolved	0.00050	mg/L	--	--	--	--	-	-	-	-	-	-	-	<0.00050	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	0.10	ug/L	--	--	--	--	1.40	-	-	-	-	0.66	1.59	0.43	0.76	0.62	<0.10	-	-	-	-	-
Copper (Cu)-Dissolved	0.20	ug/L	--	[b]	--	--	3.45	-	-	-	-	2.36	0.53	2.42	2.30	3.45	0.67	-	-	-	-	-
Iron (Fe)-Dissolved	10	ug/L	--	350	--	--	376	-	-	-	-	84	68	106	92	136	54	-	-	-	-	-
Lead (Pb)-Dissolved	0.050	ug/L	--	--	--	--	2.86	-	-	-	-	0.315	1.59	0.786	1.03	1.95	0.063	-	-	-	-	-
Lithium (Li)-Dissolved	1.0	ug/L	--	--	--	--	2.3	-	-	-	-	2.3	2.6	1.7	2.2	2.2	<1.0	-	-	-	-	-
Manganese (Mn)-Dissolved	0.10	ug/L	--	--	--	--	599	-	-	-	-	129	130	186	203	144	2.38	-	-	-	-	-
Mercury (Hg)-Dissolved	0.0050	ug/L	--	--	--	--	<0.0050	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-
Molybdenum (Mo)-Dissolved	0.050	ug/L	--	--	--	--	1.43	-	-	-	-	1.24	0.208	0.834	1.07	0.953	0.430	-	-	-	-	-
Nickel (Ni)-Dissolved	0.50	ug/L	--	--	--	--	6.17	-	-	-	-	7.16	4.66	2.76	5.04	4.40	<0.50	-	-	-	-	-
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	89	-	-	-	-	67	<50	52	51	<50	<50	-	-	-	-	-
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	3.67	-	-	-	-	2.62	0.57	1.30	2.13	0.91	0.22	-	-	-	-	-
Selenium (Se)-Dissolved	0.050	ug/L	--	--	--	--	0.182	-	-	-	-	0.112	0.057	0.133	0.135	0.106	0.119	-	-	-	-	-
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5750	-	-	-	-	4770	11200	4610	4820	5830	7070	-	-	-	-	-
Silver (Ag)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	-	-	-	-	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	-	-	-	-	-
Strontium (Sr)-Dissolved	0.20	ug/L	--	--	--	--	566	-	-	-	-	611	588	418	507	412	112	-	-	-	-	-
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	22300	-	-	-	-	14500	19700	22400	26400	35900	2510	-	-	-	-	-
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	-	-
Thallium (Tl)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-
Tin (Sn)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-
Titanium (Ti)-Dissolved	0.30	ug/L	--	--	--	--	0.32	-	-	-	-	0.36	<0.30	0.38	<0.30	0.33	1.77	-	-	-	-	-
Tungsten (W)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-
Uranium (U)-Dissolved	0.010	ug/L	--	--	--	--	8.31	-	-	-	-	5.61	11.8	6.38	8.11	8.74	1.60	-	-	-	-	-
Vanadium (V)-Dissolved	0.50	ug/L	--	--	--	--	<0.50	-	-	-	-	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	-	-	-	-	-
Zinc (Zn)-Dissolved	1.0	ug/L	--	--	--	--	44.8	-	-	-	-	22.3	19.1	18.5	33.6	38.3	5.1	-	-	-	-	-
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	0.142	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.085	-	-	-	-	-

							Landfill - Upstream															
Client Sample ID							SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)	SW2-07 (E303731)
Date Sampled							9-May-2022	21-Mar-2023	10-May-2023	20-Nov-2023	2-May-2019	23-Oct-2019	12-May-2020	02-Nov-2020	13-May-2021	16-Dec-2021	09-May-2022	21-Mar-2023	10-May-2023	20-Nov-2023		
Time Sampled							12:50	11:39	08:46	14:15	8:52	9:36	15:30	12:41	13:12	10:29	12:50	11:39	08:46	14:15		
ALS Sample ID							VA22B0122-003	VA23A6235-011	VA23B0397-001	VA23C8258-001	L2267651-7	L2371873-1	VA20A6594-004	VA20B9937-002	VA21A9336-002	VA21C8342-003	VA22B0122-003	VA23A6235-011	VA23B0397-001	VA23C8258-001		
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW (1) c	BC WQG LW (2) d																
Dissolved Metals (Semi-Trace)																						
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	18400	25400	24300	40700												
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	3770	5140	5420	7640												
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	1280	1110	1410	1210												
Sodium (Na)-Dissolved	50	ug/L	--	--	--	--	2350	2020	2840	3020												
Dissolved Metals (Trace)																						
Aluminum (Al)-Dissolved	1.0	ug/L	--	--	--	--	98.6	75.0	96.5	16.8												
Antimony (Sb)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10												
Arsenic (As)-Dissolved	0.10	ug/L	--	--	--	--	0.61	1.21	1.75	0.97												
Barium (Ba)-Dissolved	0.10	ug/L	--	--	--	--	21.0	23.5	26.6	31.9												
Beryllium (Be)-Dissolved	0.10	ug/L	--	--	--	--	<0.100	<0.100	<0.100	<0.100												
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050												
Boron (B)-Dissolved	10	ug/L	--	--	--	--	<10	<10	<10	<10												
Cadmium (Cd)-Dissolved	0.0050	ug/L	--	[b]	--	--	0.0129	0.0233	0.0198	0.0127												
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	0.010	<0.010	<0.010	<0.010												
Chromium (Cr)-Dissolved	0.10	ug/L	--	--	--	--	<0.50	<0.50	<0.50	<0.50												
Chromium, hexavalent [Cr VI], dissolved	0.50	ug/L	--	--	--	--	<0.50	<0.00050	<0.00100	<0.00050												
chromium, trivalent [Cr III], dissolved	0.00050	mg/L	--	--	--	--	-	<0.00050	<0.00100	<0.00050												
Cobalt (Co)-Dissolved	0.10	ug/L	--	--	--	--	0.20	<0.10	<0.10	<0.10												
Copper (Cu)-Dissolved	0.20	ug/L	--	[b]	--	--	0.98	0.78	0.93	1.03												
Iron (Fe)-Dissolved	10	ug/L	--	350	--	--	74	60	72	14												
Lead (Pb)-Dissolved	0.050	ug/L	--	--	--	--	0.085	0.122	0.068	<0.050												
Lithium (Li)-Dissolved	1.0	ug/L	--	--	--	--	<1.0	<1.0	1.0	<1.0												
Manganese (Mn)-Dissolved	0.10	ug/L	--	--	--	--	140	10.7	30	30.9												
Mercury (Hg)-Dissolved	0.0050	ug/L	--	--	--	--	<0.0050	<0.0050	<0.0050	<0.0050												
Molybdenum (Mo)-Dissolved	0.050	ug/L	--	--	--	--	1.63	1.25	2.18	1.73												
Nickel (Ni)-Dissolved	0.50	ug/L	--	--	--	--	<0.50	<0.50	<0.50	<0.50												
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<50	149	166	60												
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	0.56	0.23	0.36	<0.20												
Selenium (Se)-Dissolved	0.050	ug/L	--	--	--	--	0.182	0.558	0.315	0.879												
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5360	4510	8150	3780												
Silver (Ag)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010												
Strontium (Sr)-Dissolved	0.20	ug/L	--	--	--	--	106	133	130	224												
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	4130	8760	4890	10400												
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20												
Thallium (Tl)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	<0.010	<0.010	<0.010												
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10												
Tin (Sn)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10												
Titanium (Ti)-Dissolved	0.30	ug/L	--	--	--	--	2.12	1.62	1.70	0.36												
Tungsten (W)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10												
Uranium (U)-Dissolved	0.010	ug/L	--	--	--	--	2.49	3.84	4.06	12.6												
Vanadium (V)-Dissolved	0.50	ug/L	--	--	--	--	0.59	0.72	0.99	0.53												
Zinc (Zn)-Dissolved	1.0	ug/L	--	--	--	--	<1.0	<1.0	<1.0	<1.0												
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20												

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF				Downstream										
Client Sample ID							SW4-07 (E303733)	SW4-07 (E303733)	SW4-07 (E303733)	SW4-07 (E303733)	SEEPAGE WEIR (RDHBDS01)	SEEPAGE WEIR (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)
Date Sampled							2-May-2019	23-Oct-2019	13-May-2020	02-Nov-2020	30-Apr-2019	23-Oct-2019	13-May-2020	02-Nov-2020	18-May-2021	20-Jan-2022	09-May-2022	26-Sep-2022	05-Dec-2022	07-Mar-2023	03-May-2023	19-Sep-2023	22-Nov-2023
Time Sampled							12:01	12:14	16:13	12:01	15:48	11:03	15:29	13:30	13:51	10:25	10:41	15:13	13:29	14:52	10:50	13:46	10:59
ALS Sample ID							L2267651-10	L2371873-4	VA20A6594-013	VA20B9937-003	L2266695-6	L2371873-3	VA20A6594-012	VA20B9937-005	VA21A9807-016	VA22A1177-002	VA22B0122-006	VA22C3650-009	VA22C9736-002	VA23A5201-005	VA23A9835-004	VA23C2587-002	VA23C8416-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW (1) c	BC WQG LW (2) d																	
Field Parameters																							
pH, Field		--	6.5-9.0	5-9.5	5-9.5	8.30		7.68	8.10	7.30	8.26	8.45	7.60	6.84	7.43	7.36	6.88	7.04	7.38	7.28	7.92	7.95	
Temperature		°C	15 AO	18 (12 spring/fall) (a)	(d)	(d)	18.2[ab]	11.0	18[a]	7.3	8.0	8.7	9.3	7.4	11.9	6.4	8.1	12.5	7.0	8.0	9.2	11.5	9.7
Conductivity		µS/cm	--	--	700 (e)	--	921	2272	1061	1904	532	563	506	299.8	551	480.0	472.1	513	563	571	506	657	629
Turbidity		NTU	(b)	(b)	(b)	(b)	2.38	1.75	1.46	7.48	1.87	0.28	4.66	3.71	4.09	2.29	5.74	19	6.3	5.2	0.85	4.19	4.96
General Chemistry																							
Conductivity	2.0	µS/cm	--	--	700 (e)	--	1040	2890	1240	2880	777	749	740	768	733	717	671	823	820	802	764	827	808
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	517	2050	681	1980	410	394	382	391	370	382	356	404	427	442	414	455	456
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	371	468	425	426	387	457	415
pH	0.10		--	6.5-9.0	5-9.5	5-9.5	8.40	7.99	8.27	8.12	7.76	7.64	7.94	7.85	8.26	7.96	8.28	8.38	7.94	8.35	8.20	8.39	8.16
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	640	-	-	-	-	-
solids, total suspended [TSS]	3.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	8.2	12.3	<3.0	<3.0	<3.0	<3.0	3.5
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	293	109	246	152	208	200	203	203	206	212	209	241	226	221	232	252	210
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.25	<0.50	<0.250	<1.00	0.061	<0.050	0.051	<0.250	<0.050	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
Chloride (Cl)	0.50	mg/L	250 AO	150	100	600	35.6	29.0	30.7	35.0	3.15	3.67	2.80	3.53	2.70	2.55	<2.50	3.29	3.58	3.22	2.91	3.01	3.51
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1 (e)	0.150	0.270	0.177	<0.400	0.131	0.143	0.140	0.160	0.118	0.126	0.112	0.103	0.118	0.119	0.112	0.134	0.145
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	--	1000	245	1870[ad]	438[d]	1890[ad]	221	220	194	222	200	185	162	220	225	231	204	211	233
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	-	<0.018	<0.019	-	-	<0.018	<0.019	<0.010	<0.010	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011	<0.011
Sulphide as S	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.018	<0.018	<0.018	0.046	<0.018	<0.018	<0.011	<0.011	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	--	--	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	<0.0015	<0.0055[b]	<0.0049[b]
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	67.3	24.1	52.8	36.6	50.2	49.7	47.7	52.7	54.2	51.9	55.5	63.8	61.4	55.5	49.4	63.2	60.1
Total Organic Carbon	0.50	mg/L	4	(c)	--	--	14[a]	11.1[a]	12.1[a]	5.88[a]	2.83	2.40	2.89	2.38	2.44	2.8	2.94	3.75	3.11	3.00	3.09	3.45	2.62
COD	20	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-	-
anion sum	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	8.22	-	-	-	-	-	-	-
cation sum (total)	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	8.16	-	-	-	-	-	-	-
ion balance (cations/anions ratio)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	99.3	-	-	-	-	-	-	-
ion balance (cation-anion difference)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	0.366	-	-	-	-	-	-	-
Nutrients																							
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	--	--	0.0114	0.0096	0.0208	0.0066	0.128	0.101	0.125	0.0652	0.0430	0.0577	0.0956	0.138	0.0513	0.0159	0.0087	0.0277	0.0187
Nitrate (as N)	0.0050	mg/L	10	3	--	100	0.0550	<0.050	<0.0250	<0.100	0.118	0.0829	0.133	0.148	0.0545	0.753	0.524	0.0618	0.172	0.469	0.549	0.112	0.676
Nitrite (as N)	0.0010	mg/L	1	[b]	--	10	<0.0050	<0.010	<0.0050	<0.0200	0.0010	<0.0010	0.0025	<0.0050	<0.0010	0.0061	<0.0050	0.0130	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	1.02	0.656	0.817	0.431	0.210	0.251	0.235	0.217	0.127	0.292	0.236	0.331	0.144	0.120	0.104	0.119	0.158
Phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.4	-	-
phosphorus, total	2.0	µg/L	10 AO for lakes	5	--	--	-	-	-	-	-	-	-	-	-	-	21.6[ab]	29.8[ab]	-	0.0203	0.0042	9.6[b]	12.5[ab]
Total Metals (Semi-Trace)																							
Calcium (Ca)-Total	50	ug/L	--	--	--	--	147000	516000	205000	508000	115000	107000	106000	106000	102000	103000	98800	124000	112000	111000	106000	121000	110000
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	36400	186000	40800	173000	31600	30700	28400	30400	28000	30300	30100	38500	35200	36200	29800	37600	34100
Potassium (K)-Total	50	ug/L	--	--	--	--	9020	33200	6390	28700	3640	3520	3460	3870	3220	3950	3860	4640	4380	3950	3810	4620	3930
Sodium (Na)-Total	50	ug/L	--	--	--	--	28800	36400	25200	24200	7750	8370	6910	7500	6160	8410	8180	9680	9050	9800	8390	10200	9420
Total Metals (Trace)																							
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	5000	5000	3.0	14.3	3.5	40.9	4.1	<3.0	5.4	4.5	<3.0	22.8	287	257	27.1	44.4	17.4	35.6	25.4
Antimony (Sb)-Total	0.10	ug/L	6	74	--	--	0.33	0.52	0.24	0.63	0.18	0.22	0.20	0.11	0.15	0.13	0.15	<0.10	<0.10	0.10	0.14	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	100	25	1.24	1.48	1.12	1.69	2.56	2.73	2.62	1.26	2.23	0.63	0.96	3.02	0.69	0.80	0.53	0.76	0.56
Barium (Ba)-Total	0.10	ug/L	--	1000	--	--	42.6	75.5	58.9	47.5	44.5	40.2	39.8	47.0	32.3	46.2	55.0	72.3	60.4	55.5	45.3	48.8	50.3
Beryllium (Be)-Total	0.10	ug/L	--	0.13	100	100	<0.10	<0.20[b]	<0.100	<0.200[b]	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	--	--	<0.050	<0.10	<0.050	<0.100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	500 (e)	5000	232	129	198	81	21	22	17	24	21	19	17	22	22	20	16	22	20
Cadmium (Cd)-Total	0.0050	ug/L	5	--	5.1	80	1.55	6.14[a]	2.56	8.27[a]	0.0226	0.0143	0.0256	0.0110	0.0125	0.0720	0.113	0.0814	0.0498	0.0525	0.0284	0.0788	0.0266
Cesium (Cs)-Total	0.010	ug/L	--	--	--	--	0.047	0.039	0.069	0.073	0.029	0.026	0.033	0.026	0.025	0.062	0.110	0.118	0.050	0.045	0.030	0.060	0.041
Chromium (Cr)-Total	0.10	ug/L	50	--	--	--	0.31	0.38	0.21	<0.20	<0.10	<0.10	<0.10	<0.10	<0.00050	<0.50	0.52	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
chromium, hexavalent [Cr VI], total	0.50	ug/L	--	1	8	50	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.00050	<0.00050	<0.00050	<0.00050
chromium, trivalent [Cr III], total	0.50	ug/L	--	8.9	4.9	50	-	-	-	-	-	-	-	-	-	-	-	<0.50	-	<0.00050	-	<0.00050	-
Cobalt (Co)-Total	0.10	ug/L	1	4	50	1000	0.45	0.29	0.28	0.41	0.24	0.22	0.19	0.14	0.20	0.21	0.42	0.97	0.36	0.14	<0.10	0.28	0.15
Copper (Cu)-Total	0.50	ug/L	1000	--	200	300	2.09	4.20	1.95	2.52	1.18	<0.50	0.64	<0.50	<0.50	0.76	1.13	0.81	<0.50	0.81	0.71	<0.50	0.54
Iron (Fe)-Total	10	ug/L	300	1000	--	--	110	146	57	366[a]	1410[ab]	1190[ab]	1310[ab]	361[a]	801[a]	234	838[a]	2500[ab]	312[a]	391[a]	46	172	94
Lead (Pb)-Total	0.050	ug/L	5	[b]	200 (e)	100	3.78	14.3[a]	3.25	37[a]	0.138	<0.050	0.103	<0.050	0.070	0.071	0.272	0.376	0.060	0.081	<0.050	0.059	0.053
Lithium (Li)-Total	1.0	ug/L	--	--	750 (e)	--	3.0	21.6	3.1	19.2	1.0	1.1	<1.0	<1.0	<1.0	1.2	1.0	1.5	1.0	<1.0	<1.0	1.0	<1.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	200	--	17.9	27[a]	13.4	51.9[a]	1210[a]	1130[a]	1100[a]	883[a]	1250[a]	1170[a]	1400[a]	4930[a]	2130[a]	312[a]	138[a]	2370[a]	494[a]
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	2	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	10 (e)	16	1.30	0.760	1.70	0.673	3.90	4.32	4.28	3.50	4.73	3.05	2.98	4.76	3.23	1.83	2.05	3.45	1.88
Nickel (Ni)-Total	0.50	ug/L	80	[b]	200	1000	6.89	6.50	6.95	7.18	0.54	0.65	0.51	<0.50	<0.50	<0.50	0.93	1.48	0.93	0.54	<0.50	0.96	0.58
Phosphorus (P)-Total	50	µg/L	10 AO for lakes	5	--	--	<50[ab]	<100[ab]	<50[ab]	<100[ab]	<50[ab]	<50[ab]	62[ab]	<50[ab]	<50[ab]	-	55[ab]	<50[ab]	<50[ab]	<50[ab]	52[ab]	<50[ab]	<50[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	--	--	6.46	21.8	5.93	20.6	2.06	1.76	2.14	1.96	1.75	2.1	2.29	3.04	2.20	2.17	1.82	2.46	1.77
Selenium (Se)-Total	0.050	ug/L	10	2	10	30	<0.15	0.150	0.136	0.152	0.163	0.153	0.168	0.078	0.218	0.193	0.357	0.066	0.068	0.189	0.346	0.084	0.357
Silicon (Si)-Total	100	ug/L	--	--	--	--	4530	7780	5310	7250	7600	8060	7140	7460	7550	7560	8680	9040	8490	7970	7390	9120	8920
Silver (Ag)-Total	0.010	ug/L	--	[b]	--	--	0.012	0.046	0.014	0.101	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	--	--	622	1850	838	1780	454	420	445	419	407	467	423	569	516	494	481	557	502
Sulfur (S)-Total	500	ug/L	--	--	--	--	94400	682000	164000	674000	82800	89800	71200	71900	80300	66600	62100	80400	77900	84600	68500	78600	92600
Tellurium (Te)-Total	0.20	ug/L	--	--	--	--	<0.20	<0.40	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	--	--	0.081	0.125	0.111	0.130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.20	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	0.18	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	--	--	<0.10	0.22	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	--	--	<0.30	0.73	<0.30	<2.70	<0.30	<0.30	<0.30	<0.30	<0.30	0.94	9.79	8.45	0.84	1.59	0.57	1.08	<0.90
Tungsten (W)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.20	<0.10	<0.20	0.13	0.11	0.13	<0.10	0.12	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	10	200	8.23	3.29	6.64	6.11	4.36	4.62	3.70	3.15	3.33	8.14	6.73	4.32	4.82	7.72	10[b]	5.95	6.81
Vanadium (V)-Total	0.50	ug/L	--	--	100	100	<0.50	<1.0	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.84	0.75	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	ug/L	3000	--	[a]	2000	1150	1530	964	3020[a]	6.4	5.2	6.4	4.3	3.6	12.6	12.0	8.7	9.5	10.2	5.4	8.3	3.3
Zirconium (Zr)-Total	0.060	ug/L	--	--	--	--	<0.060	<0.40	<0.20	<0.40	<0.060	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							TSF				Downstream										
Client Sample ID							SW4-07 (E303733)	SW4-07 (E303733)	SW4-07 (E303733)	SW4-07 (E303733)	SEEPAGE WEIR (RDHBDS01)	SEEPAGE WEIR (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)	Seepage Weir (RDHBDS01)
Date Sampled							2-May-2019	23-Oct-2019	13-May-2020	02-Nov-2020	30-Apr-2019	23-Oct-2019	13-May-2020	02-Nov-2020	18-May-2021	20-Jan-2022	09-May-2022	26-Sep-2022	05-Dec-2022	07-Mar-2023	03-May-2023	19-Sep-2023	22-Nov-2023
Time Sampled							12:01	12:14	16:13	12:01	15:48	11:03	15:29	13:30	13:51	10:25	10:41	15:13	13:29	14:52	10:50	13:46	10:59
ALS Sample ID							L2267651-10	L2371873-4	VA20A6594-013	VA20B9937-003	L2266695-6	L2371873-3	VA20A6594-012	VA20B9937-005	VA21A9807-016	VA22A1177-002	VA22B0122-006	VA22C3650-009	VA22C9736-002	VA23A5201-005	VA23A9835-004	VA23C2587-002	VA23C8416-003
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d																	
Dissolved Metals (Semi-Trace)																							
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	-	-	-	-	111000	-	-	-	-	-	95800	102000	112000	119000	114000	120000	120000
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	-	-	-	-	32000	-	-	-	-	-	28400	36200	35800	35100	31500	37700	38000
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	3700	-	-	-	-	-	3810	4370	4110	4020	3790	4450	4430
Sodium (Na)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	7510	-	-	-	-	-	7980	8880	8790	8950	8300	9480	10400
Dissolved Metals (Trace)																							
Aluminum (Al)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	<1.0	-	-	-	-	-	2.0	<1.0	1.3	1.4	1.1	3.5	1.5
Antimony (Sb)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	0.17	-	-	-	-	-	0.14	<0.10	<0.10	<0.10	0.12	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	2.45	-	-	-	-	-	0.68	2.30	0.56	0.52	0.47	0.64	0.48
Barium (Ba)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	44.3	-	-	-	-	-	52.8	66.9	59.3	55.4	48.4	46.9	51.4
Beryllium (Be)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	-	-	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	<0.050	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	--	--	--	--	-	-	-	-	20	-	-	-	-	-	16	19	20	18	16	23	20
Cadmium (Cd)-Dissolved	0.0050	ug/L	--	[b]	--	--	-	-	-	-	0.0219	-	-	-	-	-	0.0949	0.0567	0.0425	0.0498	0.0254	0.0731	0.0279
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	0.027	-	-	-	-	-	0.037	0.057	0.046	0.035	0.026	0.052	0.038
Chromium (Cr)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium, hexavalent [Cr VI], dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	<0.00050	<0.00050	<0.00050	<0.00050
chromium, trivalent [Cr III], dissolved	0.00050	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	-	<0.00050	-
Cobalt (Co)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	0.20	-	-	-	-	-	0.28	0.78	0.34	0.12	<0.10	0.25	0.14
Copper (Cu)-Dissolved	0.20	ug/L	--	[b]	--	--	-	-	-	-	0.28	-	-	-	-	-	0.88	0.30	0.26	0.64	0.54	0.32	0.47
Iron (Fe)-Dissolved	10	ug/L	--	350	--	--	-	-	-	-	1250	-	-	-	-	-	358[a]	1020[a]	90	89	<10	25	32
Lead (Pb)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	<0.050	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	1.0	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0
Manganese (Mn)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	1130	-	-	-	-	-	1400	4100	2180	290	137	2310	520
Mercury (Hg)-Dissolved	0.0050	ug/L	--	--	--	--	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	3.88	-	-	-	-	-	3.06	4.48	3.28	1.85	1.87	3.50	2.07
Nickel (Ni)-Dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	0.56	-	-	-	-	-	1.03	1.06	0.85	<0.50	<0.50	0.92	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	-	-	-	-	<50	-	-	-	-	-	<50	<50	<50	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	2.02	-	-	-	-	-	1.88	2.48	2.10	1.85	1.72	2.37	1.97
Selenium (Se)-Dissolved	0.050	ug/L	--	--	--	--	-	-	-	-	0.199	-	-	-	-	-	0.316	0.071	0.072	0.269	0.381	0.102	0.257
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	-	-	-	-	7370	-	-	-	-	-	7460	8470	8080	7490	7850	8940	8760
Silver (Ag)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	<0.010	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	447	-	-	-	-	-	431	509	520	558	493	549	528
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	-	-	-	-	83200	-	-	-	-	-	56800	70400	70800	76500	66800	74600	89700
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	-	-	-	-	<0.20	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	<0.010	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	<0.10	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	--	--	--	-	-	-	-	<0.30	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	--	--	--	--	-	-	-	-	0.11	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	--	--	--	--	-	-	-	-	3.91	-	-	-	-	-	5.98	4.15	4.83	7.39	9.40	5.63	7.40
Vanadium (V)-Dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	<0.50	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	--	--	--	--	-	-	-	-	5.2	-	-	-	-	-	9.9	5.4	7.8	9.1	4.6	7.2	3.4
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	-	-	-	-	<0.060	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Downstream																			Salmo River	
Client Sample ID							Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	TAILINGS POND OUTLET (E252602)	TAILINGS POND OUTLET (E252602)	Tailings Pond Outlet (E252602)	Tailings Pond Outlet (E2522602)	Tailings Pond Outlet (E252602)	Tailings Pond Outlet (E252602)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Salmo - Upstream (RDHBDS08)	Salmo - Downstream (RDHBDS09)
Date Sampled							29-Apr-2019	12-May-2020	17-May-2021	16-Dec-2021	09-May-2022	21-Mar-2023	3-May-2023	20-Nov-2023	29-Apr-2019	23-Oct-2019	12-May-2020	02-Nov-2020	18-May-2021	20-Jan-2022	09-May-2022	21-Mar-2023	03-May-2023	22-Nov-2023	09-May-2022	26-Sep-2022	05-Dec-2022	07-Mar-2023	03-May-2023	19-Sep-2023	22-Nov-2023	27-Sep-2022	27-Sep-2022
Time Sampled							12:35	16:09	15:33	09:09	09:29	11:39	13:08	15:14	11:02	10:25	14:19	13:12	13:40	10:03	11:29	11:39	11:47	09:45	10:29	15:08	13:17	14:58	10:41	13:56	10:50	10:27	10:45
ALS Sample ID							L2266695-5	VA20A6594-005	VA21A9807-012	VA21C8342-001	VA22B0122-004	VA23A6235-009	VA23A9835-007	VA23C8258-002	L2266695-4	L2371873-2	VA20A6594-002	VA20B9937-004	VA21A9807-013	VA22A1177-001	VA22B0122-007	VA23A6235-010	VA23A9835-005	VA23C8416-002	VA22B0122-005	VA22C3650-008	VA22C9736-001	VA23A5201-004	VA23A9835-003	VA23C2587-001	VA23C8416-001	VA22C3650-006	VA22C3650-007
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW (1) c	BC WQG LW (2) d																										
Field Parameters																																
pH, Field		--	6.5-9.0	5-9.5	5-9.5	8.27	7.26	7.51	8.21	8.13	7.50	8.02	7.85	8.00	10.03[b]	7.12	8.30	6.98	8.36	8.19	8.08	7.96	7.82	8.02	6.94	6.98	7.59	7.55	7.86	8.15	7.46	7.35
Temperature	°C	15 AO	18 (12 spring/fall) (a)	(d)	(d)	8.8	13	17.2[a]	0.8	7.8	0.9	11.6	2.4	11.2	6.1	15.8[a]	6.0	17.8[a]	0.1	9.8	3.2	14.8	1.6	8.2	10.8	0.6	1.0	10.3	10.0	2.1	9.9	10.3
Conductivity	µS/cm	--	--	700 (e)	--	273.9	283	389.8	176.8	225.1	261.5	161.0	533	297.1	131.5	307	314.2	393.9	164.2	237.3	298.3	161.3	535	236.9	615	551	286.2	153.6	601	504	100.1	100.9
Turbidity	NTU	(b)	(b)	(b)	(b)	1.18	1.10	0.00	7.36	12.4	6.8	3.2	1.11	1.99	0.23	4.50	6.97	0.70	4.34	19.7	6.3	3.6	3.24	14.0	5.4	14	5.1	2.5	5.61	2.54	1.0	0.90
General Chemistry																																
Conductivity	2.0	µS/cm	--	--	700 (e)	--	393	378	461	312	327	456	207	890	382	184	378	508	456	301	340	479	197	914	340	820	976	476	209	788	849	138	142
Hardness (as CaCO3)	0.50	mg/L	--	--	--	--	193	184	215	160	150	211	92.8	459	190	88.4	177	244	227	147	153	220	88.0	492	157	395	534	247	95.9	433	452	57.9	58.5
hardness (as CaCO3), from total Ca/Mg	0.60	µg/L	--	--	--	--	-	-	-	-	152	217	90.8	479	-	-	-	-	-	-	158	230	84.6	464	166	467	533	235	94.2	438	444	66.9	68.5
pH	0.10		--	6.5-9.0	5-9.5	5-9.5	7.99	8.10	8.19	8.00	8.12	8.07	8.03	8.14	8.01	7.90	8.04	7.88	8.11	8.04	8.12	8.25	8.02	8.22	8.12	8.47	8.21	8.29	8.04	8.48	8.22	8.05	8.05
solids, total dissolved [TDS]	10	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	590	-	-	-	-	-	130	88
solids, total suspended [TSS]	3.0	mg/L	--	--	--	--	-	-	-	-	9.4	7.0	<3.0	<3.0	-	-	-	-	-	-	19.6	5.4	3.8	<3.0	12.2	<3.0	5.8	18.8	<3.0	9.1	<3.0	<3.0	<3.0
Alkalinity, bicarbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	110	-	-	-	-	-	-	-	-	-	110	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, carbonate (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, hydroxide (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, phenolphthalein (as CaCO3)	1.0	mg/L	--	--	--	--	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	1.0	mg/L	--	--	--	--	90.7	86.2	83.6	84.0	110	110	70.2	141	90.1	59.2	84.2	76.4	76.9	91.7	110	110	67.0	138	112	223	211	121	70.7	241	138	58.4	59.5
Bromide (Br)	0.050	mg/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.050	<0.250	<0.250	<0.050	<0.050	<0.250	<0.250	<0.050	<0.050
Chloride (Cl)	0.50	mg/L	250 AO	150	100	600	2.74	2.28	2.20	1.97	6.40	5.22	2.38	4.41	2.90	<0.50	2.36	2.48	2.23	1.77	6.68	5.53	2.51	4.30	6.49	5.08	5.89	5.12	2.35	2.98	4.26	1.13	1.15
Fluoride (F)	0.020	mg/L	1.5	[b]	1	1 (e)	0.077	0.081	0.072	0.070	0.076	0.129	0.073	<0.100	0.084	0.060	0.083	0.083	0.068	0.079	0.077	0.147	0.071	<0.100	0.079	0.102	0.129	0.088	0.072	0.119	0.122	0.038	0.042
Sulfate (SO4)	0.30	mg/L	500 AO	[a]	--	1000	107	100	146	73.7	51.1	124	32.8	357	112	34.1	103	183	150	62.4	55.0	139	30.8	366	54.5	230	328	125	33.5	199	327	8.49	10.0
sulfide (as H2S)	0.018	mg/L	--	--	--	--	-	<0.018	<0.010	<0.010	<0.011	<0.011	<0.011	<0.011	-	-	<0.018	<0.019	<0.010	<0.010	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.0016	<0.011	<0.011	<0.011	<0.011	<0.011
Sulphide as S	0.018	mg/L	--	--	--	--	<0.018	<0.018	<0.011	<0.011	<0.010	<0.010	<0.010	<0.010	<0.018	<0.018	<0.018	<0.018	<0.011	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0015	<0.010	<0.010	<0.010	<0.010	<0.010
sulfide, un-ionized (as H2S), from total	0.0015	mg/L	--	0.002	--	--	-	-	-	-	0.0	0.0	<0.0015	<0.0049[b]	-	-	-	-	-	-	0.0	0.0	<0.0015	<0.0049[b]	0.0	0.0	0.0	0.0	<0.0015	<0.0058[b]	<0.0049[b]	0.0	0.0
Total Inorganic Carbon	0.50	mg/L	--	--	--	--	21.1	18.6	21.0	26.1	27.4	25.0	16.0	33.1	21.3	15.2	19.5	20.3	19.5	21.9	28.6	25.2	15.4	33.1	28.4	53.8	58.2	28.9	15.0	60.0	33.3	15.0	15.2
Total Organic Carbon	0.50	mg/L	4	(c)	--	--	3.03	3.48	2.57	4.34[a]	5.58[a]	4.97[a]	3.41	4.41[a]	3.76	2.12	3.88	4.53[a]	3.55	2.8	5.71[a]	6.35[a]	3.10	5.49[a]	5.77[a]	3.77	3.93	2.48	3.12	2.44	4.19[a]	0.75	0.81
COD	20	mg/L	--	--	--	--	-	-	<20	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
anion sum	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	3.19	-	-	-	-	-	-	-	-	-	-	-	-	-
cation sum (total)	0.10	meq/L	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	3.17	-	-	-	-	-	-	-	-	-	-	-	-	-
ion balance (cations/anions ratio)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	99.4	-	-	-	-	-	-	-	-	-	-	-	-	-
ion balance (cation-anion difference)	0.010	%	--	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	0.314	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																
Ammonia, Total (as N)	0.0050	mg/L	--	[c]	--	--	0.0057	<0.0050	<0.0050	0.0078	0.157	0.0072	0.0076	0.0062	0.0110	<0.0050	0.0096	0.0065	0.0058	0.012	0.210	0.0121	0.0055	0.0230	0.182	0.0468	0.0202	<0.0050	0.0062	0.0187	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0050	mg/L	10	3	--	100	0.0215	0.0259	0.105	0.132	0.417	0.630	0.0529	0.0402	<0.0050	<0.0050	0.0850	<0.0050	<0.0050	0.0495	0.334	0.474	<0.0050	<0.0250	0.432	1.09	0.475	0.171	0.0664	0.184	0.0457	0.0224	0.0174
Nitrite (as N)	0.0010	mg/L	1	[b]	--	10	<0.0010	<0.0010	<0.0010	0.0025	0.0124	0.0014	0.0022	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0142	0.0054	<0.0010	<0.0050	0.0124	0.0056	<0.0050	<0.0010	0.0018	<0.0050	<0.0050	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	mg/L	--	--	--	--	0.127	0.163	0.195	0.172	0.440	0.324	0.108	0.176	0.170	0.127	0.246	0.371	0.241	0.135	0.528	0.426	0.131	0.280	0.472	0.290	0.159	0.094	0.096	0.123	0.206	<0.050	<0.050
Phosphate, ortho-, dissolved (as P)	0.0010	mg/L	--	--	--	--	-	-	-	-	-	-	58.0	-	-	-	-	-	-	-	-	-	38.3	-	-	-	-	-	51.6	-	-	-	-
phosphorus, total	2.0	µg/L	10 AO for lakes	5	--	--	-	-	-	-	41.5[ab]	-	0.0480	41.6[ab]	-	-	-	-	-	-	52.3[ab]	-	0.0220	41.4[ab]	44.6[ab]	25.1[ab]	-	0.120	0.0439	32[ab]	40.9[ab]	3.2	4.7
Total Metals (Semi-Trace)																																
Calcium (Ca)-Total	50	ug/L	--	--	--	--	56800	55400	61700	45800	40800	61900	27500	130000	56200	25600	51800	66500	65900	42500	43500	65300	25800	127000	46800	126000	146000	68200	28600	117000	122000	23300	23900
Magnesium (Mg)-Total	5.0	ug/L	--	--	--	--	12400	11200	14800	11200	12100	15100	5380	37400	12000	5920	11500	18900	15100	9850	11900	16200	4900	35800	12000	37000	40900	15800	5540	35300	33800	2120	2150
Potassium (K)-Total	50	ug/L	--	--	--	--	2370	2240	2870	2570	3600	3310	1790	2860	2370	793	2370	3490	2930	1900	3830	3790	1740	2510	3700	4960	4480	2250	1780	4410	2690	875	902
Sodium (Na)-Total	50	ug/L	--	--	--	--	3900	3720	4000	4100	8430	6100	3160	9100	3820	1030	3670	4400	4060	3490	8260	6550	3210	8970	8090	9500	9780	6470	3210	9740	8750	1920	1970
Total Metals (Trace)																																
Aluminum (Al)-Total	3.0	ug/L	9500	[a]	5000	5000	14.0	10.0	14.8	614	454	214	107	12.4	12.4	4.5	10.5	39.3	15.2	134	1130	158	133	59.4	802	33.7	141	52.1	108	73.6	39.4	6.9	6.9
Antimony (Sb)-Total	0.10	ug/L	6	74	--	--	0.45	0.54	0.84	0.20	0.20	0.21	0.28	0.30	0.46	0.32	0.38	2.24	1.21	0.13	0.20	0.20	<0.10	0.15	0.20	0.13	0.19	0.12	0.11	0.17	0.14	<0.10	<0.10
Arsenic (As)-Total	0.10	ug/L	10	5	100	25	0.74	0.68	0.90	1.19	1.32	2.32	0.97	0.94	0.98	0.54	1.01	3.02	2.36	0.60	1.72	2.64	0.71	0.96	1.43	1.17	2.02	0.98	0.79	0.87	0.84	0.33	0.36
Barium (Ba)-Total	0.10	ug/L	--	1000	--	--	17.1	16.4	23.0	36.4	40.4	29.3	18.2	52.5	16.8	4.85	15.7	16.1	22.5	29.2	46.4	27.8	17.4	52.2	43.2	60.0	57.1	34.7	18.5	43.3	50.1	19.7	19.5
Beryllium (Be)-Total	0.10	ug/L	--	0.13	100	100	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.10	<0.10	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Total	0.050	ug/L	--	--	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0050	<0.050	<0.050	<0.050
Boron (B)-Total	10	ug/L	5000	1200	500 (e)	5000	19	13	15	11	47	33	13	<10	20	<10	14	13	14	<10	54	34	13	<10	54	19	15	13	12	20	<10	<10	<10
Cadmium (Cd)-Total	0.0050	ug/L	5	--	5.1	80	0.294	0.362	0.319	0.217	0.129	0.293	0.0705	0.137	0.447	0.108	0.373	0.349	0.266	0.328	0.141	0.181	0.0406	0.079	0.121	0.192	0.162	0.0702	0.0308	0.118	0.0615	0.133	0.121
Cesium (Cs)-Total	0.010	ug/L	--	--	--	--	0.011	0.014	0.018	0.27	0.210	0.187	0.062	0.025	0.015	0.036	0.015	0.028	0.024	0.074	0.246	0.031	0.023	0.029	0.301	0.093	0.108	0.196	0.090	0.075	0.167	<0.010	<0.010
Chromium (Cr)-Total	0.10	ug/L	50	--	--	--	<0.10	0.10	<0.00050	0.00086	1.12	0.56	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.00050	<0.50	1.94	0.57	<0.50	<0.50	1.40	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
chromium, hexavalent [Cr VI], total	0.50	µg/L	--	1	8	50	-	-	-	-	-	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	-	<0.50	<0.50	<0.00050	<0.00050	<0.00050	<0.00050	<0.50	<0.50
chromium, trivalent [Cr III], total	0.50	µg/L	--	8.9	4.9	50	-	-	-	-	-	0.00056	-	<0.00050	-	-	-	-	-	-	-	0.00057	-	-	-	<0.50	-	<0.00050	-	<0.00050	-	<0.50	<0.50
Cobalt (Co)-Total	0.10	ug/L	1	4	50	1000	<0.10	<0.10	<0.10	0.25	0.41	0.21	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.43	0.78	0.59	0.10	0.16	0.49	0.39	0.25	<0.10	<0.10	0.15	<0.10	<0.10	<0.10
Copper (Cu)-Total	0.50	ug/L	1000	--	200	300	1.71	1.98	1.94	3.10	2.76	3.21	1.90	3.13	1.61	1.62	1.92	4.24	1.35	1.20	3.26	4.54	0.89	1.85	2.58	0.90	1.41	1.12	0.85	1.27	1.69	<0.50	<0.50
Iron (Fe)-Total	10	ug/L	300	1000	--	--	38	25	33	505[a]	646[a]	321[a]	114	15	106	<10	81	196	208	267	1430[ab]	366[a]	148	79	880[a]	239	497[a]	76	115	158	63	50	52
Lead (Pb)-Total	0.050	ug/L	5	[b]	200 (e)	100	1.18	0.693	0.822	2.19	1.65	1.23	0.514	0.076	6.19[a]	0.115	5.64[a]	23.8[ab]	20.8[ab]	0.757	3.01	1.50	0.336	0.209	2.10	0.125	0.662	0.177	0.300	0.319	0.137	0.071	0.069
Lithium (Li)-Total	1.0	ug/L	--	--	750 (e)	--	1.3	1.3	1.6	1.1	1.0	<1.0	<1.0	1.0	1.4	<1.0	1.4	2.2	1.9	1.1	1.6	<1.0	<1.0	1.1	1.3	1.5	1.1	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
Manganese (Mn)-Total	0.10	ug/L	20	[b]	200	--	5.45	3.44	7.43	54[a]	53[a]	79.6[a]	6.59	2.03	20.3[a]	2.30	20.7[a]	25.7[a]	38.8[a]	239[a]	164[a]	254[a]	21.7[a]	50.2[a]	102[a]	2100[a]	716[a]	20.4[a]	9.88	443[a]	28[a]	13.0	16.7
Mercury (Hg)-Total	0.0050	ug/L	1	[f]	2	3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Total	0.050	ug/L	88	7600	10 (e)	16	0.549	0.517	0.811	0.939	0.756	1.38	0.734	1.37	0.385	0.641	0.370	0.627	0.424	0.702	0.762	1.40	0.470	0.908	0.849	3.57	2.65	0.878	0.598	2.74	1.07	1.20	1.22
Nickel (Ni)-Total	0.50	ug/L	80	[b]	200	1000	1.21	1.04	0.93	1.85	2.14	1.56	0.60	0.74	1.52	<0.50	1.25	2.03	0.98	1.1	2.98	1.43	0.61	0.76	2.36	1.06	1.04	0.97	0.58	0.86	0.79	<0.50	<0.50
Phosphorus (P)-Total	50	µg/L	10 AO for lakes	5	--	--	<50[ab]	<50[ab]	<50[ab]	<50[ab]	57[ab]	311[ab]	55[ab]	60[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	<50[ab]	-	73[ab]	327[ab]	90[ab]	<50[ab]	<50[ab]	<50[ab]	186[ab]	123[ab]	97[ab]	54[ab]	<50[ab]	<50[ab]	<50[ab]
Rubidium (Rb)-Total	0.20	ug/L	--	--	--	--	1.55	1.60	1.90	1.90	1.96	1.11	0.83	1.10	1.62	0.75	1.61	2.69	2.19	0.74	3.06	1.08	0.76	0.58	2.52	2.84	2.25	0.82	0.83	2.48	1.04	0.85	0.83
Selenium (Se)-Total	0.050	ug/L	10	2	10	30	0.081	0.112	0.123	0.192	0.177	0.315	0.152	0.306	0.087	0.098	0.062	0.128	0.059	0.157	0.182	0.322	0.066	0.349	0.197	0.106	0.274	0.173	0.099	0.119	0.367	0.357	0.342
Silicon (Si)-Total	100	ug/L	--	--	--	--	5820	5760	6310	6900	6000	4920	6040	5100	5580	3410	5400	7540	5890	5730	6980	4440	5980	4480	6870	8490	7810	6130	6170	8840	4640	4320	4370
Silver (Ag)-Total	0.010	ug/L	--	[b]	--	--	<0.010	<0.010	<0.010	0.016	0.011	0.015	<0.010	<0.010	<0.010	<0.010	0.015	0.021	<0.010	<0.010	0.015	0.026	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	0.20	ug/L	7000	--	--	--	187	189	230	196	212	263	130	510	182	95.8	197	218	221	211	224	273	124	477	235	566	580	267	129	516	467	113	114
Sulfur (S)-Total	500	ug/L	--	--	--	--	39300	36800	51600	24400	18300	42400	10400	136000	39500	12600	38200	61300	55200	22700	19500	48500	9700	134000	19600	84700	118000	43700	10900	74400	117000	2840	2880
Tellurium (Te)-Total	0.20	ug/L	--	--	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Total	0.010	ug/L	--	0.8	--	--	0.018	0.026	0.026	0.011	<0.010	<0.010	<0.010	<0.010	0.025	<0.010	0.027	0.011	0.019	<0.010	0.015	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	0.25	0.18	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.60	<0.10	<0.10	<0.10	0.29	<0.10	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Total	0.30	ug/L	--	--	--	--	0.41	0.47	0.63	15.4	15.7	6.73	2.97	0.53	0.35	<0.30	0.31	0.84	0.45	3.90	34.7	3.87	3.36	1.56	21.9	1.36	4.94	2.14	2.73	2.69	1.20	<0.30	<0.30
Tungsten (W)-Total	0.10	ug/L	--	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Total	0.010	ug/L	20	8.5	10	200	1.30	0.922	0.870	4.63	3.58	6.71	1.51	20.3[ab]	1.14	4.23	0.922	0.804	0.890	4.40	3.60	7.42	1.21	21.8[ab]	4.05	7.44	21.1[ab]	5.67	1.58	6.81	20.8[ab]	0.378	0.377
Vanadium (V)-Total	0.50	ug/L	--	--	100	100	<0.50	<0.50	<0.50	1.25	1.22	1.39	1.42	0.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.14	1.41	0.81	<0.50	1.58	<0.50	0.61	0.79	1.01	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Total	3.0	ug/L	3000	--	[a]	2000	130	110	95.3	43.2	23.4	49.9	13.1	22.5	136	55.9	96.8	134	58.2	70.3	27.7	48.5	8.7	7.7	22.1	39.8	49.4	26.6	9.6	22.8	13.4	<3.0	<3.0
Zirconium (Zr)-Total	0.060	ug/L	--	--	--	--	<0.060	<0.20	<0.20	0.30	<0.20	<0.20	<0.20	<0.20	0.071	<0.20	<0.20	<0.20	<0.20	<0.20	0.37	<0.20	<0.20	<0.20	0.26	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 11

Surface Water Quality Monitoring Results - TSF EMP
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

							Downstream																			Salmo River	
Client Sample ID							Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	Outlet Ditch (E252603)	TAILINGS POND OUTLET (E252602)	TAILINGS POND OUTLET (E252602)	Tailings Pond Outlet (E252602)	Tailings Pond Outlet (E2522602)	Tailings Pond Outlet (E252602)	Tailings Pond Outlet (E252602)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Inlet (RDHBDS06)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Spillway Outlet (RDHBDS07)	Salmo - Upstream (RDHBDS08)	Salmo - Downstream (RDHBDS09)
Date Sampled							29-Apr-2019	12-May-2020	17-May-2021	16-Dec-2021	09-May-2022	21-Mar-2023	3-May-2023	20-Nov-2023	29-Apr-2019	23-Oct-2019	12-May-2020	02-Nov-2020	18-May-2021	20-Jan-2022	09-May-2022	21-Mar-2023	03-May-2023	22-Nov-2023	09-May-2022	26-Sep-2022	05-Dec-2022	07-Mar-2023	03-May-2023	19-Sep-2023	22-Nov-2023	27-Sep-2022	27-Sep-2022
Time Sampled							12:35	16:09	15:33	09:09	09:29	11:39	13:08	15:14	11:02	10:25	14:19	13:12	13:40	10:03	11:29	11:39	11:47	09:45	10:29	15:08	13:17	14:58	10:41	13:56	10:50	10:27	10:45
ALS Sample ID							L2266695-5	VA20A6594-005	VA21A9807-012	VA21C8342-001	VA22B0122-004	VA23A6235-009	VA23A9835-007	VA23C8258-002	L2266695-4	L2371873-2	VA20A6594-002	VA20B9937-004	VA21A9807-013	VA22A1177-001	VA22B0122-007	VA23A6235-010	VA23A9835-005	VA23C8416-002	VA22B0122-005	VA22C3650-008	VA22C9736-001	VA23A5201-004	VA23A9835-003	VA23C2587-001	VA23C8416-001	VA22C3650-006	VA22C3650-007
Parameter	Lowest Detection Limit	Units	BC WQG DW a	BC WQG FAW b	BC WQG IW [1] c	BC WQG LW [2] d																											
Dissolved Metals (Semi-Trace)																																	
Calcium (Ca)-Dissolved	50	ug/L	--	--	--	1000000	56700	-	-	-	42000	59800	28200	127000	-	-	-	-	-	-	42500	62200	26700	134000	43500	103000	146000	73600	29100	115000	123000	19700	19900
Magnesium (Mg)-Dissolved	5.0	ug/L	--	--	--	--	12600	-	-	-	10900	15000	5440	34500	-	-	-	-	-	-	11300	15700	5190	38200	11700	33500	41100	15300	5650	35400	35300	2120	2150
Potassium (K)-Dissolved	50	ug/L	--	--	--	--	2370	-	-	-	3410	3050	1720	2650	-	-	-	-	-	-	3470	3470	1670	2560	3550	4460	4110	2170	1710	4190	2600	868	880
Sodium (Na)-Dissolved	50	ug/L	--	--	--	--	3810	-	-	-	7680	5900	3120	8450	-	-	-	-	-	-	8030	6340	3210	9320	7870	8260	9470	5790	3190	9140	8800	1730	1730
Dissolved Metals (Trace)																																	
Aluminum (Al)-Dissolved	1.0	ug/L	--	--	--	--	2.8	-	-	-	23.0	11.7	4.9	2.5	-	-	-	-	-	-	16.9	12.8	5.5	6.5	25.2	1.4	1.1	4.3	3.3	2.0	6.3	3.4	3.5
Antimony (Sb)-Dissolved	0.10	ug/L	--	--	--	--	0.43	-	-	-	0.18	0.18	0.21	0.24	-	-	-	-	-	-	0.16	0.17	<0.10	0.14	0.18	<0.10	0.14	0.11	0.10	0.17	0.12	<0.10	<0.10
Arsenic (As)-Dissolved	0.10	ug/L	--	--	--	--	0.75	-	-	-	1.04	1.97	0.82	0.85	-	-	-	-	-	-	1.06	2.28	0.59	0.88	1.05	0.92	1.44	0.94	0.68	0.75	0.77	0.30	0.32
Barium (Ba)-Dissolved	0.10	ug/L	--	--	--	--	16.9	-	-	-	31.3	24.5	16.7	49.6	-	-	-	-	-	-	31.9	22.4	16.1	50.4	32.7	57.9	51.2	34.5	17.0	40.9	47.7	19.6	19.2
Beryllium (Be)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	<0.100	<0.100	<0.100	<0.100	-	-	-	-	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (Bi)-Dissolved	0.050	ug/L	--	--	--	--	<0.050	-	-	-	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (B)-Dissolved	10	ug/L	--	--	--	--	18	-	-	-	47	26	13	<10	-	-	-	-	-	-	49	28	13	<10	49	17	14	11	12	20	<10	<10	<10
Cadmium (Cd)-Dissolved	0.0050	ug/L	--	[b]	--	--	0.253	-	-	-	0.0812	0.242	0.0279	0.126	-	-	-	-	-	-	0.0656	0.126	0.0268	0.0706	0.0644	0.161	0.137	0.0614	0.0200	0.0957	0.0649	0.114	0.108
Cesium (Cs)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	-	-	-	0.084	0.112	0.038	0.019	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	0.108	0.084	0.064	0.180	0.060	0.058	0.158	<0.010	<0.010
Chromium (Cr)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	<0.50	<0.50	<0.50	<0.50	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium, hexavalent [Cr VI], dissolved	0.50	ug/L	--	--	--	--	-	-	-	-	<0.50	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	<0.50	<0.00050	<0.00050	<0.00050	<0.50	-	-	<0.00050	<0.00050	<0.00050	<0.00050	-	-
chromium, trivalent [Cr III], dissolved	0.00050	mg/L	--	--	--	--	-	-	-	-	-	<0.00050	-	<0.00050	-	-	-	-	-	-	-	<0.00050	-	-	-	-	-	<0.00050	-	<0.00050	-	-	-
Cobalt (Co)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	0.16	0.11	<0.10	<0.10	-	-	-	-	-	-	0.27	0.51	<0.10	0.14	0.17	0.34	0.14	<0.10	<0.10	0.10	<0.10	<0.10	<0.10
Copper (Cu)-Dissolved	0.20	ug/L	--	[b]	--	--	1.49	-	-	-	1.79	2.38	1.24	2.73	-	-	-	-	-	-	1.42	3.43	0.62	1.56	1.51	0.67	0.85	0.79	0.66	0.86	1.56	<0.20	<0.20
Iron (Fe)-Dissolved	10	ug/L	--	350	--	--	16	-	-	-	65	71	<10	<10	-	-	-	-	-	-	60	146	<10	19	70	38	17	10	<10	17	22	42	42
Lead (Pb)-Dissolved	0.050	ug/L	--	--	--	--	0.589	-	-	-	0.318	0.482	<0.050	<0.050	-	-	-	-	-	-	0.344	0.800	<0.050	0.063	0.323	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lithium (Li)-Dissolved	1.0	ug/L	--	--	--	--	1.4	-	-	-	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	<1.0	<1.0	<1.0	1.1	<1.0	1.1	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
Manganese (Mn)-Dissolved	0.10	ug/L	--	--	--	--	2.90	-	-	-	35.8	65.8	2.66	1.20	-	-	-	-	-	-	125	239	17.5	49.4	79.4	1660	574	14.7	6.01	400	25.2	11.4	13.8
Mercury (Hg)-Dissolved	0.0050	ug/L	--	--	--	--	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	0.050	ug/L	--	--	--	--	0.535	-	-	-	0.826	1.20	0.678	1.20	-	-	-	-	-	-	0.744	1.25	0.444	0.938	0.796	3.32	2.55	0.823	0.568	2.83	1.14	1.09	1.09
Nickel (Ni)-Dissolved	0.50	ug/L	--	--	--	--	1.12	-	-	-	1.53	1.30	<0.50	0.65	-	-	-	-	-	-	1.44	1.23	<0.50	0.66	1.48	0.97	0.73	0.87	<0.50	0.78	0.70	<0.50	<0.50
Phosphorus (P)-Dissolved	50	µg/L	--	--	--	--	<50	-	-	-	<50	246	<50	<50	-	-	-	-	-	-	<50	237	<50	<50	<50	<50	98	97	51	<50	<50	<50	<50
Rubidium (Rb)-Dissolved	0.20	ug/L	--	--	--	--	1.48	-	-	-	1.36	0.72	0.61	0.96	-	-	-	-	-	-	1.15	0.81	0.66	0.51	1.36	2.58	2.03	0.68	0.62	2.28	0.96	0.78	0.75
Selenium (Se)-Dissolved	0.050	ug/L	--	--	--	--	0.132	-	-	-	0.192	0.329	0.162	0.293	-	-	-	-	-	-	0.206	0.426	0.075	0.338	0.178	0.136	0.196	0.129	0.107	0.134	0.326	0.276	0.307
Silicon (Si)-Dissolved	50	ug/L	--	--	--	--	5550	-	-	-	4970	4410	6310	4600	-	-	-	-	-	-	4780	3820	6210	4240	4990	8260	7030	5760	6280	8970	4640	4350	4240
Silver (Ag)-Dissolved	0.010	ug/L	--	--	--	--	<0.010	-	-	-	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	-	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Dissolved	0.20	ug/L	--	--	--	--	185	-	-	-	217	240	131	472	-	-	-	-	-	-	215	254	126	468	223	495	569	295	132	522	443	100	101
Sulfur (S)-Dissolved	500	ug/L	--	--	--	--	38800	-	-	-	16900	41500	10300	118000	-	-	-	-	-	-	18100	45600	10000	136000	18500	72300	105000	40500	10600	73100	126000	2570	2450
Tellurium (Te)-Dissolved	0.20	ug/L	--	--	--	--	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)-Dissolved	0.010	ug/L	--	--	--	--	0.017	-	-	-	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium (Th)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (Ti)-Dissolved	0.30	ug/L	--	--	--	--	<0.30	-	-	-	0.60	<0.30	<0.30	<0.30	-	-	-	-	-	-	0.51	0.31	<0.30	<0.30	0.68	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Tungsten (W)-Dissolved	0.10	ug/L	--	--	--	--	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)-Dissolved	0.010	ug/L	--	--	--	--	1.08	-	-	-	3.24	6.31	1.38	18.3	-	-	-	-	-	-	3.24	6.86	1.11	21.2	3.37	7.18	20.9	5.47	1.46	6.55	19.4	0.363	0.362
Vanadium (V)-Dissolved	0.50	ug/L	--	--	--	--	<0.50	-	-	-	<0.50	0.82	1.04	<0.50	-	-	-	-	-	-	<0.50	1.08	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	0.73	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	1.0	ug/L	--	--	--	--	135	-	-	-	13.7	42.8	9.2	20.2	-	-	-	-	-	-	10.9	37.4	5.4	7.8	11.6	36.1	35.5	22.4	7.2	19.1	12.8	2.4	2.3
Zirconium (Zr)-Dissolved	0.060	ug/L	--	--	--	--	<0.060	-	-	-	<0.20	<0.20	<0.20	<0.20	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Analytical Table Notes
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Notes:

Table 3 - Leachate and Tailings Source Monitoring Results - Landfill EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
3.36 - Concentration is greater than both background and the applicable standard.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] BC WQG Drinking Water (DW) Guideline.
[d] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.
(1) The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2) The BC CSR criteria for iron does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 32 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3) The BC CSR criteria for manganese does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 35 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.

Table 4 - Background Groundwater Quality Monitoring Results - Landfill EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
3.36 - Concentration is greater than both background and the applicable standard.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] BC WQG Drinking Water (DW) Guideline.
[d] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.
(1) The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2) The BC CSR criteria for iron does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 32 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3) The BC CSR criteria for manganese does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 35 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.

Analytical Table Notes
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Notes:

Table 5 - NCAZ Groundwater Quality Monitoring Results - Landfill EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
3.36 - Concentration is greater than both background and the applicable standard.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] BC WQG Drinking Water (DW) Guideline.
[d] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.
(1) The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2) The BC CSR criteria for iron does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 32 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3) The BC CSR criteria for manganese does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 35 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.

Table 6 - SCAZ Groundwater Quality Monitoring Results - Landfill EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
3.36 - Concentration is greater than both background and the applicable standard.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] BC WQG Drinking Water (DW) Guideline.
[d] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.
(1) The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2) The BC CSR criteria for iron does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 32 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3) The BC CSR criteria for manganese does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 35 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.

Analytical Table Notes
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Notes:

Table 7 - Residential Wells Groundwater Quality Monitoring Results - Landfill EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
< - Associated reporting limit is below detection level.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] BC WQG Drinking Water (DW) Guideline.
[d] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
[f] - Limit varies with Methyl Mercury.
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.
(1) The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2) The BC CSR criteria for iron does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 32 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3) The BC CSR criteria for manganese does not apply to the Landfill as the Landfill is not used for an industrial or commercial purpose or activity listed under footnote 35 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.

Table 8 - Groundwater Quality Monitoring Results - TSF EMP

BC CSR - British Columbia (BC) Contaminated Sites Regulation (CSR) - Schedule 3.2 - Generic Numerical Water Standards
< - Not detected at the associated reporting limit.
[a] Schedule 3.2 Column 6 Drinking Water (DW) Standard.
[b] Schedule 3.2 Column 3 Freshwater Aquatic Life (FAW) Standard.
[c] Schedule 3.2 Column 4 Irrigation (IW) Standard.
[d] Schedule 3.2 Column 5 Livestock (LW) Standard.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Standard is crop dependent
(b) - Standard varies with crop, soil drainage and MO:cu ratio
AO - Aesthetic objective.
(1) BC CSR IW Standards are only applied to TSF Downgradient Wells
(2) BC CSR LW Standards are only applied to TSF Downgradient Wells

Table 9 - Seep Water Quality Monitoring Results - Landfill EMP

BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
< - Associated reporting limit is below detection level.
3.36 - Concentration is greater than both background and the applicable standard.
[a] BC WQG Drinking Water (DW) Guideline.
[b] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
[f] - Limit varies with Methyl Mercury.
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.

Analytical Table Notes
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Notes:

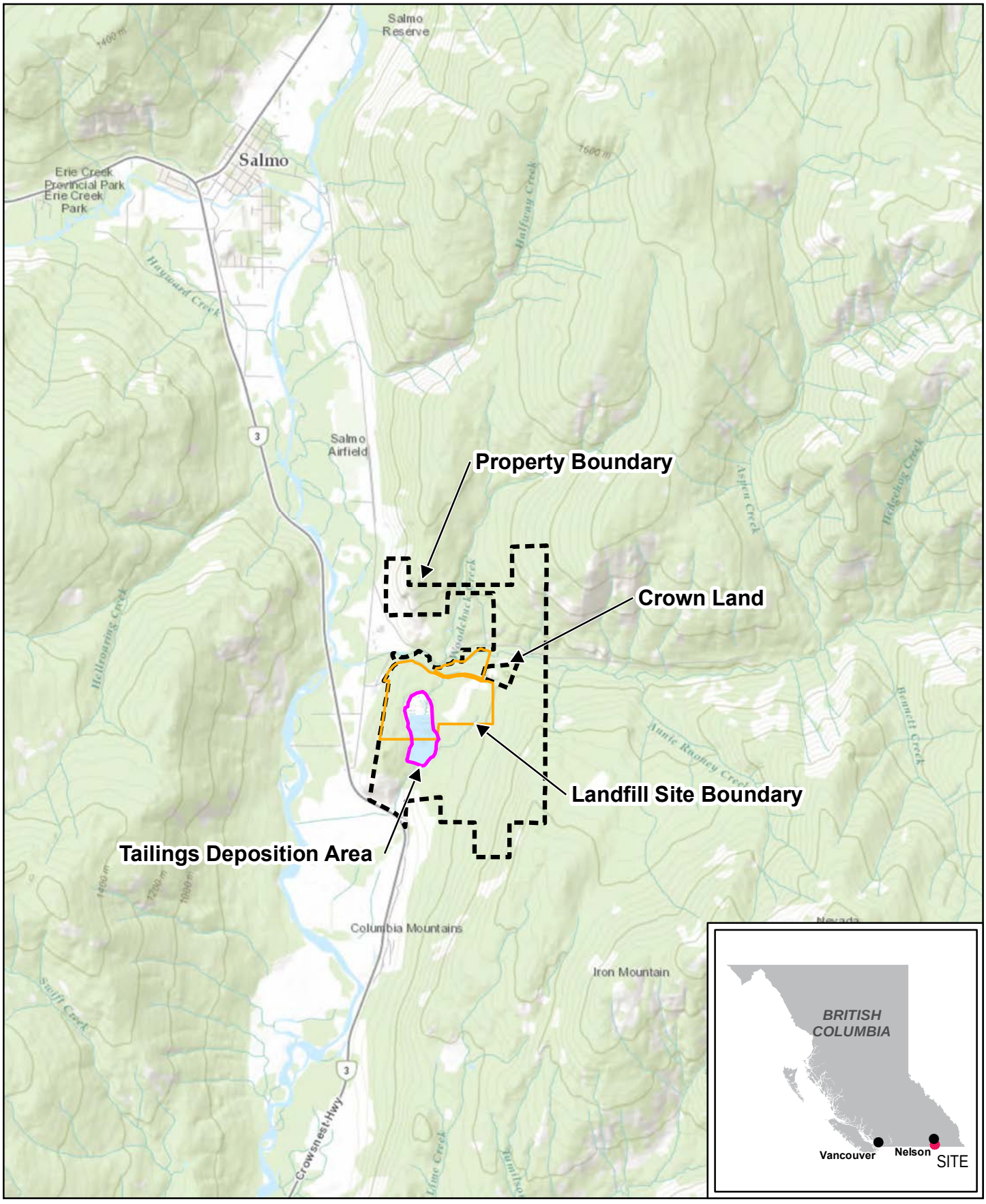
Table 10 - Sheep Creek Surface Water Quality Monitoring Results - Landfill EMP

BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
< - Associated reporting limit is below detection level.
3.36 - Concentration is greater than both background and the applicable standard.
[a] BC WQG Drinking Water (DW) Guideline.
[b] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
[f] - Limit varies with Methyl Mercury.
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
AO - Aesthetic objective.

Table 11 - Surface Water Quality Monitoring Results - TSF EMP

BC WQG - British Columbia Approved Water Quality Gudielines (ENV, August, 2019).
All BC WQGs listed are short term maximum guidelines unless otherwise indicated.
< - Not detected at the associated reporting limit.
< - Associated reporting limit is below detection level.
3.36 - Concentration is greater than both background and the applicable standard.
[a] BC WQG Drinking Water (DW) Guideline.
[b] BC WQG Freshwater Aquatic Life (FAW) Guideline.
[c] BC WQG Irrigation (IW) Guideline.
[d] BC WQG Livestock (LW) Guideline.
[a] - Limit varies with pH.
[b] - Limit varies with Hardness.
[c] - Limit varies with Chloride (mg/L).
(a) - Optimum temperature range for streams with unknown fish distribution.
(b) - Criteria for turbidity is described in the Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments Overview Report:
(c) - Criteria for TOC (FAW) is described in Ambient Water Quality Guidelines for Organic Carbon Overview Report:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/organic-carbon-or.pdf
(d) - Max of +/- 1 degree change from ambient background temperature. Hourly rate of change up to 0.5 degrees.
(e) - Crop dependent - strictest guideline applied
AO - Aesthetic objective.
(1) BC WQG IW Standards are only applied to the Outlet Ditch location
(2) BC WQG LW Standards are only applied to the Outlet Ditch location

Figures



Paper Size ANSI A

0 600 1,200 1,800

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

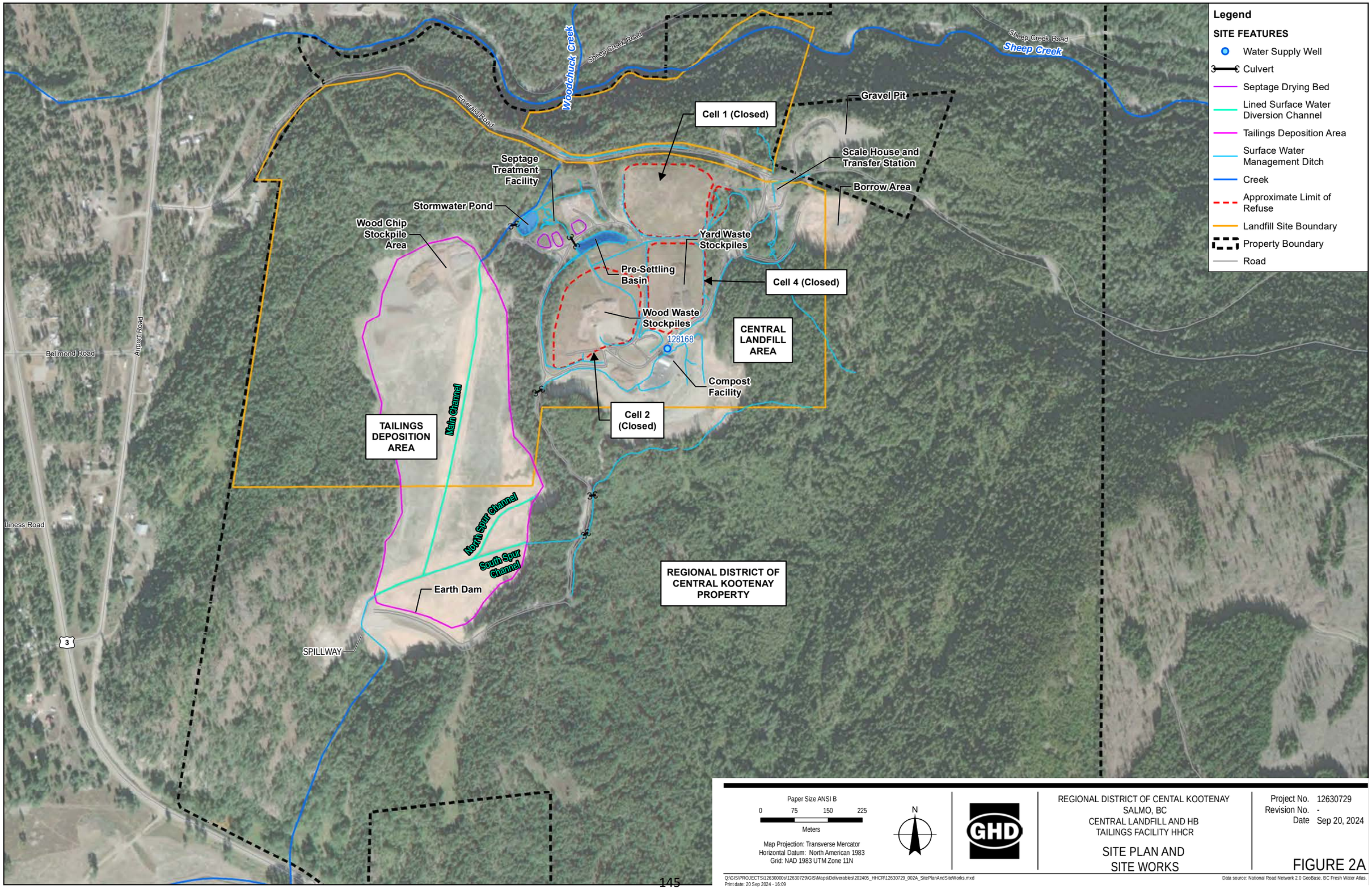
SITE LOCATION MAP

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE 1

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_001_SiteLocationMap.mxd
Print date: 20 Sep 2024 - 15:45

Data source: ESRI Topographic Basemap, Accessed 2024; ESRI Data & Maps 2008 Data Distribution Application (DDA); GHD.



Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

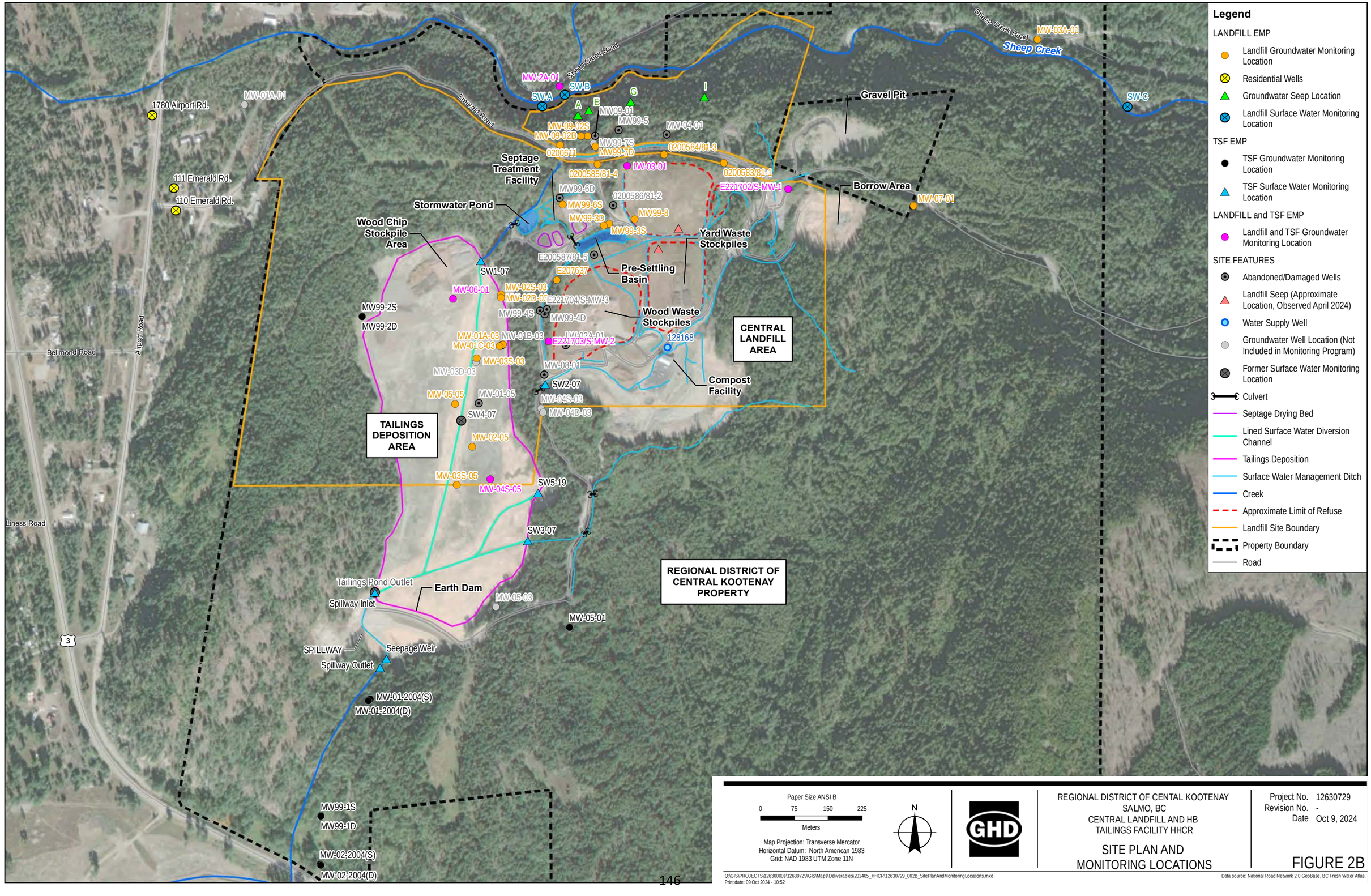
SITE PLAN AND
SITE WORKS

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE 2A

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_002A_SitePlanAndSiteWorks.mxd
Print date: 20 Sep 2024 - 16:09

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Legend

LANDFILL EMP
- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP
- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP
- Landfill and TSF Groundwater Monitoring Location

SITE FEATURES
- Abandoned/Damaged Wells
- Landfill Seep (Approximate Location, Observed April 2024)
- Water Supply Well
- Groundwater Well Location (Not Included in Monitoring Program)
- Former Surface Water Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

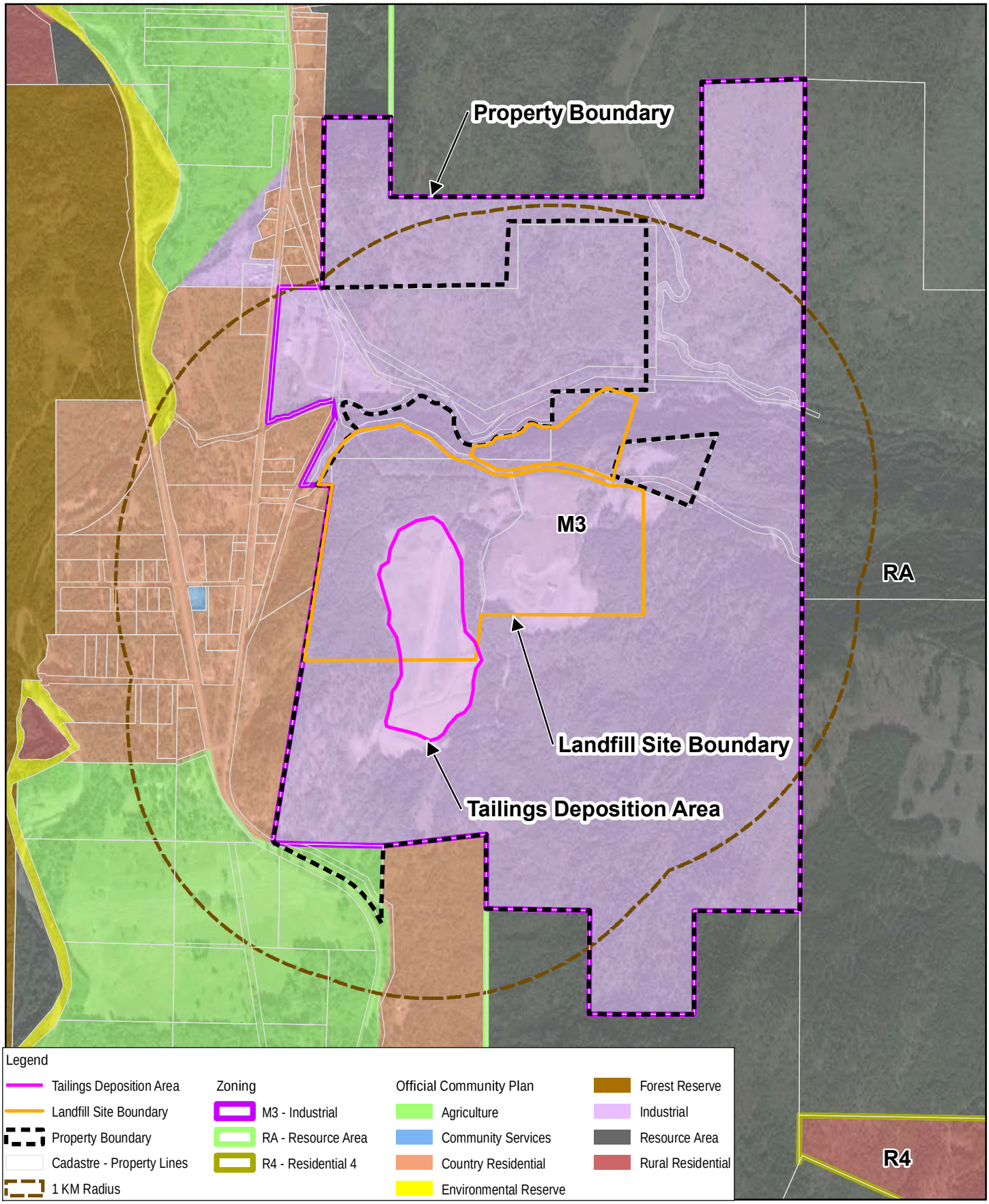
SITE PLAN AND MONITORING LOCATIONS

Project No. 12630729
Revision No. -
Date Oct 9, 2024

FIGURE 2B

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_002B_SitePlanAndMonitoringLocations.mxd
Print date: 09 Oct 2024 - 10:52

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Paper Size ANSI A

0 125 250 375 500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

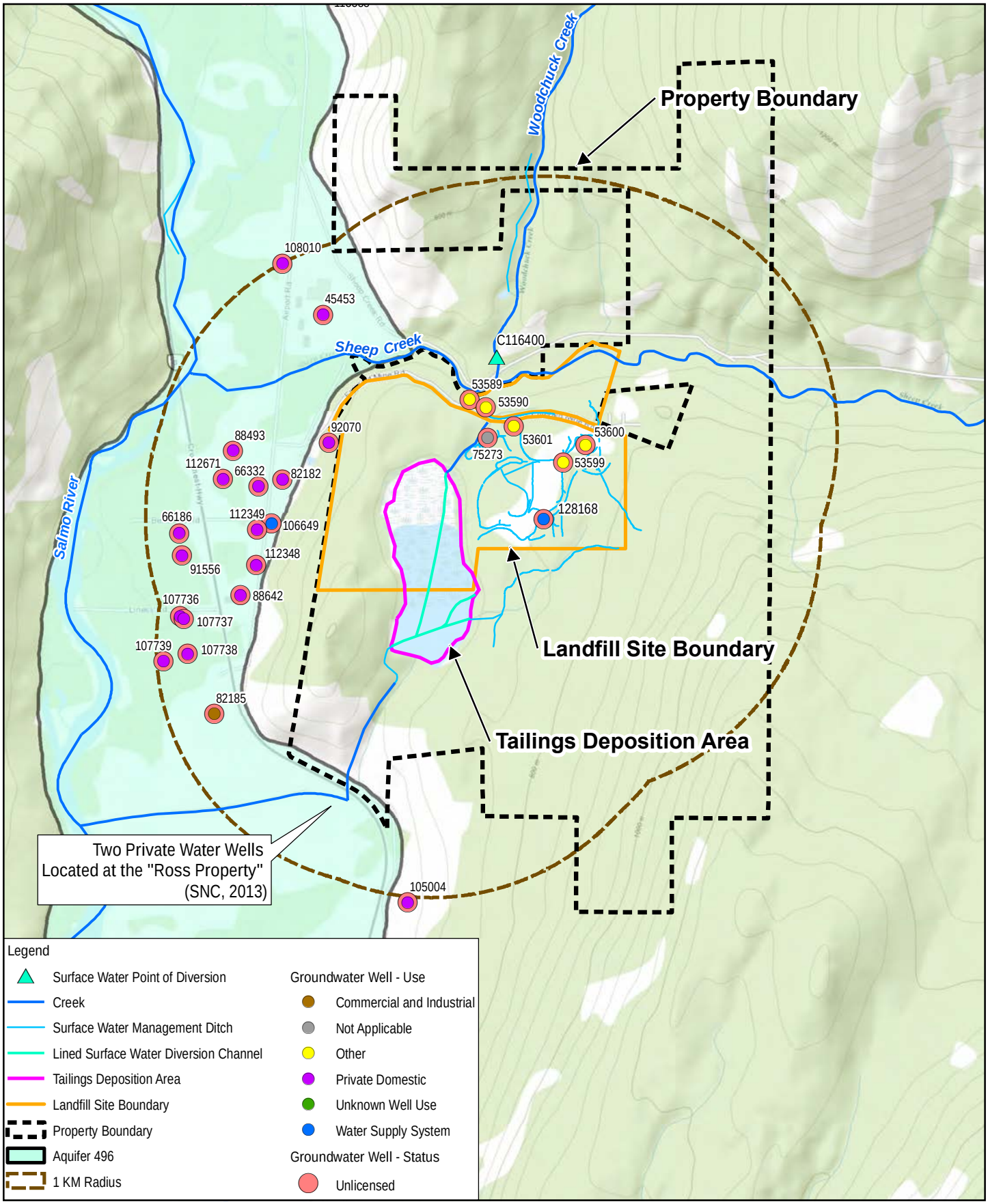
SURROUNDING LAND USE
AND ZONING MAP

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE 3

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_003_SurroundingLandUseandZoningMap.mxd
Print date: 20 Sep 2024 - 15:45

Data source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.



Paper Size ANSI A

0 130 260 390 520

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

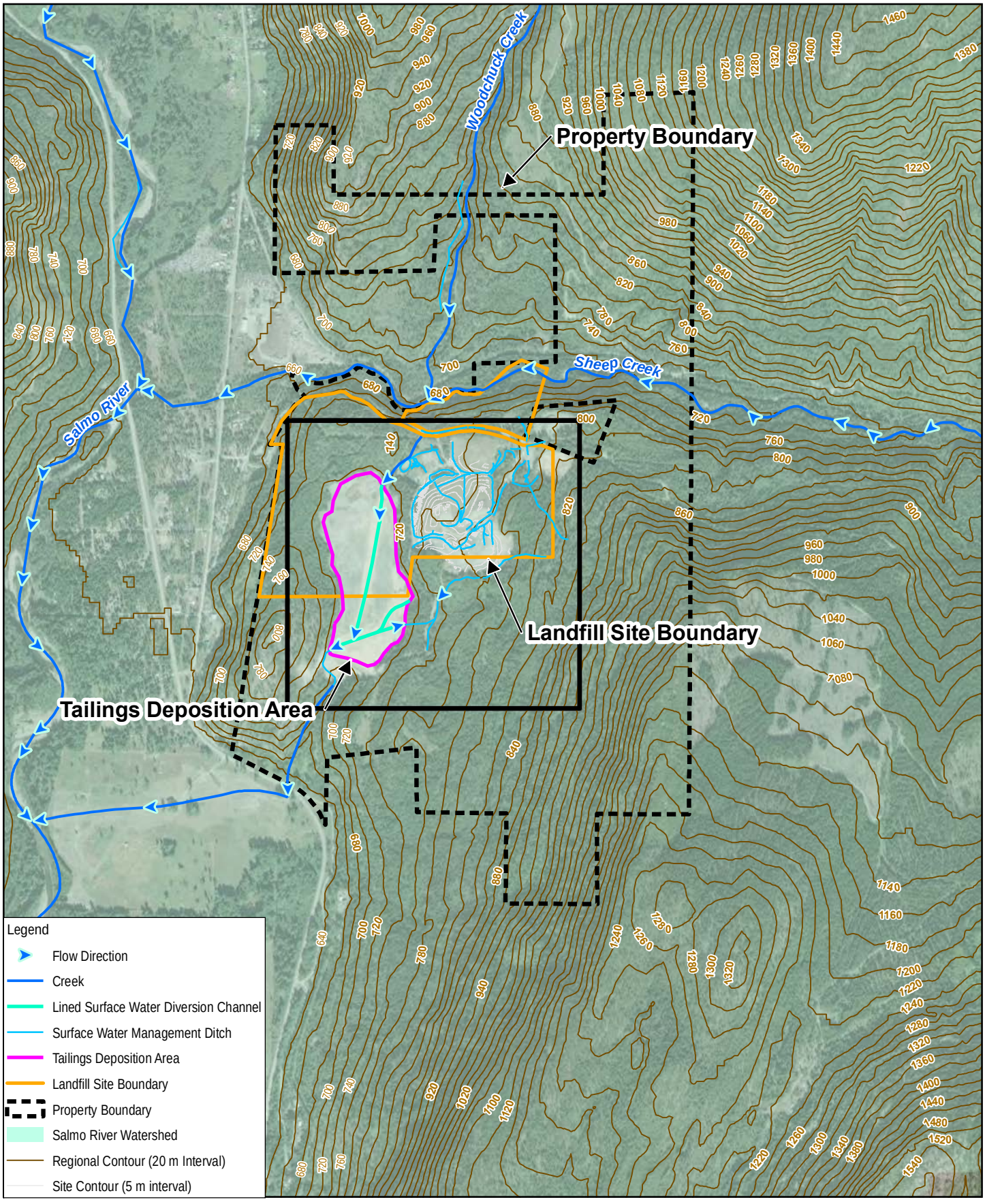
Project No. 12630729
Revision No. -
Date Sep 20, 2024

SURROUNDING WATER USE MAP

FIGURE 4

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_004_SurroundingWaterUseMap.mxd
Print date: 20 Sep 2024 - 15:52

Data source: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.



Paper Size ANSI A

0 140 280 420 560

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

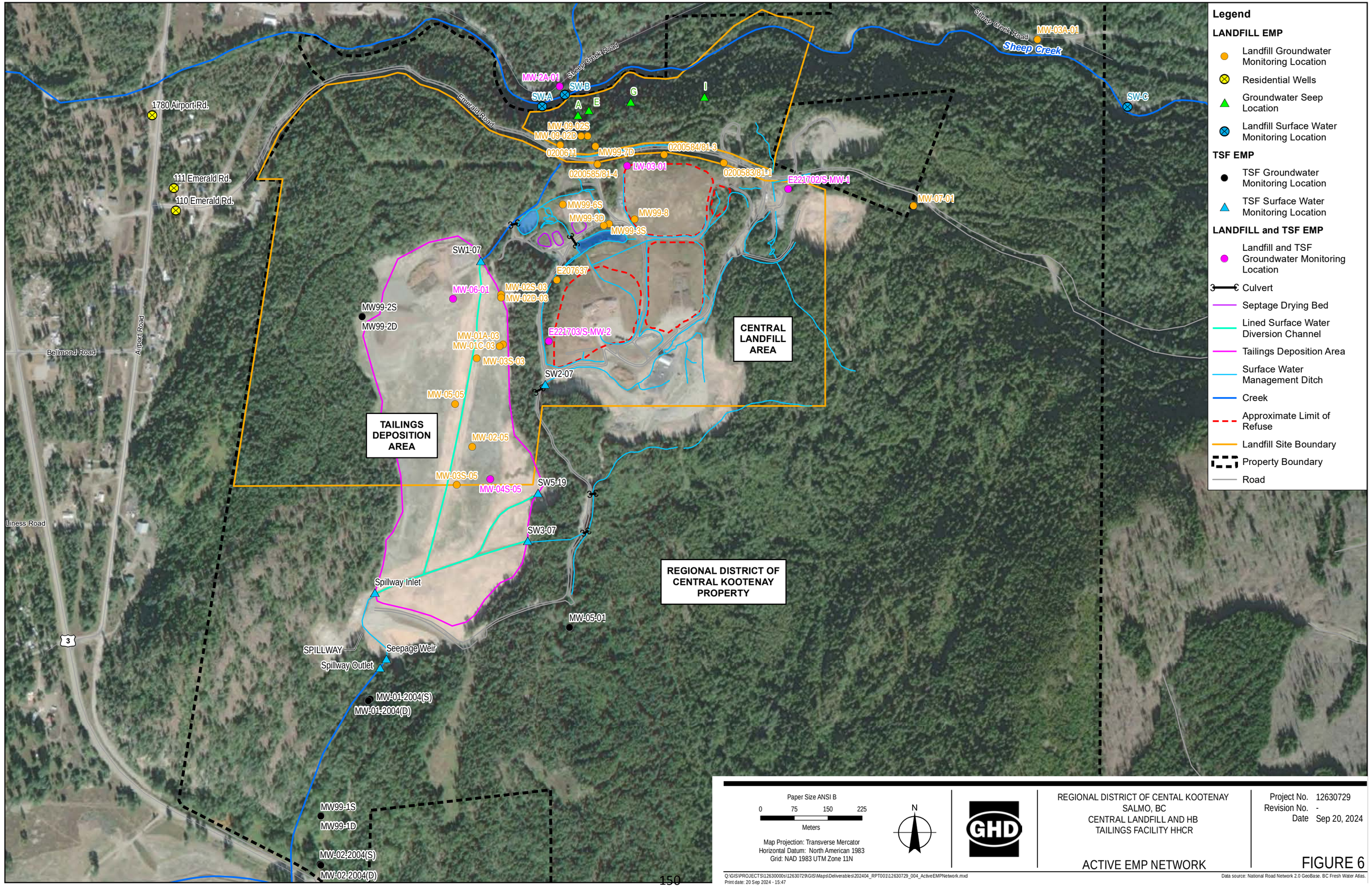
Project No. 12630729
Revision No. -
Date Sep 20, 2024

TOPOGRAPHY AND SITE DRAINAGE

FIGURE 5

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_005_TopographyANDDrainage.mxd
Print date: 20 Sep 2024 - 15:53

Data source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.



Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

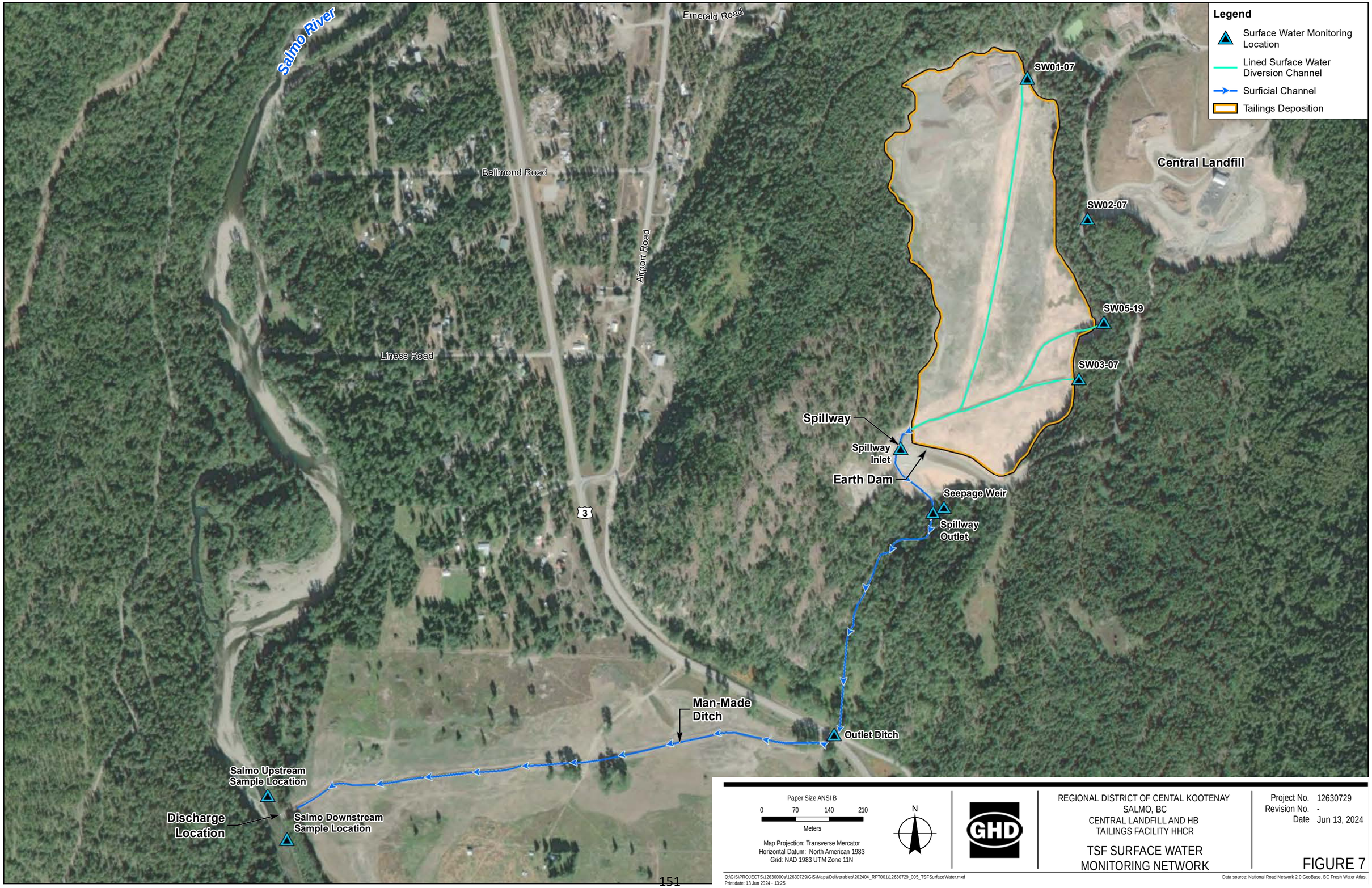
ACTIVE EMP NETWORK

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE 6

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202404_RPT001\12630729_004_ActiveEMPNetwork.mxd
Print date: 20 Sep 2024 - 15:47

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Paper Size ANSI B

0 70 140 210

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

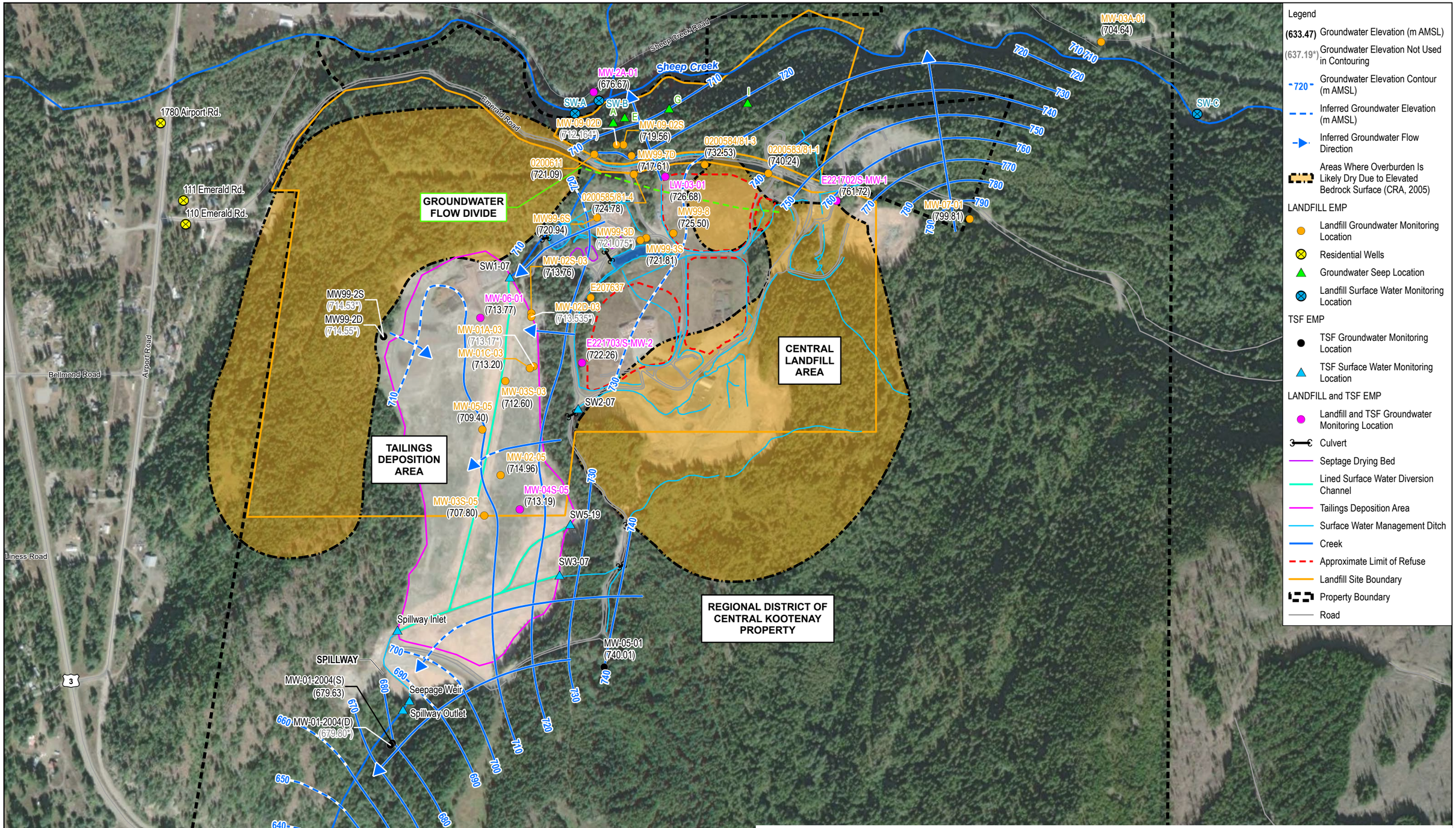
TSF SURFACE WATER MONITORING NETWORK

Project No. 12630729
Revision No. -
Date Jun 13, 2024

FIGURE 7

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202404_RPT001\12630729_005_TSFSurfaceWater.mxd
Print date: 13 Jun 2024 - 13:25

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Legend

- (633.47) Groundwater Elevation (m AMSL)
- (637.19*) Groundwater Elevation Not Used in Contouring
- 720 Groundwater Elevation Contour (m AMSL)
- Inferred Groundwater Elevation (m AMSL)
- Inferred Groundwater Flow Direction
- Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)

LANDFILL EMP

- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP

- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP

- Landfill and TSF Groundwater Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition Area
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

OVERBURDEN GROUNDWATER ELEVATION CONTOURS MAY 2023

Project No. **12630729**
Revision No. **-**
Date **Dec 18, 2024**

FIGURE 8

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_202412_HHCR\12630729_202412_HHCR.aprx
Print date: 18 Dec 2024 - 16:34

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.

Appendices

Appendix A

Site Permits

Appendix A1

Landfill OC

MINISTRY OF ENVIRONMENT

OPERATIONAL CERTIFICATE

16519

Under the Provisions of the Environmental Management Act

Regional District of Central Kootenay
Box 590
202 Lakeside Drive
Nelson, BC V1L 5R4

is authorized to manage municipal solid waste and discharge waste as specified in this authorization to the ground in accordance with the Regional District of Central Kootenay's Solid Waste Management Plan. Contravention of any of these terms and conditions is a violation of the *Environmental Management Act (EMA)* and may result in prosecution.

This Operational Certificate supersedes previous versions of Operational Certificate MR-16519, issued under Section 28, of the *Environmental Management Act (EMA)*. All ministry policies and guidelines specified in this document refer to the most current version of these policies and guidelines.

1. AUTHORIZED DISCHARGES & FACILITIES

1.1 Authorized Discharge

This section applies to the discharge of municipal solid waste to a SANITARY LANDFILL, treatment of contaminated soil at a SOIL TREATMENT AREA and discharge of septage to DRYING BEDS at a site known as the Central Landfill in Salmo, BC. The site reference number for this discharge is E211946.

1.1.1 The authorized discharge is:

a. Municipal solid waste and other waste as may be authorized by the Director in writing.

b. Septage in designated drying beds as per the Design & Operations Plan.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

For the purpose of this section "Septage" refers to typical septic tank contents.

1.1.2 All solid waste discharged to this landfill must meet the requirements of the Regional District of Central Kootenay Solid Waste Management Plan and applicable by-laws of the Regional District.

The controlled discharge of septage must occur only in beds located as specified in the Design & Operation Plan.

1.1.3 The authorized works are a sanitary landfill and Septage Drying Beds. The authorized works include berms, cover soil or cover material, surface water diversionary works and are inclusive of any related appurtenances pertaining to the works and discharges specified in this section.

The authorized works referred to in this section must be maintained and operable while municipal solid waste, contaminated soil and septage is being actively managed i.e., disposed, transferred and/or recycled at the site. Post closure requirements for the site are specified in Section 5.

The authorized works are located approximately as shown on the attached Site Plan A.

1.1.4 The legal description for the location of the point of discharge is Lot A, District Lot 1236, Sublot 36, Plan 14234, Kootenay District, PID #010-013-911, as shown on attached Site Plan A.

1.1.5 The following waste types and materials are prohibited from being landfilled:

- Hazardous Wastes other than those specifically approved for disposal to authorized landfills in the Hazardous Waste Regulation.
- Human anatomical and animal waste components of biomedical waste and the untreated non-anatomical waste component of biomedical waste. Biomedical wastes is defined in the Guidelines for the Management of Biomedical Wastes in Canada (Canadian Council of Ministers of the Environment, February 1992).

- Bulk liquids and semi-solid wastes, which contain free liquids, as determined by US EPA Method 9095A Paint Filter Liquids Test, Test Methods for Evaluating Solid Wastes -Physical/Chemical Methods (EPA Publication No. Sw-846).
- Waste oil.
- Vehicle hulks.
- Automobile batteries.
- Wastes that are specifically prohibited by applicable by-laws or waste bans of the Regional District.

1.1.6 The disposal of animal carcasses is not allowed, an exception being those of a domestic nature, the result of animal road kills or animal control activities of the Ministry of Environment's Conservation Officer Service (COS). Disposal of other animal carcasses is allowed if authorized by the Director.

Mortalities from agricultural operations may be discharged where the generator has demonstrated to the satisfaction of the Director that the carcasses cannot be disposed of in accordance with the Agricultural Waste Control Regulation under the *Environmental Management Act*.

1.1.7 The total waste discharged during any operational period of the operational site life must not exceed that calculated for the period based on the fill rate specified in the Design & Operations Plan.

1.1.8 Storage of recyclable material must be in accordance with the Design & Operations Plan and applicable regulations.

1.1.9 Composting of material from septage drying beds is permitted provided that compost is utilized onsite only.

1.1.10 Contaminated soil that contains contaminants in concentrations less than that qualifying the material hazardous waste as defined in the Hazardous Waste Regulation under the *Environmental Management Act* may be disposed at the landfill. Disposal includes but is not limited to monofilling, co-disposal with other wastes, and use as daily or intermediate cover material. The use of these soils as final cover material is prohibited if contaminants exceed commercial / industrial land use standards as specified in the Contaminated Sites Regulation under the *Environmental Management Act*.



1.1.11 The disposal of waste asbestos in compliance with the requirements of Section 40 of the Hazardous Waste Regulation under the *Environmental Management Act* is permitted. In accordance with section 40 "Management of Waste Asbestos", under part 6 "Management of Specific Hazardous Wastes" of the Hazardous Waste Regulation, the waste asbestos disposed at a landfill other than a secure landfill must be immediately covered with a minimum of 0.5 metre of cover material.

2. DESIGN & OPERATIONS PLAN

2.1 The Operational Certificate holder must ensure that a Qualified Professional prepares and maintains a Design and Operations (D & O) Plan for the landfill which is acceptable to the Director. The Plan must be reviewed at least once every five years. The Plan must address, but not be limited to, each of the subsections in the Landfill Criteria for Municipal Solid Waste including performance, siting, design, operational, closure and post-closure criteria. The facilities must be developed, operated and closed in accordance with the Plan. Should there be any inconsistency between this Operational Certificate and the Plan, this Operational Certificate must take precedence.

Written authorization from the Director must be obtained prior to implementing any changes to the approved plans. Based on any information obtained in connection with this facility, the Director may require revision of, or addition to, the design, operating and closure plans.

"As built" drawings certified correct and sealed by a Qualified Professional must be submitted electronically within 60 days of the completion of engineered construction activities required as per the Design & Operations Plan.

3. LANDFILL OPERATIONS

3.1 Inspections

3.1.1 Waste Inspections

The waste acceptance policies and procedures for the landfill must include a program to detect a prohibited waste so that it is prevented from being disposed of in a landfill cell. The Operational Certificate holder must also establish procedures for addressing such non-compliance to prevent recurrence of the same.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)



Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

3.1.2 **Inspections of Authorized Works**

The Operational Certificate holder must inspect the authorized works at least once every three months to ensure compliance with this Operational Certificate and the BC Landfill Criteria. A record of the inspections and actions recommended or action items must be maintained in the operating record at the site office and made available to the Director upon request. During such inspections, the Operational Certificate holder must also inspect the property boundaries and immediately notify the Regional Manager Environmental Protection of:

- any visual or physical evidence of concerns pertaining to the authorized works such as leachate breaks, damage to monitoring wells;
- any visual or physical evidence of concerns of potential environmental impacts including but not limited to significant litter beyond the property boundary.

3.2 **Site Access & Supervision**

Locking gates must be maintained at all access routes to the landfill site. Gates, perimeter fencing and/or barriers must be installed where necessary to prevent unauthorized access to the site by vehicles. Gates must be locked during non-operating hours. Signs onsite must be in accordance with the BC Landfill Criteria.

The Operational Certificate holder must ensure that any person(s) authorized to work within the landfill boundary and directly involved in the landfilling of waste is fully cognizant of this Operational Certificate and applicable sections of the BC Landfill Criteria for Municipal Solid Waste and must take all reasonable measures to ensure that the person(s) complies with all requirements of the same. A landfill operator that has received BC Qualified Landfill Operator training, is familiar with the requirements of the Operational Certificate and the specifications of the Design and Operations Plan, must be present at all times during operating hours. Training records for staff must be maintained and made available to the Director upon request.

3.3 **Scavenging & Salvaging**

Uncontrolled scavenging of waste is prohibited. The controlled separation of salvageable waste stream components by persons authorized by the Operational

Certificate holder is permitted in areas designated for separation and storage of these materials.

3.4 Public Health Safety & Nuisance

Operation of the landfill must be carried out in a manner that ensures that the facility does not pose a threat to public health or safety. The Operation Certificate holder must manage accumulations of litter within the site and prevent litter escaping from the fill area.

3.5 Waste Deposition, Compaction & Cover

The Operational Certificate holder must ensure that waste deposition and compaction meets or exceeds the requirements of the BC Landfill Criteria or its most current version. Control must be exercised to ensure keeping freshly deposited refuse in a well defined and small/manageable working face.

3.5.1 Daily Cover

Application of daily cover must be in accordance with requirements of the BC Landfill Criteria. Alternate Daily Cover (ADC) that is functionally equivalent to daily soil cover may be used.

3.5.2 Intermediate Cover

Application of intermediate cover must be in accordance with requirements of the BC Landfill Criteria or its most current version. The Director must be notified in writing of the use of functionally equivalent intermediate cover material.

3.5.3 Final Cover

Final cover must be installed and maintained in accordance with the requirements of the BC Landfill Criteria. Completed portions of the landfill are to progressively receive final cover during the active life of the landfill as specified in the Design & Operations Plan.

3.6 Litter, Wildlife & Vector Control

The Operational Certificate holder must ensure that vector and wildlife attractants are minimized as a result of routine landfilling operations. Such

measures include but are not limited to:

a. Application of cover material in a timely and consistent manner in compliance with the requirements of the BC Landfill Criteria.
b. Installation and maintenance of electrified wildlife control fencing where deemed necessary. The active landfill cell must be enclosed by a bear resistant electrified fence. The fence must be energized during the active bear season.
c. Ensuring that the public drop off area is used in a manner that does not contribute to wildlife attraction. This includes the timely transfer of waste from public drop off areas to the tipping face or beyond the wildlife control fence, maintaining adequate bin capacity for public drop-off and addressing improper bin usage through awareness raising measures for the public or site users.

Litter must be controlled and minimized by compacting the waste, minimizing the work face area, applying cover at the required frequencies and good housekeeping practices. A regular litter pick-up program to target windblown litter must be established as part of routine site operations. Litter prevention measures including provision of litter control fences must be under taken, if necessary. Controls must prevent the accumulation, or off-site migration, of litter in quantities that create a nuisance or cause other problems.

For the purpose of this section, a "vector" is defined as an organism or carrier capable of transmitting a pathogen from one organism to another including, but not limited to flies and other insects, rodents, and birds.

For the purpose of this section an "attractant" is defined as waste, municipal solid waste, refuse, organic matter, compost, garbage, food or food waste that attracts bears or other wildlife.

3.7 **Operations, Maintenance & Emergency Procedures Manual**

The Operational Certificate holder must prepare an Operations, Maintenance and Emergency Procedures Manual. This manual must be reviewed and kept updated to reflect current site conditions. A copy of the manual must be available at the site office and must be made available to the Director upon request.

3.8 Fire Prevention & Control

The Operational Certificate Holder must take all reasonable measures to prevent fires from occurring at the site and is responsible for complying with all local fire safety requirements. The Operational Certificate holder must provide and maintain firefighting equipment and materials as required for the site.

In the event of a landfill fire the following must be notified immediately:

- The Fire Department
- Provincial Emergency Program (PEP)
- The Regional Manager Environmental Protection

3.9 Maintenance of Works & Emergency Procedures

The Operational Certificate holder must maintain the authorized works in good working order. In the event of an emergency or condition beyond the control of the Operational Certificate holder which prevents continuing operation of the authorized works and/or the continued performance of the prescribed methods of operation, the Operational Certificate holder must immediately notify the Regional Manager Environmental Protection and take appropriate remedial action in consultation with a Qualified Professional if specified by the Director.

Any activity or construction at the disposal site must be carried out in a manner that protects the integrity of the areas under final cover and without compromising landfill stability or without damage to the authorized works and related appurtenances.

Any settlement of areas under final cover or differential settlement that prevents the authorized works and appurtenances mentioned in Section 1 from functioning as intended in the Design & Operations plan must be addressed/ remedied accordingly to the satisfaction of the Director.

All access roads, within the landfill boundary, used for transporting waste to the tipping area for disposal must be maintained as necessary to assure safe and reliable all-weather access to the tipping face.

3.10 Qualified Professionals

Information pertaining to the landfill including details of works, plans, assessments, investigations, surveys, programs and reports, must be prepared by a Qualified Professional unless specified otherwise by the Director.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)



Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

3.11 Additional Facilities or Works

The Director may require additional investigations, surveys, and the construction of additional facilities or works related to the landfill operation. The Director may also revise the requirements of any of the information required by this Operational Certificate including plans, programs, assessments and reports.

3.12 Groundwater & Surfacewater Quality Protection

The Operational Certificate holder must take appropriate measures to ensure that ground water and surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines or other appropriate criteria as may be specified by the Director at and beyond the landfill property boundary.

These measures include but are not limited to:

a. Prohibiting the discharge of municipal solid waste into water.
b. Ensuring that no new waste is landfilled within 1.2 m of the highest groundwater level.
c. Ensuring that adequate surface water and groundwater diversion works are constructed and maintained to minimize surface water run-off and groundwater seepage from entering the landfill.
d. Ensuring that the management systems for surface water that has not come in contact with waste are hydraulically separate from those for managing impacted surface water.
e. Ensuring that the landfill is operated in a manner that prevents the exceedance in surface water and groundwater, of anticipated leachate indicators or parameters distinctive of leachate or those specified by the Director at the landfill boundary.
f. Ensuring that the indicators in e) above, at specified groundwater monitoring wells within the property boundary are in accordance with those predicted by design and that suitable measures are taken to address the cause of any exceedances above the trigger levels identified in the design.
g. Ensuring that the landfill is operated in accordance with a Design & Operations Plan which specifies measures to prevent decreases in groundwater and surface water quality at and beyond the property boundary.

If exceedances to the specified water quality criteria occur at the landfill boundary as a result of landfill operations, suitable corrective measures

including but not limited to leachate management control measures or works acceptable to the Director must be undertaken.

3.13 Additional Facilities or Works

The Operational Certificate holder must ensure that operation of the landfill must not cause combustible gas concentrations to exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit at or in on-site or off-site structures.

The Operational Certificate holder must ensure that the facility is in compliance with the requirements of the *Landfill Gas Management Regulation* on or before applicable dates specified in the regulation. The requirements of the regulation and its guideline documents must be incorporated by the Operational Certificate holder into the Design and Operation Plan revisions as they come into effect and as applicable.

4. MONITORING & REPORTING REQUIREMENTS

4.1 Environmental Monitoring

4.1.1 Environmental Monitoring Program

The Operational Certificate holder must ensure that a Qualified Professional develops, maintains, conducts and reports to the Regional Manager, Environmental Protection a monitoring program to identify potential impacts to the environment and public health from the facility. The program must be designed to assess and identify:

- The design performance of the landfill including but not limited to compliance with Water Quality performance standards at the property boundary.
- Landfill leachate as a contaminant source.
- Residential well water quality.
- Surface Water Quality.

The monitoring program must address, but not be limited to relevant sections of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. The Environmental Monitoring Program must take into consideration results from previous monitoring programs and any other investigations conducted at the site to ensure that early detection of potential impacts is possible.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)



Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

The Environmental Monitoring Program must be reviewed and reported on annually. The need for subsequent increased or decreased monitoring must be assessed annually by the Operational Certificate Holder on the basis of available monitoring data. Based on the results of the monitoring program, or any other information relevant to the site, the Director may vary the frequency, location and analyses of environmental monitoring as warranted.

The Operational Certificate holder must ensure that groundwater monitoring wells and ambient locations are established and maintained to allow for uninterrupted monitoring as specified by the Environmental Monitoring Program. The location and installation of the monitoring well(s) must be specified and supervised by a Qualified Professional who is knowledgeable in the fields of Hydrogeology and Landfill Impact Assessment. The Operational Certificate holder must ensure that monitoring wells and other equipment are adequately secured and maintained, including provisions to ensure protection from damage due to weather, vehicles or vandalism. In the event of damage to the wells or monitoring equipment which could affect/compromise the integrity of monitoring data, the Operational Certificate holder must take immediate and necessary measures to ensure that conditions for uninterrupted monitoring are restored.

The Operational Certificate holder must maintain records of all monitoring program data and analyses and make these available for inspection upon request.

4.1.2 **Biological / Ecological Impact Assessment for Sheep Creek**

The Operational Certificate holder must ensure that an ecological impact assessment must be carried out on Sheep Creek by a Qualified Professional to assess the impact of groundwater discharging to the creek from the Landfill property. The ecological impact assessment must be completed during the fifth year following the last assessment. The assessment must characterize the aquatic community of Sheep Creek and determine any impact to the community by the Landfill. The Operational Certificate holder must ensure that the recommendations of the Qualified Professional arising from such an assessment must be taken into account in future reviews of the Design & Operations Plan and Environmental Monitoring Plan or changes to operational practices at the site.

4.1.3 **Field Sampling Techniques**

Sampling must be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination and breakage.

4.1.4 **Laboratory Analysis**

Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publication Centre, P. O. Box 9452, Stn. Prov. Govt. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

4.2 **Reporting**

4.2.1 **Monitoring Event Reporting**

The Operational Certificate Holder must notify the Regional Manager Environmental Protection of the completion of a monitoring event at the landfill through a memorandum within 60 days of the end of each event. The memorandum must identify exceedances to the water quality criteria for surface and ground water and observed non-compliance with operational certificate requirements.

4.2.2 **Non-Compliance Reporting**

The Operational Certificate holder must notify the Regional Manager Environmental Protection by facsimile or email of any non-compliance with the requirements of this Operational Certificate. The Operational Certificate holder must identify the non-compliance, the cause of non-compliance and any

remedial action to address the non-compliance.

4.2.3 **Five Year Report**

The Operational Certificate holder must submit to the Director a report every five years by April 30 of the respective fifth year after the last report. This report must be prepared by a qualified professional and must include but not be limited to:

a. an executive summary;
b. A current topographic map detailing airspace consumption, on-site borrow pit changes and future developments;
c. Volume and density analysis or an in-place material summary, updated estimates for the remaining capacity, site life, revised closure date for the current phase or sequence and revised closure date for the current landfill footprint;
d. An update on the financial assurance mechanism including a statement of the current dollar value of the Closure Fund and the amount earmarked for the Landfill site;
e. A detailed hydrogeological assessment of the site based on the previous five years monitoring data and other relevant information. The hydrogeological review must provide an update on the assimilative capacity of the site for contaminants of concern;
f. Any proposed changes to the Design and Operations Plan and the Environmental Monitoring Program (EMP), with rationale for the changes and any changes to the closure or post-closure plans;
g. A review of the preceding five years of operation or an operations update which summarizes landfill development work completed in the subject reporting years and work planned for the subsequent five years;
h. A summary of any new information that could affect the facilities, plans, assessments, surveys, programs and reports;
i. A statement regarding the facility's compliance with the objectives of the Regional Solid Waste Management Plan.
j. Any additional information requested by the Director.

4.2.4 **Design & Operations Plan Review**

The Design and Operations plan must be reviewed every five years throughout the operating life of the landfill and updated to include at least the next five years of landfill operations. Updated plans must be prepared by a Qualified Professional. The review must take into account the information from the hydrogeological assessment specified in Section 4.2.3e. The Regional Manager,

Environmental Protection may request additional reviews of the design based on the compliance history and design performance of the site.

4.2.4 **Annual Report**

The Operational Certificate holder must submit to the Director an Annual Report for the facility by April 30 each year. The report must include memorandum summarizing operational information and results of monitoring as per the Environmental Monitoring Program for the site. The report must include sample data sheet and the results of laboratory analysis.

This report must be prepared by a qualified professional and must include but not be limited to:

a. an executive summary
b. the type and tonnage of waste received, recycled, stored on-site and discharged/landfilled for the years reported;
c. A review of the preceding year of operation or an operations update which summarizes landfill development work completed in the subject reporting year and work planned for the subsequent year.
d. A summary of any new information that could affect the facilities, plans, assessments, surveys, programs and reports
e. An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis and include trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;
f. Significant occurrences or observations of wildlife (medium and large carnivores) at the landfill;
g. A list of training programs completed for landfill operators during the previous year;
h. Any additional information requested by the Director.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)



Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

4.2.5 **Sheep Creek Embankment Slope Stability Assessment Report**

The Operational Certificate holder must provide to the Ministry by December 31st 2012, a slope stability assessment prepared by a qualified professional identifying the factors contributing to any previous or potential slope failures at the embankment.

4.2.6 **Reporting Format & Records Retention**

All reports must be submitted, suitably formatted in both print and electronic format. The Operational Certificate Holder must maintain records of all monitoring data in perpetuity and must ensure that the results of monitoring and analysis are submitted in electronic format suitable for entry into applicable provincial databases.

5. CLOSURE & POST CLOSURE REQUIREMENTS

5.1 Closure & Post Closure Plan

A Closure Plan and Final Cover Design that meets or exceeds the requirements of the BC Landfill Criteria should be submitted to the Director at least 12 months prior to the closure of the landfill. The plan must also include a Post Closure Plan or Aftercare measures to be taken at the landfill. The post closure plan must be reviewed every five years throughout the post closure period.

Completion of closure works in accordance with the Closure Plan and Final Cover Design must be certified by a Qualified Professional within sixty days of the implementation of the Final Cover Design.

5.2 Closure Fund

The Operational Certificate holder must provide for the funding of progressive closure operations, final closure and operations beyond closure by maintaining a closure fund. The value of the closure fund must meet or exceed the estimated closure and post-closure costs as established in the approved Design and Operations Plan and updated in the annual report, plus a reasonable contingency for any remediation which may be required. Reported costs must be adjusted for inflation annually. Alternately, a closure and post-closure financial security acceptable to the Director may be built over time.

The Operational Certificate holder must determine and ensure that the closure

fund is adequate by preparing annually a financial statement of the fund which must be made available to the Director upon request. The financial statement must report the accrued capital, interest and additions to the fund for the previous year and review the sufficiency of the fund and the rate of accrual in consideration of the projected costs of closure and post-closure obligations.

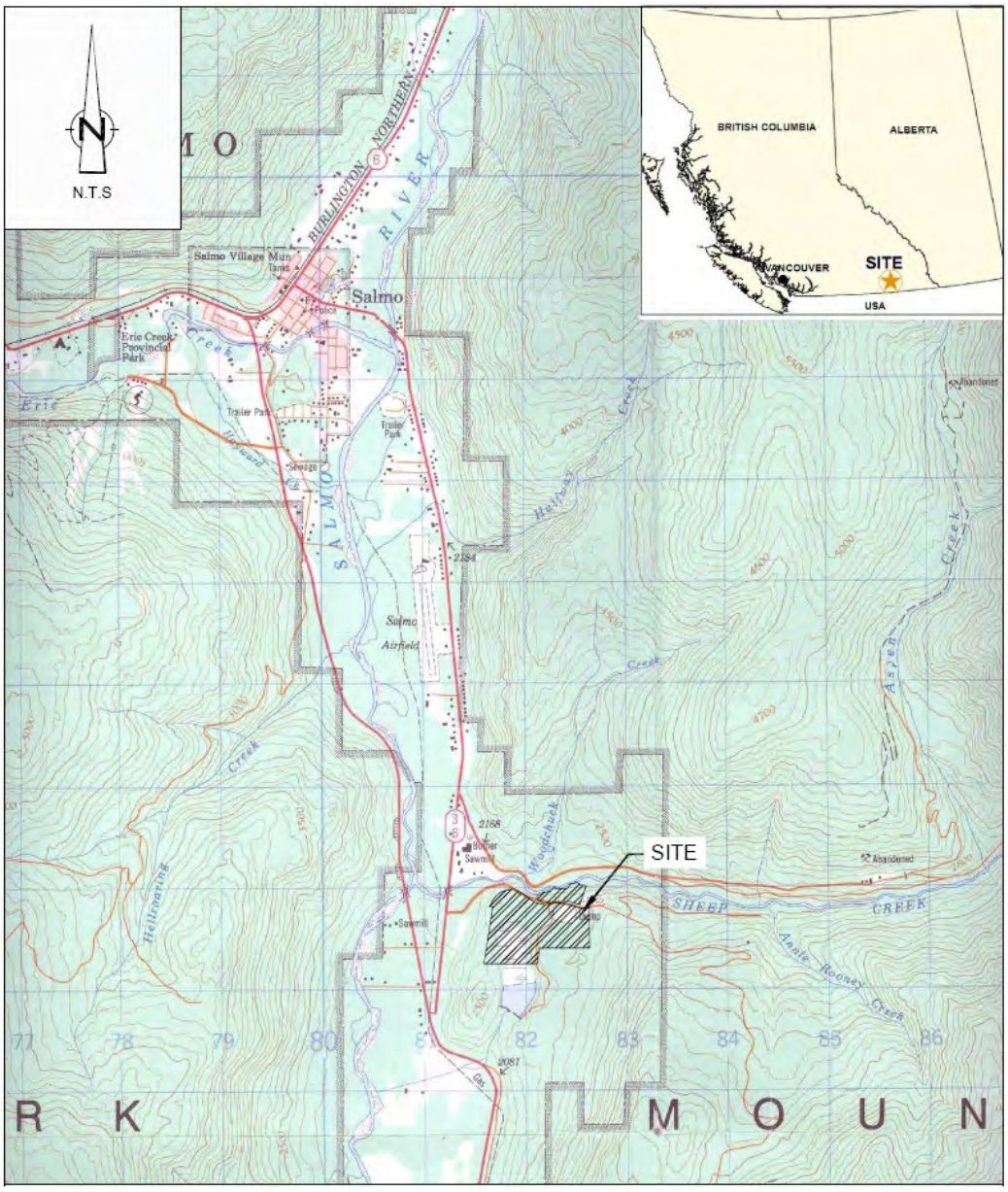
The Operations Certificate holder must take measures to ensure that the closure and post-closure funds will ultimately meet or exceed the estimated closure and post-closure costs and include a reasonable contingency for any remediation that may be required.

5.3 Site Decommissioning

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate holder must submit a site profile to the manager at least 10 days prior to decommissioning the facilities authorized in Section 1.

5.4 Declaration of Landfill

Landfills sited on titled land must register a covenant that the property was used for the purpose of waste disposal as a charge against the title to the property as provided for under Section 215.1 of the *Land Title Act*. Landfills located on crown land are to have a "notation on file" registered that the property was used for the purpose of waste disposal. The Operational Certificate holder must comply with these requirements and notify the Director as applicable.

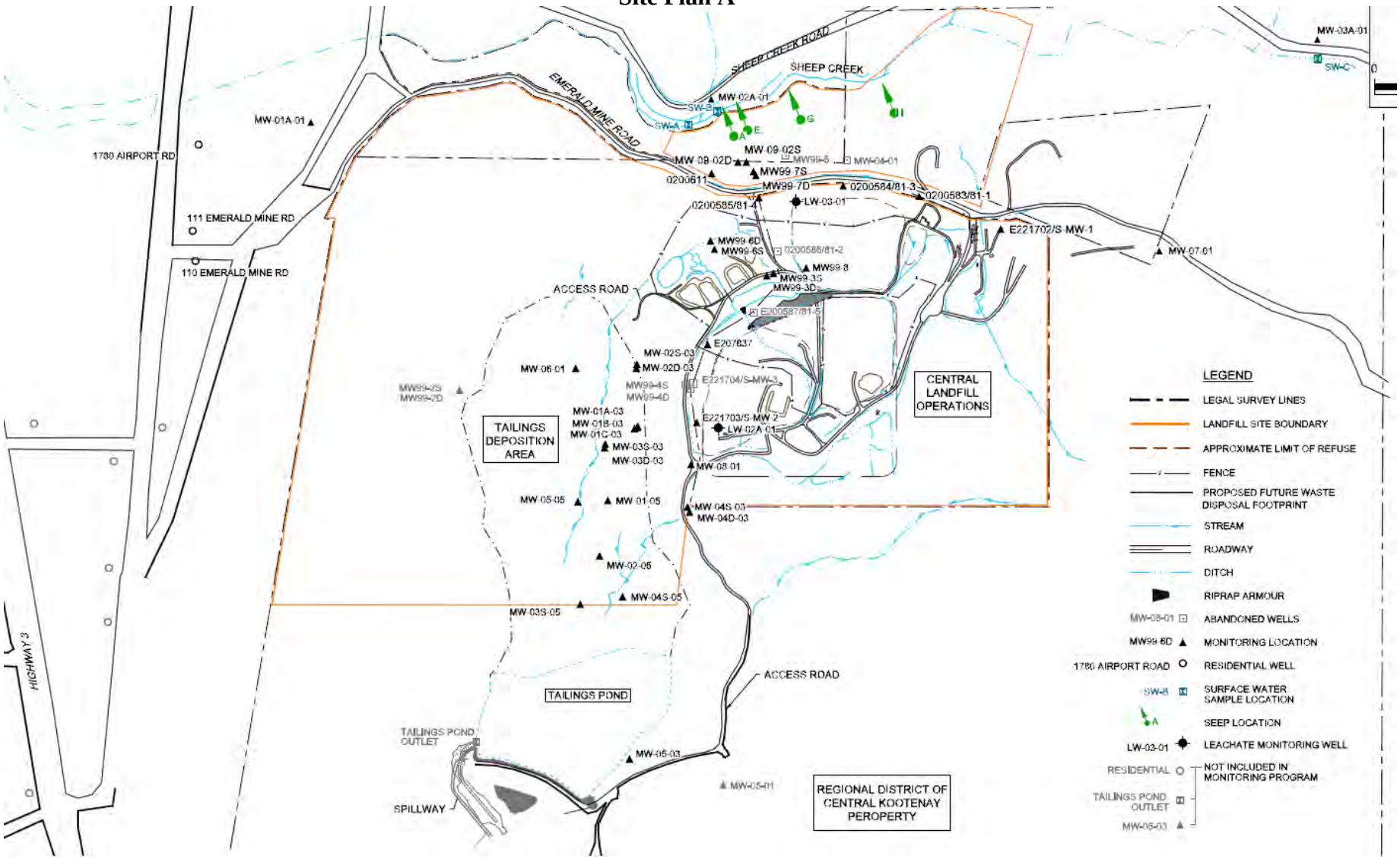


Location: Lot A, District Lot 1236, Sublot 36, Plan 14234, Kootenay District, PID #010-013-911, as shown on attached Site Plan A.

Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

Site Plan A



Date issued: November 27, 2000
Date amended: August 23, 2011
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

Appendix A2

TSF Permit

PERMIT AMENDMENT

APPROVING HB MINE TAILINGS FACILITY RECLAMATION AND CLOSURE PLAN

Permit: **M-218** Mine No: **1101163**

Issued to: **Regional District of Central Kootenay**
Box 590, 202 Lakeside Drive
Nelson, British Columbia
V1L 5R4

for work located at the:

HB Mine Tailings

Amended at Victoria, British Columbia this 18th day of May in the year 2021.

J. Lowell Constable, P.Eng.
Deputy Chief Permitting Officer
Major Mines Office

PREAMBLE

An application entitled "*HB Mine Tailings Facility Remediation and Closure Plan*" prepared by the Regional District of Central Kootenay (RDCK) (Document 1) was filed with the Chief Permitting Officer on July 22, 2019, in accordance with Section 10(6) of the *Mines Act* and forms the application permitted under this *Mines Act* M-218 permit amendment. The version of Document 1 approved by this permit is dated August 2020.

Additional documents were submitted to the Chief Permitting Officer, and also form part of the application, including:

- Memo entitled "*HB Dam Stability Analysis Update*" dated January 9, 2020, prepared by SRK Consulting (Canada) Inc. (Document 2)
- Memo entitled "*Response to Geotechnical Review of HB Dam Stability Analysis Update (ISSUE ID's 139 to 148, 40, 52, 54, and 55)*" dated February 24, 2020, prepared by SRK Consulting (Canada) Inc. (Document 3)
- Memo entitled "*Issue ID #131 ITRB Comments and Recommendations*" dated December 13, 2019, prepared by SRK Consulting (Canada) Inc. (Document 4)
- Letter entitled "*Issue ID #37 – Detailed Engineering Design*" dated December 13, 2019, prepared by SRK Consulting (Canada) Inc. (Document 5)
- Report entitled "*Technical Specifications – HB Mine Tailings Facility Closure and Remediation – Revision 01*" dated October 2019, prepared by SRK Consulting (Canada) Inc. (Document 6)
- Drawings 1 and 2 entitled "*Surface Water and Groundwater Monitoring Locations*" and "*Metals Uptake, Re-Vegetation and Wildlife Monitoring Locations*", respectively, dated February 28, 2020, prepared by SLR Consulting (Canada) Ltd. (Document 7)
- Report entitled "*HB Mine Tailings Facility – 2016 Tailings Characterization Factual Report*" dated May 2017, prepared by SRK Consulting (Canada) Inc. (Document 8)

This permit contains the requirements of the Ministry of Energy, Mines and Low Carbon Innovation. It is also compatible, to the extent possible, with the requirements of other provincial ministries. However, nothing in this permit limits the authority of other provincial ministries to set other condition, or to act independently, under their respective permits and legislation.

The mine is located within the consultative territory of the Ktunaxa National Council, Shuswap Indian Band, Okanogan Indian Band, Okanogan National Alliance, Lower Similkameen Indian Band, Penticton Indian Band and Upper Nicola Indian Band.

TABLE OF CONTENTS

PREAMBLE **2**
CONDITIONS **4**
A. General **4**
1. Compliance with *Mines Act* and Code 4
2. Departure from Approval 4
3. Permit Approval 4
4. Permit 4
5. Maintenance of Mine 4
6. Sign-off by a Qualified Professional 4
7. First Nations Information Sharing 5
8. Compliance Status Report 5
B. Geotechnical **5**
1. General 5
2. Tailings Storage Facility 6
3. Soil, Overburden and Rock Ore Stockpiles 6
4. Borrow Pits and Quarry Excavations 6
C. Protection of Land and Watercourses **7**
1. Environmental Management System 7
2. Environmental Site Management 7
3. Metal Leaching (ML) and Acid Rock Drainage (ARD) 7
4. Surface and Ground Water Management and Monitoring 9
5. Tailings Geochemistry Monitoring and Assessment 9
6. Model Validation and Updated Water Quality Predictions 10
7. Construction Environmental Management 10
8. Erosion and Sediment Control 10
9. Soil Salvage and Stockpiling 11
10. Vegetation Management 11
11. Wildlife Protection 12
12. Archaeological Resources 12
13. Ongoing Reclamation Research 12
D. Reclamation and Closure Program **13**
1. Reclamation Security 13
2. Land Use 14
3. Erosion Control 14
4. Re-vegetation 14
5. Growth Medium 14
6. Surface Water Management Ponds and Channels 14
7. Mine Roads 15
8. Reclamation Program and Closure Plan Update 15
Figure 1 – Permitted Mine Area **17**

CONDITIONS

The Chief Permitting Officer hereby approves the application subject to compliance with the following conditions:

A. General

1. Compliance with *Mines Act* and Code

The Permittee shall ensure that all work is in compliance with all sections and parts of the *Mines Act* and the Health, Safety and Reclamation Code for Mines in B.C. (Code), and the Permittee shall obey all orders issued by the Chief Inspector of Mines (Chief Inspector) or the Chief Inspector's delegate.

2. Departure from Approval

The Permittee shall notify the Chief Permitting Officer in writing of any intention to depart from the Mine Plan and Reclamation Program approved under this *Mines Act* permit (M-218) to any substantial degree, and shall not proceed to implement the proposed changes without the written authorization of the Chief Inspector.

3. Permit Approval

The Permittee is authorized under this permit (M-218) for development and works outlined in Document 1, within the area encompassing approximately 62.6 Ha (Figure 1 – Permitted Mine Area), including a management buffer around the approved disturbance area. This permit does not approve borrow sources located outside of the Permitted Mine Area.

4. Permit

This Permit is non-transferable of assignable.

5. Maintenance of Mine

The Permittee shall maintain mine facilities and infrastructure in a manner to meet design objectives, environmental protection requirements and reclamation requirements.

6. Sign-off by a Qualified Professional

Unless otherwise approved in writing by the Chief Inspector, the Permittee shall ensure that all reports required to be submitted under this permit are signed by a qualified professional with applicable experience and registered in the province of British Columbia.

7. First Nations Information Sharing

Unless otherwise requested by the Chief Inspector, the Permittee shall provide to the Ktunaxa National Council, Shuswap Indian Band, Okanogan Indian Band, Okanogan National Alliance, Lower Similkameen Indian Band, Penticton Indian Band and Upper Nicola Indian Band all material reports and plans required to be submitted under this permit, including annual monitoring reports.

8. Compliance Status Report

The Permittee shall track compliance status of all permit conditions and inspection orders in a form acceptable to the Chief Inspector. The Permittee shall maintain an up-to-date tracking table. The Permittee shall ensure that the tracking table is available at the mine site at all times and to a Mines Inspector upon request. The Permittee shall prepare and submit an annual Compliance Status report to the Chief Inspector by March 31st and shall include a summary of outstanding non-compliance issues and an action plan, to the satisfaction of the Chief Inspector, for achieving compliance.

B. Geotechnical

1. General

(a) The Permittee shall ensure that all geotechnical designs, specification, work plans, monitoring requirements and reports required to be prepared under section (B) are completed to the satisfaction of the Chief Inspector, are maintained on site during construction and are made available to any Inspector of Mines, upon request.

(b) The Permittee shall ensure construction is completed under the supervision of a Professional Engineer and that sufficient field reviews have been conducted to ensure that all facilities are built in general conformance of the design, accepted engineering practices, and the Code.

(c) The Permittee shall ensure recommendations by a Professional Engineer, relating to health and safety, geotechnical stability or environmental protection are followed, unless a suitable alternative course of action is approved in writing by a Professional Engineer.

(d) The Permittee shall submit an Advice of Geotechnical Incident form to the Chief Inspector for any geotechnical incident that is classified as a dangerous occurrence or any other incident as described in the current EMPR Advice of Geotechnical Incident form.

2. Tailings Storage Facility

(a) The Permittee shall ensure that the Tailings Storage Facility (TSF) Operations, Maintenance and Surveillance (OMS) manual includes quantitative performance objectives (QPOs) and Trigger-Action Response Plans (TARPs). The Permittee shall ensure that QPOs and TARPs are developed in consultation with the Engineer of Record.

(b) The Permittee shall ensure that a minimum freeboard in the TSF is defined by the Engineer of Record and included in the QPOs.

(c) The Permittee shall prepare and implement a Safe Work Procedure (SWP) for all work conducted on or around the tailings surface including, but not limited to, upstream riprap excavation, fill placement and liner installation. The Permittee shall ensure the SWP is developed in consultation with the TSF Engineer of Record and is submitted to the Chief Inspector at least 30 days prior to start of construction.

(d) The Permittee shall ensure a TSF construction monitoring plan is prepared by the Engineer of Record, is implemented, and is submitted to the Chief Inspector at least 30 days prior to commencing construction activities at the TSF. The Permittee shall ensure that the TSF construction monitoring plan includes, but is not limited to, monitoring frequencies and thresholds to be implemented during the following works:

(i) Foundation preparation;
(ii) Upstream riprap excavation;
(iii) Fill placement;
(iv) Liner installation; and
(v) Spillway construction.

3. Soil, Overburden and Rock Ore Stockpiles

The Permittee shall ensure that all soil, overburden and rock stockpiles are constructed in accordance with designs prepared by a Professional Engineer and are constructed and inspected to ensure stability and erosion control is maintained, unless exempt in writing from the Chief Inspector.

4. Borrow Pits and Quarry Excavations

The Permittee shall ensure that all borrow pits and quarry excavations are constructed in accordance with designs prepared by a Professional Engineer, and are constructed and inspected to ensure stability and erosion control is maintained.

C. Protection of Land and Watercourses

1. Environmental Management System

(a) The Permittee shall develop and implement an Environmental Management System (EMS) consisting of Environmental Management Plans (EMPs) and Standard Operating Procedures (SOPs). The Permittee shall ensure the EMS references relevant policies and establishes proactive procedures to provide direction for effective operational management and monitoring on-site. The Permittee shall submit the EMS and plans by May 31, 2021, to the satisfaction of the Chief Inspector.

(b) The Permittee shall ensure the EMS is reviewed annually, revised as soon and as often as required, and made available at the mine site at all times and to an Inspector of Mines upon request. The findings of the annual review of the EMS shall be reported in the Annual Reclamation Report.

(c) The Permittee shall ensure that mine site employees and contractors are knowledgeable and accountable to act consistently with the requirements of the EMPs and SOPs that form the EMS.

2. Environmental Site Management

The Permittee shall ensure that a qualified Environmental Site Manager is assigned. The Environmental Site Manager shall have the authority to implement remedial actions as may be necessary to ensure maintenance of environmental standards and permit requirements. If suspension of construction or operations occurs due to environmental concerns, the Permittee shall immediately notify the Chief Inspector.

3. Metal Leaching (ML) and Acid Rock Drainage (ARD)

(a) General

(i) The Permittee shall ensure that all materials with the potential to generate ML/ARD are placed in a manner that minimizes the production and release of metals and contaminants to levels that are protective of environmental quality.

(ii) The Permittee shall ensure that, unless otherwise approved, all plans for the prediction, prevention, mitigation and management of metal leaching and acid rock drainage are prepared in accordance with the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (1998).

(iii) The Permittee shall not make changes to the criteria for ML/ARD definition in C.3(b), waste handling procedures, mitigation strategies, or the materials monitoring program without the written approval of the Chief Inspector.

(iv) Concurrent with remediation and closure activities, the Permittee shall characterize excavated materials to determine ML/ARD generating potential, validate pre-construction predictions, guide material management decisions and confirm effectiveness of material handling procedures.

(v) The Permittee shall maintain an inventory of rock and overburden material, including information on composition, volume, source, history of excavation and geochemical monitoring data.

(vi) The Permittee shall not use PAG materials for construction purposes.

(vii) The Permittee shall ensure that no PAG rock is stored on surface after December 31, 2021.

(b) Definition of Potentially ARD Generating (PAG) and Metal Leaching (ML) Materials

(i) Tailings, overburden and construction materials are defined as PAG if NP/AP is < 2:1, where acid potential (AP) is calculated using total sulphur and neutralization potential (NP) is determined by the modified Sobek NP method.

(ii) Tailings, overburden and construction materials containing soluble metal concentrations (as determined by shake flask extraction) higher than the receiving water objectives are defined as having a potential for metal leaching.

(c) Analytical Requirements

The Permittee shall ensure that all water quality and solid material samples are analyzed by a certified off-site laboratory.

(d) ML/ARD Reporting

The Permittee shall ensure results of the ML/ARD analytical testwork be reported and assessed in the Annual Reclamation Report and any significant changes or trends shall be discussed, and implications for materials handling shall be identified.

4. Surface and Ground Water Management and Monitoring

(a) The Permittee shall develop and submit a Water Management and Monitoring Plan by May 31, 2021 to the satisfaction of the Chief Inspector. The Permittee shall ensure the plan includes, but is not limited to, surface water, tailings porewater, seepage, and groundwater quality and quantity monitoring locations, frequencies and parameters. The Permittee shall ensure that an effective QA/QC program for the surface water, groundwater and seepage monitoring programs is included and implemented.

(b) The Permittee shall ensure that water quality monitoring results, including interpretation of results, are reported and assessed in the Annual Reclamation Report. The Permittee shall ensure that any significant changes or trends in water quality or quantity are discussed, and those that require additional evaluation and management are identified in the report.

(c) The Permittee shall include a comparison of water quality monitoring results to source term concentrations in the Annual Reclamation Report. The Permittee shall ensure that the implications of the results to source term refinement, water quality mitigation, source control and adaptive management are discussed in the report.

5. Tailings Geochemistry Monitoring and Assessment

(a) The Permittee shall develop and implement a Tailings Geochemistry Monitoring and Assessment Report, and shall submit to the Chief Inspector by March 31, 2024. The Permittee shall ensure that the report includes, but is not limited to, the following:

(i) A summary of pre-covered and post-covered tailings porewater quality, and unsaturated zone monitoring results;

(ii) A post-covered tailings sampling and characterization program, which includes total solid-phase concentrations, bulk mineralogy and the presence of authigenic phases;

(iii) Comparisons of pre-covered and post-covered tailings porewater, solid-phase composition, and geochemical modelling results;

(iv) An updated assessment of the long-term geochemical stability of the tailings; and

(v) A schedule for reporting subsequent tailings geochemistry monitoring and assessment results.

6. Model Validation and Updated Water Quality Predictions

(a) The Permittee shall track water quality and flow monitoring data to enable updating and refinement of water quality predictions based on site-specific monitoring and cover performance information.

(b) The Permittee shall submit to the Chief Inspector by October 31, 2025, for review and approval, an updated Water Quality Prediction Model. The Permittee shall ensure that the updated model incorporates updated groundwater modelling, the mine water balance, and the results of the tailings geochemical assessment. In addition, the Permittee shall clearly describe all changes that are applied to the updated model.

(c) The Permittee shall update the water quality model every five years, beginning October 31, 2025, as part of the Reclamation and Closure Plan update, or more frequently as necessary to inform reclamation and closure planning and mitigation design and engineering.

7. Construction Environmental Management

The Permittee shall implement the Construction Environmental Management Plan (CEMP) (Document 1). The Permittee shall ensure that construction activities are overseen by a qualified and trained construction environmental monitor on site. The construction environmental monitor shall have the authority to implement remedial actions as may be necessary to ensure maintenance of environmental standards and permit requirements. If the environmental monitor suspends works for any reason, the Permittee shall ensure that the Chief Inspector is notified.

8. Erosion and Sediment Control

(a) During the construction period, the Permittee shall ensure inspections are conducted daily during rain events and the snowmelt period on the mine site. The Permittee shall implement immediate remedial action where excessive sediment-laden runoff is observed.

(b) The Permittee shall appropriately characterize any significant releases of sediment-laden water from the mine boundary, defined as an unauthorized discharge to the receiving environment, with respect to extent and loading, and report the occurrence to the Chief Inspector with recommendations for improvement to the water management system, if required.

(c) The Permittee shall ensure the characterization of unauthorized discharges of sediment-laden runoff includes, at a minimum, flow, total suspended solids, turbidity, pH, conductivity, temperature, dissolved oxygen, and total and dissolved metals, of both the effluent and the receiving water.

9. Soil Salvage and Stockpiling

(a) The Permittee shall salvage and stockpile topsoil, overburden, and organic material including large woody debris for use in reclamation.

(b) The Permittee shall ensure that a qualified professional monitor directs soil sampling, salvage, segregation, and stockpiling activities on-site.

(c) The Permittee shall ensure that materials salvaged for use in reclamation are segregated based on salvage origin and measured suitability for reclamation purposes. Prior to mixing with other sources and/or applying on-site, the Permittee shall characterize and evaluate the suitability for reclamation any materials with the potential to be contaminated.

(d) The Permittee shall maintain an inventory of stockpiles of salvaged soil, overburden and organic matter including large woody debris specifying the locations, origins, and quantities of material. The Permittee shall report this information in the Annual Reclamation Report.

(e) The Permittee shall protect stockpiles from erosion, degradation, and contamination through revegetation and/or other practices.

(f) The Permittee shall ensure that stockpiles are clearly marked to ensure that they are protected during construction and mine operations.

(g) The Permittee shall not use soil suitable for use in reclamation as fill.

10. Vegetation Management

(a) The Permittee shall limit disturbance to vegetation to those areas approved by this permit.

(b) The Permittee shall manage and control weeds that establish on the site and shall ensure that weeds do not migrate from the site to adjacent areas. The Permittee shall consider using non-toxic means for weed control. The Permittee shall ensure that all seed used on-site is certified weed free.

11. Wildlife Protection

(a) Pursuant to Part 1.6.9 of the Code, the Permittee shall incorporate in the mine safety program, a no hunting and shooting policy for the mine permit area (Figure 1).

(b) The Permittee shall implement a policy of no fishing and hunting for all employees and contractors while on company business or while commuting to and from the mine.

12. Archaeological Resources

(a) Prior to beginning any mechanized surface disturbance on undisturbed lands, the Permittee shall conduct field surveys consistent with archaeological and cultural heritage resources management procedures consistent with the provisions of the BC Heritage Conservation Act.

(b) For those sites that cannot be avoided, the Permittee shall contact the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development and make arrangements to scientifically excavate and record findings.

13. Ongoing Reclamation Research

(a) The Permittee shall submit to the Chief Inspector by March 31, 2022, a Reclamation Research Program that includes details for achieving the research requirements outlined in this permit with a schedule for implementation and a description for how results will be utilized and reported. The Permittee shall ensure that the Reclamation Research Program includes a TSF cover performance assessment for achieving the end land use objective.

(b) The Permittee shall ensure a detailed summary of all research being conducted under this section is provided in the Annual Reclamation Report, including description of research activities, results, and outcomes.

(c) The Permittee shall conduct research to determine the viability of revegetation with native plant species, including culturally important species. This includes vegetation metal uptake studies to determine if allowing woody vegetation to establish is an acceptable risk.

(d) The Permittee shall establish test plots that will be used to evaluate the reclamation approaches and prescriptions applied to confirm that ecological trajectories consistent with the land use and capability targets are being achieved.

(e) The Permittee shall develop and implement a monitoring program designed to evaluate the success of revegetation, habitat restoration, soil development and erosion control. The Permittee shall include in this program ecosystem-specific sampling parameters and performance criteria.

(f) The Permittee shall develop and implement a monitoring program for evaluating metal uptake in exposed terrestrial and aquatic ecosystems, which specifies sampling requirements and performance criteria. Where harmful levels are found, the Permittee shall take any corrective action necessary to mitigate to ensure levels are safe for plant and animal life.

D. Reclamation and Closure Program

1. Reclamation Security

(a) The Permittee shall cause to be deposited with the Minister of Finance security in the amount of Two Million Seven Hundred Sixty Nine Thousand Four Hundred Seventy Nine ($2,769,479.00) dollars. The security shall be posted in accordance with the schedule shown below. The security will be held by the Minister of Finance for the proper performance of the approved program and all conditions of the M-218 permit in a manner satisfactory to the Chief Permitting Officer.

Date	Amount
December 31, 2025	$2,769,000.00

(b) The Permittee shall submit to the Chief Permitting Officer a report outlining compliance with the schedule of Post-Closure monitoring identified in Document 1 (Appendix K) by March 31, 2025, to the satisfaction of the Chief Permitting Officer. The Permittee shall ensure the report includes the following Post-Closure monitoring:

(i) Annual groundwater and surface water quality monitoring
(ii) Annual geotechnical monitoring
(iii) Minimum of one Dam Safety Review
(iv) Minimum of three years of revegetation monitoring

(c) Following the submission of the report required in condition D.1(b), with the approval of the Chief Permitting Officer in writing, the Permittee will not be required to post the security required in condition D.1(a).

(d) Notwithstanding the security posted as a condition of this Permit, the Permittee remains responsible for covering all closure and reclamation costs associated with reclamation and environmental protection.

2. Land Use

(a) The Permittee shall ensure that the land surface is reclaimed with the intent of re-establishing average pre-mining capability to the end land use objectives of Wildlife Habitat and Industrial.

(b) The Permittee shall ensure that borrow pits and quarries are reclaimed to the approved end land use once no longer required.

3. Erosion Control

The Permittee shall achieve reduction of erosion through landform configuration, development of maintenance-free vegetation covers, and the development of stable, self-sustaining drainage control features and watercourses.

4. Re-vegetation

The Permittee shall ensure the land is revegetated to a self-sustaining state using appropriate and/or native plant species including culturally important native species.

5. Growth Medium

(a) The Permittee shall monitor soil replacement operations to ensure the minimum depths are achieved. The Permittee shall develop a confirmation sampling plan to ensure quality of soil used for reclamation purposes will achieve end land use objectives. The Permittee shall report all results in the Annual Reclamation Report.

(b) The Permittee shall ensure that areas to be reclaimed are decompacted to the minimum depth required to adequately address the severity of compaction prior to placement of soil and or vegetation, in a manner intended to achieve end land use objectives and erosion control, with the exception of areas where closure plans require compaction prior to placement of growth medium in order to reduce infiltration and contact water.

6. Surface Water Management Ponds and Channels

(a) The Permittee shall reclaim all surface water management ponds and water diversions once no longer required to satisfy stability and erosion control requirements and the approved end land use.

7. Mine Roads

(a) The Permittee shall ensure all mine roads are reclaimed, in accordance with recommendations of a qualified professional, to satisfy the approved end land use objectives, including all reasonable efforts to fully re-configure to conform to the adjacent landscape where long-term stability is not compromised, unless permanent access is required.

(b) Individual mine roads may be exempted from the requirement for total reclamation under condition (a) if:

(i) The Permittee demonstrates that an agency of the Crown has explicitly accepted responsibility for the operation, maintenance and ultimate deactivation and abandonment of the road, or

(ii) The Permittee demonstrates that another private party has explicitly agreed to accept responsibility for the operation, maintenance and ultimate deactivation and abandonment of the road and has, in this regard, agreed to comply with all the terms and conditions, including bonding provisions, of this reclamation permit, and with all other relevant provincial government (and federal government) regulatory requirements.

8. Reclamation Program and Closure Plan Update

The Permittee shall develop and submit an updated Reclamation and Closure Plan to the satisfaction of the Chief Inspector by March 31, 2025, which includes, but is not limited to, the following information:

(a) The current status of the reclamation obligations based on the approved end land use;

(b) A compilation and interpretation of all monitoring for life of mine, including ML/ARD prediction, water quality and quantity, modelling predictions, metal uptake studies, soil, vegetation and reclamation programs;

(c) Detailed closure and maintenance activities;

(d) A compilation and interpretation of any research program used to inform closure planning strategies;

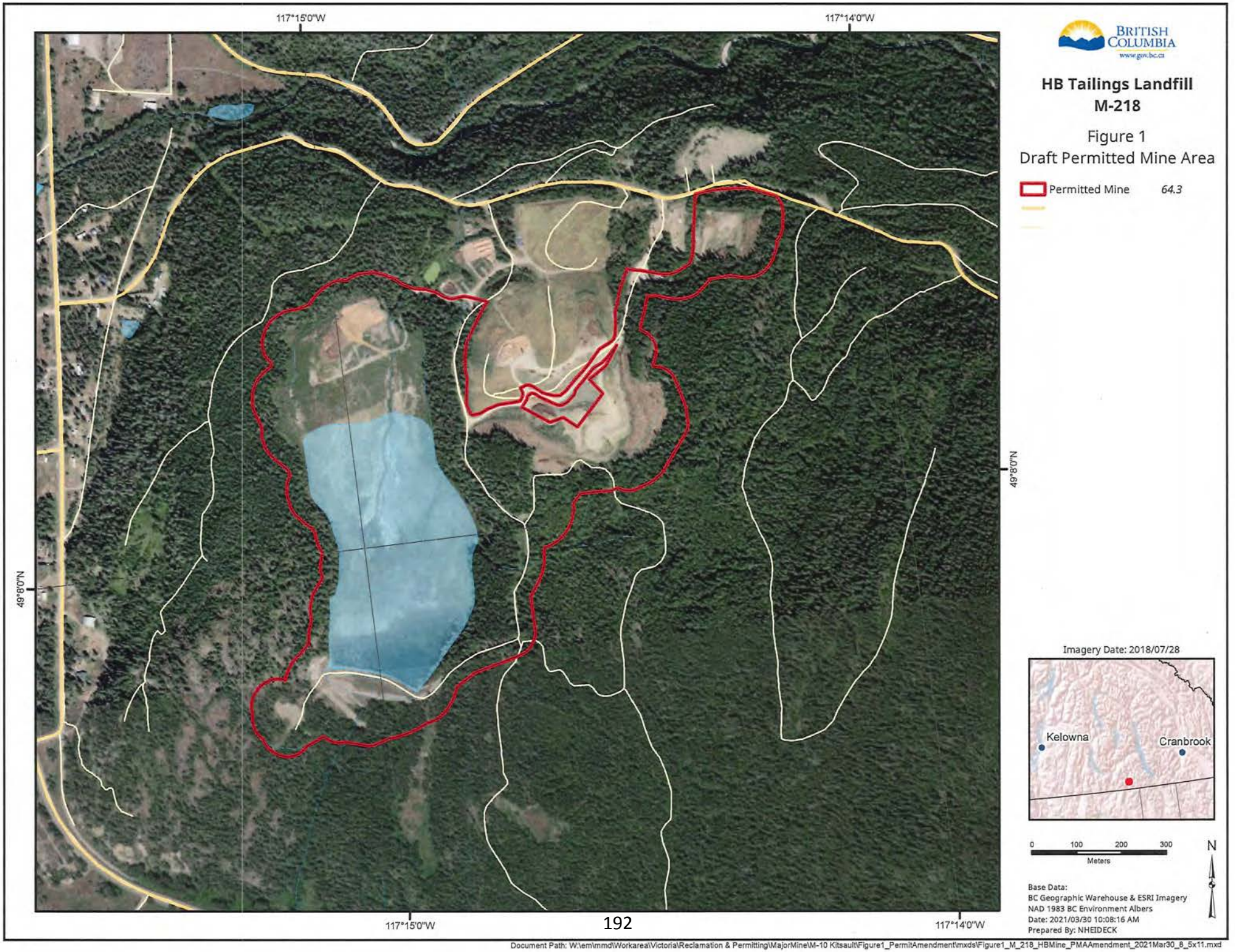
(e) Detailed contingency/remediation plans;

(f) Detailed schedule for completion of reclamation/closure works;

(g) Closure Management Manual that details monitoring and maintenance activities for post closure; and

(h) A breakdown of outstanding liabilities and associated costs including activities detailed for remediation and post closure.

Figure 1 – Permitted Mine Area


117°15'0"W
117°14'0"W
49°8'0"N
HB Tailings Landfill
M-218
Figure 1
Draft Permitted Mine Area
Permitted Mine
64.3
Imagery Date: 2018/07/28
Kelowna
Cranbrook
0
100
200
300
Meters
N
Base Data:
BC Geographic Warehouse & ESRI Imagery
NAD 1983 BC Environment Albers
Date: 2021/03/30 10:08:16 AM
Prepared By: NHEIDECK
Document Path: W:\em\mmd\Workarea\Victoria\Reclamation & Permitting\MajorMine\M-10 Kitsault\Figure1_PermitAmendment\mxds\Figure1_M_218_HBMine_PMAAmendment_2021Mar30_8_5x11.mxd

APPENDIX B: MINISTRY OF ENERGY AND MINES TABLES

(Note Tables 3, 4, 5 and 6 do not apply to the Facility as no mining occurs)

TABLE EMPR1-2022

SUMMARY OF AREAS DISTURBED AND RECLAIMED TO DECEMBER 31, 2022

COMPANY: Regional District of Central Kootenay PERMIT NO.: M-218

DISTURBANCE	MINING		RECLAMATION								
	AREA DISTURBED (ha)		AREA RECONTOURED (ha)		AREA SEEDED/PLANTED (ha)		AREA FERTILIZED (ha)		AREA REVEGETATED* (ha)		LAND USE OBJECTIVE**
	2022	TOTAL***	2022	TOTAL***	2022	TOTAL***	2022	TOTAL***	2022	TOTAL***	
WASTE DUMPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TAILINGS PONDS	N/A	1.11 (pond); 22.95 (tailings) 1.96 (dam)	21.2	21.2	26.44	26.44	26.44	26.44	N/A	N/A	wildlife habitat, industrial
PLANT SITE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ROADS	N/A	0.42	N/A	N/A	0.05	0.05	0.05	0.05	N/A	N/A	Closed to public
ADMINISTRATION	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STOCKPILES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LINEAR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER (Borrow Areas)	N/A	6.93	6.93	6.93	5.55	5.55	5.55	5.55	N/A	N/A	Industrial
TOTAL	0	33.37	28.13	28.13	32.04	32.04	32.04	32.04	0	0	wildlife habitat, industrial

* In order for an area to be recorded as “revegetated”, it must have supported vegetation that will lead to the designated land use objective for at least one year. Please provide monitoring data in the Annual Reclamation Report to support the areas reported here.

** Specify land use. Options include: forestry, grazing, wildlife habitat, recreation, agricultural, industrial, residential, and other.

*** Total up to December 31, 2022.

TABLE EMPR2

QUANTITIES OF WASTE ROCK, TAILINGS, LOW GRADE ORE, COARSE REJECT AND OTHER MINE WASTE AS OF DECEMBER 31, 2022

COMPANY: Regional District of Central Kootenay **PERMIT NO.: M-218**

Use the space below to enter information for each waste dump, tailings pond or low grade ore pile. All quantities should be given in tonnes.

Name of Waste Pile or Pond	Acid Generating Waste		Potentially Acid Generating Waste		Non-Acid Generating Waste	
Waste Dumps	2022	Total	2022	Total	2022	Total
Total	0	0	0	0	0	0
Tailings Ponds						
Total	0	0	0	0	0	Estimated at 4,200,000 m^3 (tonnes unknown)
Low Grade Ore/Coarse Reject/Other Mine Waste						
Total	0	0	0	0	0	0

APPENDIX C-1: 2020 ENVIRONMENTAL MONITORING PROGRAM

Surface Water Monitoring Locations

The recommended surface water sampling locations have been selected to correspond to previous sampling locations; this allows for comparisons of water quality with pre-construction values. Figure 6 provides the surface water sampling locations and Table 7-1 provides location descriptions.

Table 7-1: Surface Water Sampling Locations

Sampling ID	Location Description
TMF Surface Water Sampling Locations	
SW1-07	Central Landfill outflow collected immediately upstream of the tailings facility
SW2-07	Collected from the seasonal stream located upstream of the North Spur Channel Energy Dissipation Structure on the east side of the tailings facility
SW3-07	Background sample collected from the seasonal stream located upstream of the South Spur Channel Energy Dissipation Structure on the east side of the tailings facility
SW5-19	Background sample collected from the seasonal stream located upstream of the North Spur Channel Energy Dissipation Structure on the east side of the tailings facility
Seepage Weir	Collected from seepage upstream of the v-notch weir below the dam
Spillway Inlet	Collected in the spillway inlet area at a location downstream of the tailings
Spillway Outlet	Collected immediately downstream of the stilling basin
Outlet Ditch	Collected upstream of the culvert crossing Highway 3
Salmo Surface Water Sampling Locations	
Salmo – Upstream	Collected approximately 100m upgradient of the point of discharge where the downstream channel intersects the Salmo River
Salmo - Downstream	Collected approximately 100m downgradient of the point of discharge where the downstream channel intersects the Salmo River

Notes:

1. Co-ordinates of the Salmo River upstream and downstream sampling locations are approximate and will be confirmed prior to construction. Co-ordinates are in UTM Zone 11.

Surface Water Sampling Methodology

Surface water sampling will be conducted by RDCKs Environmental Monitor at each sampling location above the height of the sediment-water interface utilizing a peristaltic pump or grab sampling method at depth specific intervals. A pump will be used to first purge all water present within the tubing, and then draw water through a flow through cell to establish clarity of the sample and retain parameter observation. Field parameters including temperature, pH, conductivity, DO, and ORP will be recorded using a YSI multi-meter and turbidity readings will be measured will a turbidity meter. Between measurements, the probes will be cleaned using a solution of tap water and Alconox and then rinsed with water. Surface water samples will be placed in ice-filled coolers and delivered or shipped to Bureau Veritas (or alternative accredited laboratory) along with completed chain of custody forms within the acceptable sample holding time.

Receiving Environment Monitoring Locations

The Salmo River receiving environment will be monitoring and sampled post-closure by RDCKs Environmental Monitor. A baseline assessment will be completed to determine Spring background concentrations prior to conducting the dewatering program as described in the WDA. The baseline assessment will include collection of samples upstream and downstream of the point of discharge where the drainage channel intersects the Salmo River. The samples will be analyzed for CPOCs associated with the TMF listed in Table 7-3. Samples both upstream and downstream will be collected in similar locations to those historically sampled approximately 100 m upstream and downstream of the point of discharge. The specific sampling locations are depicted on the site plan included in the WDA submission for reference. The post closure assessment will include sampling the same upstream and downstream locations and analysis as the baseline assessment. The post closure sampling program will consist of an annual event in Spring to coincide with peak discharge flows in the channel as the discharge channel is ephemeral and flows are only expected to reach the Salmo River during freshet.

Groundwater Monitoring Locations

The groundwater sampling locations have been selected to correspond to previous sampling locations to allow for water quality comparisons to be made to pre-construction values. Figure 6 provides the groundwater sampling locations and Table 7-2 provides well descriptions.

Table 7-2: Groundwater Sampling Locations

Sampling ID	Location Description
MW99-1 (S) and (D)	Downgradient to the south of the tailings facility, approximately 144 m north of Highway 3. The shallow well (S) is screened in overburden, and the deep well (D) is screened in bedrock.
MW99-2 (S) and (D)	Immediately northwest of the tailings area and downgradient along the southern flow path. Both wells (S) and (D) are screened in bedrock.
MW-01-05	Background well is screened in overburden located approximately 200 m east of the current tailings pond.
MW-01-2004 (S) and (D)	Downgradient to the south of the tailings facility, approximately 144 m north of Highway 3. The shallow well (S) is screened in overburden, and the deep well (D) is screened in bedrock.
MW-02-2004 (S) and (D)	Downgradient to the south of the tailings facility approximately 45 m north of Highway 3. The shallow well (S) is screened in overburden, and the deep well (D) is screened in bedrock.

Water Quality Analyses

The parameters for laboratory and field analyses of water quality samples are summarized in Table 7-3.

Table 7-3: Water Quality Analyses

	Laboratory Analysis Parameters	Field Analysis Parameters
TMF Surface Water Analyses	• pH • Anion chromatography package (total alkalinity, chloride, bromide, sulphate, nitrate, nitrite) • *Un-ionized sulfide* • Total and dissolved metals (by ICP-MS, sufficient to meet BC Aquatic Life criteria), *speciated chromium analysis* • Total organic and inorganic carbon • Phosphate • TKN (measures ammonia and organic nitrogen) • *Total suspended solids (TSS)*	• Temperature • Conductivity • Dissolved oxygen • pH • Sulfide • *Turbidity* • *Flow rate (visual estimates only).*
Salmo River Surface Water Analyses	• pH • Anion chromatography package (total alkalinity, chloride, bromide, sulphate, nitrate, nitrite) • *Un-ionized sulfide* • Total and dissolved metals (by ICP-MS, sufficient to meet BC Aquatic Life	• Temperature • Conductivity • Dissolved oxygen • pH • Sulfide • *Turbidity* • *Flow rate (visual estimates only).*

	criteria), *speciated chromium analysis* • Total organic and inorganic carbon • Phosphate • TKN (measures ammonia and organic nitrogen) • *Total suspended solids (TSS)*	
Groundwater Analyses	• pH • Total dissolved solids (TDS) • Sulphate • Total and dissolved metals (by ICP-MS, sufficient to meet BC Aquatic Life criteria) • Nitrate/nitrite • Ammonia • Orthophosphate	• Temperature • Conductivity • Dissolved oxygen • pH • Sulfide • *Water elevation*

Note:

(1) Differences between surface and groundwater analyses have been italicized.

August 26, 2011

Tracking Number: 184494
Authorization Number: 16519

REGISTERED MAIL

Regional District of Central Kootenay
Box 590
202 Lakeside Drive
Nelson, BC V1L 5R4

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 16519 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

…/2

Ministry of Environment | Environmental Protection Division | 401 - 333 Victoria St. Nelson, BC V1L 4K3 | Kootenay Region Telephone: (250) 354-6333 Facsimile: (250) 354-6332

Administration of this operational certificate will be carried out by staff from the Kootenay Region. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Kootenay Region, 401 - 333 Victoria St., Nelson, BC V1L 4K3.

Yours truly,



Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Kootenay Region

Enclosure

cc: Environment Canada

Appendix B

Photolog



Photo 1 – Viewing west towards Site Entrance and Transfer Station



Photo 2 – Viewing south towards Cell 2 and Wood Waste Stockpile

Central Landfill and HB Tailings Facility Site Visit Photolog April 19, 2024



Photo 3 – Landfill Seep on South Side of Cell 2



Photo 4 – Landfill Seep on North Side of Cell 4

Central Landfill and HB Tailings Facility Site Visit Photolog April 19, 2024



Photo 5 – Surface Water Management Ditch on North Side of Cell 4



Photo 6 – Pre-Settling Basin

Central Landfill and HB Tailings Facility Site Visit Photolog April 19, 2024



Photo 7 – Septage Treatment Facility – Raw Septage



Photo 8 - Septage Treatment Facility - Drying Bed

Central Landfill and HB Tailings Facility Site Visit Photolog April 19, 2024



Photo 9 – Stormwater Pond



Photo 10 – Wood Chip Storage Area at North of Tailings Deposition Area



Photo 11 – North End of Tailings Deposition Area – Looking South



Photo 12 – South End of Tailings Deposition Area – Looking North



Photo 13 – Lined Surface Water Diversion Channel



Photo 14 – Spillway Inlet

Appendix C

Water Well Information

Appendix C

Water Well Information
Central Landfill and HB Tailings Facility HHCR
Regional District of Central Kootenay
Salmo, BC

Well Tag Number	Well Status	Licence Status	Detailed Well Record	Construction Start Date	Well Class	Intended Water Use	Street Address	Finished Well Depth (ft bgl)	Well Diameter (in)
53589	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/53589	5/24/1984	Unknown	Other	Salmo Dump	48	-
53590	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/53590	5/24/1984	Unknown	Other	Salmo Dump	80	-
53601	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/53601	5/28/1984	Unknown	Not Applicable	Salmo Dump	55	-
53599	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/53599	5/28/1984	Unknown	Other	Salmo Dump	20	-
53600	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/53600	5/28/1984	Unknown	Other	Salmo Dump	63	-
66186	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/66186	10/11/1989	Water Supply	Private Domestic	210 Belmond	35	-
66332	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/66332	9/18/1996	Water Supply	Private Domestic	1864 Airport Road	58	-
45453	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/45453	7/1/1980	Water Supply	Private Domestic	Past Double Bridge	51	-
82185	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/82185	4/15/2001	Water Supply	Commercial and Industrial	8048 Highway 3	40	6.12
105004	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/105004	9/14/2011	Water Supply	Private Domestic	8257 Tailings Road	70	6
107739	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/107739	4/25/2013	Water Supply	Private Domestic	-	48	6
107738	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/107738	4/25/2013	Water Supply	Private Domestic	-	49	6
107737	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/107737	4/24/2013	Water Supply	Private Domestic	-	45	6
107736	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/107736	4/24/2013	Water Supply	Private Domestic	-	41	6
88642	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/88642	1/23/2004	Water Supply	Private Domestic	1978 Airport Road	40	6.1
112348	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/112348	12/1/2016	Water Supply	Private Domestic	112 Belmond	56	6
91556	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/91556	9/21/1998	Water Supply	Private Domestic	-	36	6.25
124264	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/124264	10/26/2021	Water Supply	Private Domestic	116 Bellmont Road	35	6
112349	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/112349	12/1/2016	Water Supply	Private Domestic	112 Belmond	56	6
106649	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/106649	-	Water Supply	Water Supply System	1905 Airport Road	73	6
112671	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/112671	5/30/2016	Water Supply	Private Domestic	-	58	6.63
128168	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/128168	9/22/2022	Water Supply	Commercial and Industrial	-	540	6
82182	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/82182	-	Water Supply	Private Domestic	1861 Airport Road	51	6.12
88493	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/88493	9/10/2004	Water Supply	Private Domestic	Airport Road	59	6.6
92070	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/92070	8/17/2000	Water Supply	Private Domestic	-	195	6
75273	New	Unlicensed	https://apps.nrs.gov.bc.ca/gwells/well/75273	5/28/1984	Unknown	Not Applicable	Salmo Dump	20	-

BRITISH COLUMBIA

Well Summary

Well Tag Number: 128168
Well Status: New
Observation Well Number:
Well Identification Plate Number: 65420
Well Class: Water Supply
Observation Well Status:
Owner Name: RDCK
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Commercial and Industrial
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	012117251

Description of Well Location: WELL LOCATED NEAR NEW COMPOST FACILITY



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.13618
Longitude: -117.24266
UTM Easting: 482300
UTM Northing: 5442623
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2022-09-22	2022-09-29	Wild West Drilling Inc.	June 12th 2023 at 9:44 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2022-09-22	2022-09-29				

Well Completion Data

Total Depth Drilled: 600 ft bgl
Estimated Well Yield: 6 USgpm
Static Water Level (BTOC): 55 feet btoc
Finished Well Depth: 540 ft bgl
Well Cap: WATER TIGHT
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Disinfected
Artesian Pressure (head):
Depth to Bedrock: 14 feet bgl
Drilling Method: Dual Rotary
Artesian Pressure (PSI):
Ground elevation: 2460 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	14	FILL/BOULDERS/CLAY				Dense		
14	315	DARK GREY PLATED BEDROCK				Soft		1.5
315	331	LIGHT GREY BEDROCK				Medium		
331	390	DARK/BLACK PLATED BEDROCK				Soft		1.5
390	449	LIGHT GREY BEDROCK				Medium		
449	485	DARK/BLACK PLATED BEDROCK				Soft		
485	503	LIGHT GREY BEDROCK				Medium		2
503	600	DARK/BLACK PLATED BEDROCK				Soft		1.5

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	18	Steel Removed	Steel Pulled Out	10		
0	400	Production casing	Steel	6.625	0.219	Installed
400	600	Open hole	Other	6		

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 1 feet
Surface Seal Thickness: 1.5 inches
Surface Seal Depth: 18 feet

Liner Details

Liner Material: PVC
Liner Diameter: 4.5 inches
Liner Thickness: 0.248 inches
Liner from: 60 (ft bgl)
Liner to: 540 (ft bgl)
Liner perforations

From	To
500	540

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1.5 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 6 USgpm
Estimation Duration: 1.5 hours
Static Water Level Before Test: 55 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

6" STEEL CASING PERFORATED FROM 140-150', 245-255', 365-375'.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 53599
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: R.D.C.K.
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Other
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: NELSON

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.138316
Longitude: -117.241514
UTM Easting: 482384
UTM Northing: 5442860
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-28		Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-28					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield:
Static Water Level (BTOC):
Finished Well Depth: 20 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 5 feet bgl
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	3	CLAY						
3	5	GRAVEL						
5	20	BEDROCK						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRY HOLE

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
53599	Unknown	Date Unknown	Public Document	WTN 53599_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 53600
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: CENTRAL KOOTENAY R D
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Other
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: SALMO

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.138985
Longitude: -117.240229
UTM Easting: 482478
UTM Northing: 5442934
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-28		Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-28					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 0 USgpm
Static Water Level (BTOC):
Finished Well Depth: 63 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 60 feet bgl
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	10	clay and gravel						
10	20	sand and gravel						
20	25	clay						
25	35	sand clay						
35	55	sand and clay stringers, moisture						
55	60	hardpan gravel						
60	63	bedrock						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material: Other
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material: Other
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments

There are no records to show

Comments

REPLACE 81-1 (?) METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
53600	Unknown	Date Unknown	Public Document	WTN 53600_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 53601
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: CENTRAL KOOTENAY R D
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Not Applicable
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: SALMO

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.1397
Longitude: -117.24441
UTM Easting: 482173
UTM Northing: 5443015
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-28		Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-28	1984-05-28				

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 0 USgpm
Static Water Level (BTOC):
Finished Well Depth: 55 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 55 feet bgl
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	21	sand and gravel						
21	25	sand						
25	35	sandy clay						
35	50	sand						
50	55	gravel and clay						
55	55	bedrock						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material: Other
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material: Other
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

REPLACE 81-4. UR METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
53601	Unknown	Date Unknown	Public Document	WTN 53601_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 75273
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: CENTRAL KOOTENAY R D
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Not Applicable
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: SALMO

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.139233
Longitude: -117.245947
UTM Easting: 482061
UTM Northing: 5442963
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-28		Gerald Keyes	August 13th 2003 at 8:16 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-28					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield:
Static Water Level (BTOC):
Finished Well Depth: 20 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	3	clay						
3	5	gravel						
5	20	bedrock						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRY HOLE METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
75273	Unknown	Date Unknown	Public Document	WTN 75273_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 53590
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: CENTRAL KOOTENAY R D
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Other
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: SALMO

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.140412
Longitude: -117.246049
UTM Easting: 482054
UTM Northing: 5443094
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-24		Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-24					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield:
Static Water Level (BTOC):
Finished Well Depth: 80 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 45 feet bgl
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	20	sand and gravel						
20	40	clay wet and sticky						
40	45	sandy clay						
45	80	bedrock						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRY HOLE METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
53590	Unknown	Date Unknown	Public Document	WTN 53590_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 53589
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Unknown
Observation Well Status:
Owner Name: CENTRAL KOOTENAY R D
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Other
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: SALMO DUMP
Town/City: SALMO

Legal Description:

Lot	A
Plan	14234
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.140706
Longitude: -117.246997
UTM Easting: 481985
UTM Northing: 5443127
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1984-05-24		Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1984-05-24					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 0 USgpm
Static Water Level (BTOC):
Finished Well Depth: 48 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 37 feet bgl
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	20	sand gravel and clay						
20	30	sand						
30	37	boulders and coarse moisture gravel and						
30	37	clay						
37	48	bedrock						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material: Other
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material: Other
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRILLED DOWNSLOPE OF 81-4 TO TRACK THE LEACHATE. UR METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
53589	Unknown	Date Unknown	Public Document	WTN 53589_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 45453
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: RICHARD CYR
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number: 496
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: PAST DOUBLE BRIDGE
Town/City: CRESTON

Legal Description:

Lot	2
Plan	14561
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.143944
Longitude: -117.255582
UTM Easting: 481360
UTM Northing: 5443489
Zone: 11
Coordinate Acquisition Code: (100 m accuracy) Digitized from old Dept. of Lands, Forests and Water Resources maps

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1980-07-01	1980-07-01	Owen's Drilling Ltd.	August 13th 2003 at 2:17 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1980-07-01	1980-07-01				

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 10 USgpm
Static Water Level (BTOC): 25 feet btoc
Finished Well Depth: 51 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	20	clay and boulders						
20	40	gravel, dry						
40	51	loose gravel						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments

There are no records to show

Comments

10 GPM DECENT DRINKING WATER AND SUFFICIENT AMOUNT. METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
45453	Unknown	Date Unknown	Public Document	WTN 45453_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA

Well Summary

Well Tag Number: 92070
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: RAY & STELLA BERNARD
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	1
Plan	11981
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	012617768

Description of Well Location: SALMO



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.139042
Longitude: -117.255214
UTM Easting: 481385
UTM Northing: 5442944
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2000-08-17	2000-08-17	Owen's Drilling Ltd.	January 24th 2008 at 12:47 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2000-08-17	2000-08-17				

Well Completion Data

Total Depth Drilled: 195 ft bgl
Estimated Well Yield: 5 USgpm
Static Water Level (BTOC): 80 feet btoc
Finished Well Depth: 195 ft bgl
Well Cap: WELDED CAP
Artesian Flow:
Final Casing Stick Up: 6 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 6 feet bgl
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	6	SAND, GRAVEL						
6	20	BROKEN BEDROCK						
20	35	BEDROCK CASED						
35	195							

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	35		Steel	6	0.219	Installed
35	195		Open hole	6		Not Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

MEASUREMENTS FROM GROUND LEVEL. SHOE: 1X6" CARBIDE BUTTON. RECOMMENDED PUMP TYPE: SUB. RECOMMENDED PUMPING RATE: 5 USGPM.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
92070	Unknown	Date Unknown	Public Document	WTN 92070_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 82182
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: SEAN FORSYTHE
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 1861 AIRPORT ROAD
Town/City:

Legal Description:

Lot	A
Plan	NEP67909
District Lot	1236
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	024900281

Description of Well Location: Airport Road, Salmo BC



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.137624
Longitude: -117.257908
UTM Easting: 481188
UTM Northing: 5442787
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record			Thorman Drilling	November 8th 2004 at 5:37 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 18 USgpm
Static Water Level (BTOC):
Finished Well Depth: 51 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	21	Boulders- cobbles- gravel						
21	43	silty sand						
43	51	coarse sand with some silt						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	50		Steel	6.12		Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 18 USgpm
Estimation Duration:
Static Water Level Before Test: 51 ft (btoc)
Drawdown: 15 ft (btoc)
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

Water is fresh, clear with no gas, or color MEASUREMENTS TAKEN AT GROUND LEVEL

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
82182	Unknown	Date Unknown	Public Document	WTN 82182_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 106649
Well Status: New
Observation Well Number:
Well Identification Plate Number: 21387
Well Class: Water Supply
Observation Well Status:
Owner Name: DON YORK
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Water Supply System
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 1905 AIRPORT ROAD
Town/City: SALMO

Legal Description:

Lot	D
Plan	NEP 22745
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	023288469

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.13593
Longitude: -117.25856
UTM Easting: 481140
UTM Northing: 5442599
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record			Owen's Drilling Ltd.	August 29th 2012 at 7:50 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission

Well Completion Data

Total Depth Drilled: 73 ft bgl
Estimated Well Yield: 15 USgpm
Static Water Level (BTOC): 32 feet btoc
Finished Well Depth: 73 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Cable Tool
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	21	GRAVEL & BOULDERS						
21	30	GRAVEL						
30	47	SILTY CLAY						
47	63	GRAVEL						
63	73	GRAVEL					LOTS OF CLAY	

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
			Steel	6	0.188	Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method: Screen
Type:
Material: Stainless Steel
Opening: Continuous Slot
Bottom: Bail
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
69.00	73.00		Screen	30.00

Well Development

Developed by: Surging
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

No comments submitted

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
106649	Unknown	Date Unknown	Public Document	WTN 106649_21387 Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 66332
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: HAIG BERYLL
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 1864 AIRPORT RD
Town/City: FRUITVALE

Legal Description:

Lot	2
Plan	14561
District Lot	1236
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	009996800

Description of Well Location:



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.13735
Longitude: -117.25933
UTM Easting: 481084
UTM Northing: 5442757
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1996-09-18		Thorman Drilling	August 13th 2003 at 8:52 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1996-09-18					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 20 USgpm
Static Water Level (BTOC): 38 feet btoc
Finished Well Depth: 58 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	26	COBBLES BOULDERS GRAVEL						
26	32	SILTY COARSE GRAVEL						
32	52	CLAY TILL						
52	58	SANDY GRAVEL						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

STEEL CASING,58.0 TO 38.0,38.0 TO 0.0,.250 THICK,.188 THICK,16 LBS,12 LBS PUMP TEST RATE 20 USGM,38 FT AFTER 1 HRS METHOD OF DRILLING = DRILLED; DUPLICATE RECORD WTN 74705 WAS UNPUBLISHED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
66332	Unknown	Date Unknown	Public Document	WTN 66332_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 88493
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: DAN MILLER
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: AIRPORT ROAD
Town/City: SALMO

Legal Description:

Lot	A
Plan	NEP 22734
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: NOT PROVIDED



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.138715
Longitude: -117.26082
UTM Easting: 480976
UTM Northing: 5442909
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2004-09-10	2004-09-10	Thorman Drilling	November 20th 2007 at 6:45 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2004-09-10	2004-09-10				

Well Completion Data

Total Depth Drilled: 59 ft bgl
Estimated Well Yield: 25 USgpm
Static Water Level (BTOC): 35 feet btoc
Finished Well Depth: 59 ft bgl
Well Cap: WELDED CAP
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	8	COBBLES WITH SILTY SAND						
8	34	LRG BOULDERS WITH COARSE GRAVEL LITTLE SAND						
34	51	SILTY GRAVEL WITH SOME CLAY						
51	59	SANDY COARSE GRAVEL MEDIUM TO FINE SAND						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	55		Steel	6.6	0.25	Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type: Telescope
Material: Stainless Steel
Opening: Continuous Slot
Bottom: Bail
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
55.00	59.00	5.00	K-packer	20.00

Well Development

Developed by: Jetting
Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 25 USgpm
Estimation Duration: 1.5 hours
Static Water Level Before Test:
Drawdown: 35 ft (btoc)
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

MEASUREMENTS FROM GROUND LEVEL. PITLESS UNIT WELDED, NEW. RECOMMENDED PUMP TYPE SUB. RECOMMENDED PUMPING RATE 0-25 USGPM.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
88493	Unknown	Date Unknown	Public Document	WTN 88493_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 112671
Well Status: New
Observation Well Number:
Well Identification Plate Number: 47954
Well Class: Water Supply
Observation Well Status:
Owner Name: GORDY POWELL
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	**A**
Plan	**12643**
District Lot	**1236**
Block	
Section	
Township	
Range	
Land District	**26**
Property Identification Description (PID)	

Description of Well Location: NOT PROVIDED



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.137633
Longitude: -117.2614
UTM Easting: 480933
UTM Northing: 5442789
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2016-05-30	2016-05-30	Wild West Drilling	January 25th 2017 at 6:54 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2016-05-30	2016-05-30				

Well Completion Data

Total Depth Drilled: 60 ft bgl
Estimated Well Yield: 15 USgpm
Static Water Level (BTOC): 32 feet btoc
Finished Well Depth: 58 ft bgl
Well Cap: RODENT FREE
Artesian Flow:
Final Casing Stick Up: 36 inches
Well Disinfected Status: Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2050 feet
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	2	LOAMY TILL			brown	Soft		
2	45	TIGHT, DRY, SANDY GRAVEL			grey	Soft		
45	60	TIGHT GRAVEL/COARSE SAND			grey	Soft		15

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	60		Steel	6.63	0.22	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 2 feet
Surface Seal Thickness: 2 inches
Surface Seal Depth: 20 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 15 USgpm
Estimation Duration: 0.6 hours
Static Water Level Before Test: 32 ft (btoc)
Drawdown: 50 ft (btoc)
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRIVE SHOE=HD. DRILLER: WATER SAMPLE RECOMMENDED; NOT RESPONSIBLE FOR QUALITY OR QUANTITY.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 112349
Well Status: New
Observation Well Number:
Well Identification Plate Number: 40192
Well Class: Water Supply
Observation Well Status:
Owner Name: janna clark
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 112 belmond
Town/City: salmo

Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: airport rd



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.1357
Longitude: -117.2594
UTM Easting: 481078
UTM Northing: 5442573
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2016-12-01	2016-12-01	J. R. Drilling	December 12th 2016 at 12:52 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2016-12-01	2016-12-01				

Well Completion Data

Total Depth Drilled: 56 ft bgl
Estimated Well Yield: 20 USgpm
Static Water Level (BTOC): 30 feet btoc
Finished Well Depth: 56 ft bgl
Well Cap: vermin proof
Artesian Flow:
Final Casing Stick Up: 14 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Dual Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	25	sand gravel cobbles			tan	Medium		
25	52	sand silt gravel			grey	Medium		
52	56	gravel sand			grey	Medium		

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	57		Plastic	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth:
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 20 USgpm
Estimation Duration: 0.5 hours
Static Water Level Before Test: 30 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 112348
Well Status: New
Observation Well Number:
Well Identification Plate Number: 40189
Well Class: Water Supply
Observation Well Status:
Owner Name: janna clark
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 112 belmond
Town/City: salmo

Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: on airport rd



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.13433
Longitude: -117.25944
UTM Easting: 481075
UTM Northing: 5442421
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2016-12-01	2016-12-01	J. R. Drilling	December 12th 2016 at 12:46 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2016-12-01	2016-12-01				

Well Completion Data

Total Depth Drilled: 57 ft bgl
Estimated Well Yield: 20 USgpm
Static Water Level (BTOC): 30 feet btoc
Finished Well Depth: 56 ft bgl
Well Cap: vermin proof
Artesian Flow:
Final Casing Stick Up: 14 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Dual Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	5	sand			tan	Soft		
5	39	gravel sand cobbles			tan	Medium		
39	50	sand silt			tan	Soft		
50	56	gravel sand			tan	Medium	20 gpm	
56	57	sand silt			grey	Soft		

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	56		Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth:
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 20 USgpm
Estimation Duration: 0.5 hours
Static Water Level Before Test: 30 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 124264
Well Status: New
Observation Well Number:
Well Identification Plate Number: 65178
Well Class: Water Supply
Observation Well Status:
Owner Name: speers
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 116 bellmont road
Town/City: salmo bc

Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	023288422

Description of Well Location: on lot



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.13511
Longitude: -117.26116
UTM Easting: 480950
UTM Northing: 5442508
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2021-10-26	2021-10-27	J.R. Drilling Ltd.	November 5th 2021 at 8:45 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2021-10-26	2021-10-27				

Well Completion Data

Total Depth Drilled: 35 ft bgl
Estimated Well Yield: 7 USgpm
Static Water Level (BTOC): 25 feet btoc
Finished Well Depth: 35 ft bgl
Well Cap: sealed
Artesian Flow:
Final Casing Stick Up: 16 inches
Well Disinfected Status: Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Dual Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation:
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	16	sand gravel	loose	Dry	tan	Loose		
16	35	sand gravel	loose	Dry	tan	Loose		

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	35	Production casing	Steel	6	250	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth:
Surface Seal Thickness: 2 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 7 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test: 25 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

No comments submitted

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 66186
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: WENSLEY J
Well Subclass:
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

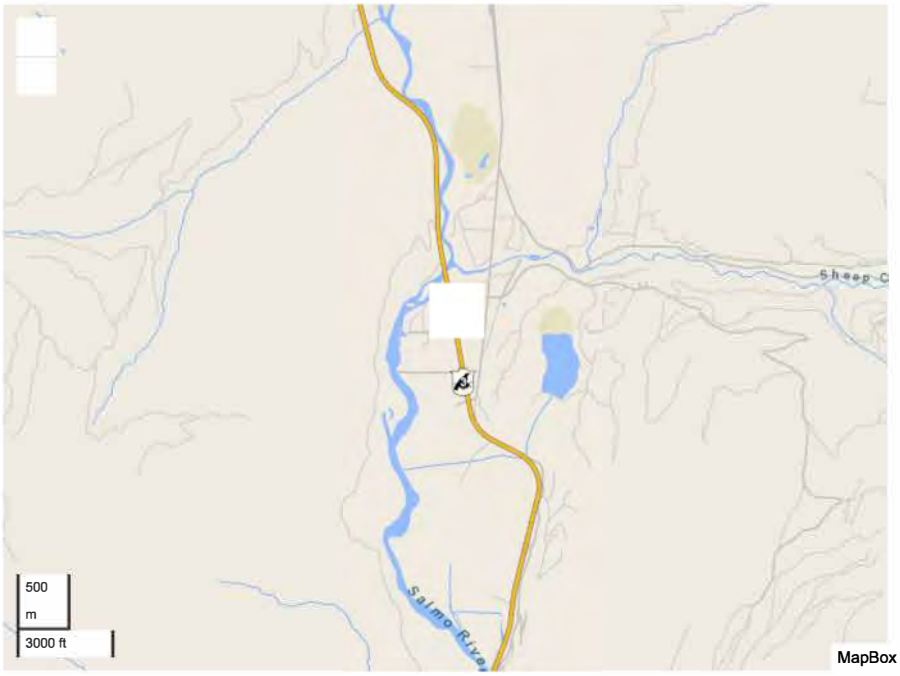
Location Information

Street Address: 210 BELMOND
Town/City: SALMO

Legal Description:

Lot	B
Plan	7111
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	006430597

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.135542
Longitude: -117.263929
UTM Easting: 480748
UTM Northing: 5442557
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1989-10-11		Owen's Drilling Ltd.	August 13th 2003 at 8:51 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1989-10-11					

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 10 USgpm
Static Water Level (BTOC): 15 feet btoc
Finished Well Depth: 35 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Other
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	20	HARD PAN CLAY & GRAVEL						
20	24	BOULDERS						
24	32	SILTY CLAY						
32	35	SAND & GRAVEL						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

STEEL CASING,0.0 TO 35.0,.188 THICK, METHOD OF DRILLING = DRILLED

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
66186	Unknown	Date Unknown	Public Document	WTN 66186_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 91556
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: NICK VISHLOFF
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	6
Plan	13432
District Lot	1236
Block	
Section	
Township	
Range	
Land District	25
Property Identification Description (PID)	009608222

Description of Well Location: NOT PROVIDED



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.134687
Longitude: -117.263788
UTM Easting: 480758
UTM Northing: 5442462
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1998-09-21	1998-09-21	Thorman Drilling	January 21st 2008 at 4:23 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1998-09-21	1998-09-21				

Well Completion Data

Total Depth Drilled: 36 ft bgl
Estimated Well Yield: 30 USgpm
Static Water Level (BTOC): 18 feet btoc
Finished Well Depth: 36 ft bgl
Well Cap: WELDED CAP
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	4							
4	32	GRAVEL & SAND				Medium	SWL 18'	
32	36	MEDIUM TO COARSE GRAVEL						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	36		Steel	6.25	0.188	Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 30 USgpm
Estimation Duration: 0.5 hours
Static Water Level Before Test:
Drawdown: 18 ft (btoc)
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

DRILLING ADDITIVES: NONE. PITLESS UNIT: WELDED, NEW. SHOE: YES. RECOMMENDED PUMP TYPE: SUB. RECOMMENDED PUMPING RATE: 0-30 USGPM.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
91556	Unknown	Date Unknown	Public Document	WTN 91556_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 88642
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: DON BECK
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 1978 AIRPORT ROAD
Town/City: SALMO

Legal Description:

Lot	2
Plan	12308
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	012116211

Description of Well Location: NOT PROVIDED



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.133184
Longitude: -117.260339
UTM Easting: 481009
UTM Northing: 5442294
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2004-01-23	2004-01-23	Thorman Drilling	November 21st 2007 at 2:47 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2004-01-23	2004-01-23				

Well Completion Data

Total Depth Drilled: 40 ft bgl
Estimated Well Yield: 40 USgpm
Static Water Level (BTOC): 20 feet btoc
Finished Well Depth: 40 ft bgl
Well Cap: WELDED CAP
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	25	COARSE SANDY GRAVEL						
25	32	BOULDERS WITH SILTY SAND						
32	40	COARSE SANDY GRAVEL COARSE-MEDIUM SAND						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	40		Steel	6.1	0.219	Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type: Telescope
Material: Stainless Steel
Opening: Continuous Slot
Bottom: Bail
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
36.00	40.00	5.00	K-packer	20.00

Well Development

Developed by: Jetting
Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 40 USgpm
Estimation Duration: 1.5 hours
Static Water Level Before Test:
Drawdown: 20 ft (btoc)
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

MEASUREMENTS FROM GROUND LEVEL. PITLESS UNIT WELDED, NEW. RECOMMENDED PUMP TYPE SUB. RECOMMENDED PUMPING RATE 0-40 USGPM.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
88642	Unknown	Date Unknown	Public Document	WTN 88642_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 107737
Well Status: New
Observation Well Number:
Well Identification Plate Number: 37955
Well Class: Water Supply
Observation Well Status:
Owner Name: Jason McNeil
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

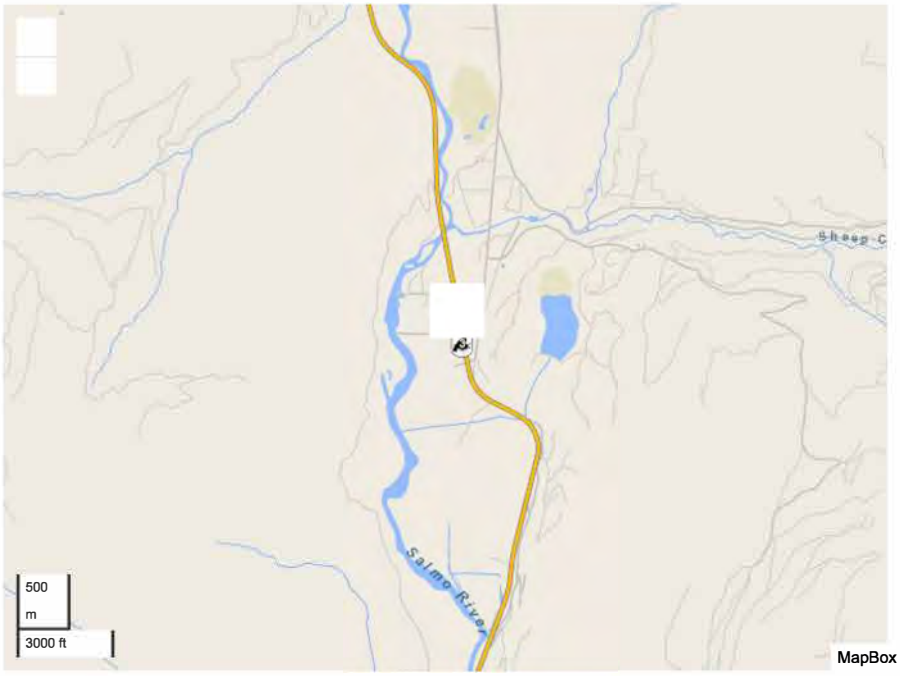
Location Information

Street Address:
Town/City:

Legal Description:

Lot	C
Plan	
District Lot	275
Block	1
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: Lot C DL 275 Block 1



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.132259
Longitude: -117.263651
UTM Easting: 480767
UTM Northing: 5442192
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2013-04-24	2013-04-24	Owen's Drilling Ltd.	April 30th 2013 at 12:13 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2013-04-24	2013-04-24				

Well Completion Data

Total Depth Drilled: 51 ft bgl
Estimated Well Yield: 10 USgpm
Static Water Level (BTOC): 13 feet btoc
Finished Well Depth: 45 ft bgl
Well Cap: Bolt On
Artesian Flow:
Final Casing Stick Up: 14 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2145 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	5	some	clayey		brown	Medium		
5	16		sandy		brown	Medium	Wet @ 16	
16	45		sandy		brown	Medium		
45	51		silty		brown	Medium	Pulled back to 45 and developed well	10

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	46		Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 16 feet
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 10 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test: 13 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 107736
Well Status: New
Observation Well Number:
Well Identification Plate Number: 37954
Well Class: Water Supply
Observation Well Status:
Owner Name: Jason McNeil
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	B
Plan	
District Lot	275
Block	1
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: Lot B DL 275 Block 1



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.132366
Longitude: -117.263857
UTM Easting: 480752
UTM Northing: 5442204
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2013-04-24	2013-04-24	Owen's Drilling Ltd.	April 29th 2013 at 11:59 PM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2013-04-24	2013-04-24				

Well Completion Data

Total Depth Drilled: 56 ft bgl
Estimated Well Yield: 10 USgpm
Static Water Level (BTOC): 9 feet btoc
Finished Well Depth: 41 ft bgl
Well Cap: Bolt On
Artesian Flow:
Final Casing Stick Up: 13 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2130 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	4		clayey		brown	Medium		
4	16	Gravel	sand streaks		brown	Medium	Wet @ 16	
16	41		sandy		brown	Medium		
41	56		silty		brown	Medium	Pulled back to 41	10

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	42		Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 16 feet
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 10 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test: 9 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 107738
Well Status: New
Observation Well Number:
Well Identification Plate Number: 37956
Well Class: Water Supply
Observation Well Status:
Owner Name: Jason McNeil
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address:
Town/City:

Legal Description:

Lot	D
Plan	
District Lot	275
Block	1
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: Lot D DL 275 Block 1



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.130928
Longitude: -117.263439
UTM Easting: 480782
UTM Northing: 5442044
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2013-04-25	2013-04-25	Owen's Drilling Ltd.	April 30th 2013 at 12:24 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2013-04-25	2013-04-25				

Well Completion Data

Total Depth Drilled: 55 ft bgl
Estimated Well Yield: 20 USgpm
Static Water Level (BTOC): 9 feet btoc
Finished Well Depth: 49 ft bgl
Well Cap: Bolt On
Artesian Flow:
Final Casing Stick Up: 12 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2096 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	49		sandy		brown	Medium		
49	55		silty		brown	Medium	Pulled back to 49	20

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	50		Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 16 feet
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 20 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test: 9 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 107739
Well Status: New
Observation Well Number:
Well Identification Plate Number: 37957
Well Class: Water Supply
Observation Well Status:
Owner Name: Jason McNeil
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

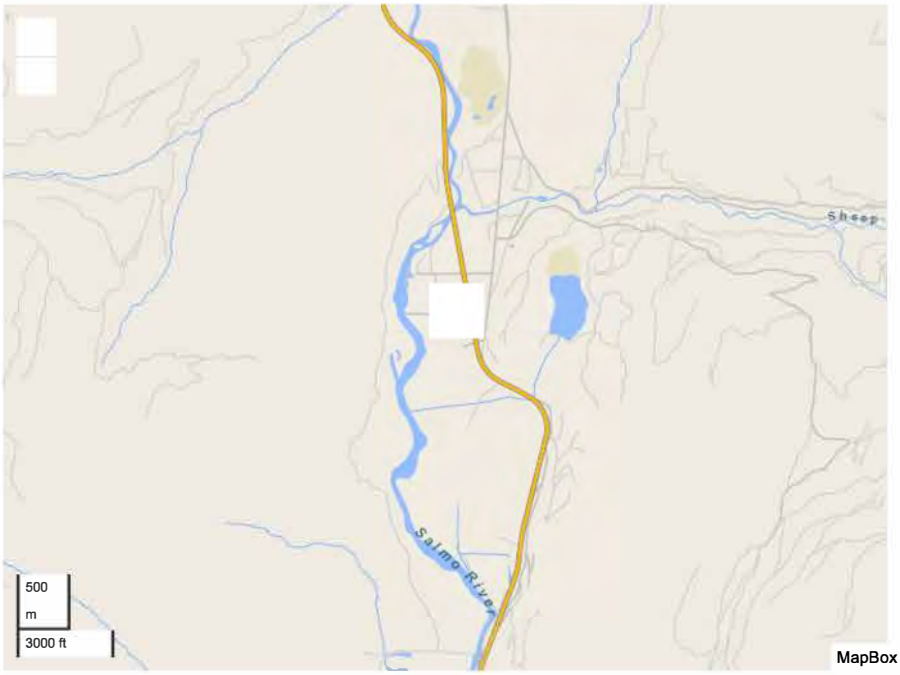
Location Information

Street Address:
Town/City:

Legal Description:

Lot	
Plan	
District Lot	275
Block	1
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: Remainder 1 DL 275 Block 1; R1



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.130637
Longitude: -117.264822
UTM Easting: 480681
UTM Northing: 5442012
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2013-04-25	2013-04-25	Owen's Drilling Ltd.	April 30th 2013 at 1:56 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2013-04-25	2013-04-25				

Well Completion Data

Total Depth Drilled: 55 ft bgl
Estimated Well Yield: 20 USgpm
Static Water Level (BTOC): 8 feet btoc
Finished Well Depth: 48 ft bgl
Well Cap: Bolt On
Artesian Flow:
Final Casing Stick Up: 14 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2186 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	3	some	clayey		brown	Medium		
3	48		sand streaks		brown	Medium	Wet @ 15	
48	55		silty		brown	Medium	Pulled back to 48	20

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	49		Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 16 feet
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 20 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test: 8 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

WELL RECORD SUBMITTED THROUGH EWELLS.

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 82185
Well Status: New
Observation Well Number:
Well Identification Plate Number:
Well Class: Water Supply
Observation Well Status:
Owner Name: KOOTENAY STONE CENTRE
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Commercial and Industrial
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 8048 HIGHWAY 3
Town/City: SOUTH SALMO

Legal Description:

Lot	2
Plan	11 847
District Lot	1236
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	012652954

Description of Well Location: Hwy 3, South of Salmo; Folio #24707 05557 04311



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.128629
Longitude: -117.261864
UTM Easting: 480896
UTM Northing: 5441788
Zone: 11
Coordinate Acquisition Code: unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2001-04-15	2001-04-15	Thorman Drilling	November 8th 2004 at 5:37 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2001-04-15	2001-04-15				

Well Completion Data

Total Depth Drilled:
Estimated Well Yield: 25 USgpm
Static Water Level (BTOC):
Finished Well Depth: 40 ft bgl
Well Cap:
Artesian Flow:
Final Casing Stick Up:
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	40	Coarse gravel with coarse to medium sand						

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
20	0		Steel	6.25		Installed
40	20		Steel	6.12		Installed

Surface Seal and Backfill Details

Surface Seal Material:
Backfill Material Above Surface Seal:
Surface Seal Installation Method:
Backfill Depth:
Surface Seal Thickness:
Surface Seal Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:
Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 25 USgpm
Estimation Duration:
Static Water Level Before Test: 11 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

Water is fresh and clear with no color, smell or gas MEASUREMENTS TAKEN AT GROUND LEVEL

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
82185	Unknown	Date Unknown	Public Document	WTN 82185_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 105004
Well Status: New
Observation Well Number:
Well Identification Plate Number: 32087
Well Class: Water Supply
Observation Well Status:
Owner Name: MARCO & LISA VAN DER WILK & TEDESCO
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number:
Alternative specs submitted: No
Artesian Condition: Yes
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

Location Information

Street Address: 8257 TAILINGS ROAD
Town/City:

Legal Description:

Lot	
Plan	X69
District Lot	1236
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	

Description of Well Location: PARCEL A EXCEPT PLAN SRW14293. SEE REF PL 52867I



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.121422
Longitude: -117.250533
UTM Easting: 481720
UTM Northing: 5440984
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2011-09-14	2011-09-14	Owen's Drilling Ltd.	January 11th 2012 at 3:45 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2011-09-14	2011-09-14				

Well Completion Data

Total Depth Drilled: 70 ft bgl
Estimated Well Yield: 15 USgpm
Static Water Level (BTOC):
Finished Well Depth: 70 ft bgl
Well Cap: BOLT ON
Artesian Flow: 5 USgpm
Final Casing Stick Up: 12 inches
Well Disinfected Status: Not Disinfected
Artesian Pressure (head):
Depth to Bedrock: 25 feet bgl
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 2908 feet
Method of determining elevation: Unknown
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	15	CLAY GRAVEL BOULDERS			brown	Medium		
15	20				brown	Medium		
20	25	CLAY GRAVEL			brown	Medium		
25	30	CASED BEDROCK			brown	Medium		
30	70				brown	Medium		15

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	16		Steel	6	0.219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 16 feet
Surface Seal Thickness: 1 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 1 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 15 USgpm
Estimation Duration: 1 hours
Static Water Level Before Test:
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

INTENDED WATER USE PRIVATE DOMESTIC AND WATER SUPPLY SYSTEM

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document
105004	Unknown	Date Unknown	Public Document	WTN 105004_Well Construction.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Appendix D

Stratigraphic and Instrumentation Logs

THURBER CONSULTANTS LTD.
Geotechnical Engineers

Sheet 1 of 2

TEST HOLE No 81-1

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay
PROJECT H.B. Mine Site
DATE May 5, 1981
METHOD Churn Drill
DRILLING Co Thomas Well Drilling
INSPECTOR C.A. Schmidt

Δ = 16.43

752.53

LEGEND:
SAMPLES: Disturbed, Undisturbed, No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

LOG

DEPTH (METRES)

TOP OF HOLE ELEV. 735.9

Top of pipe el. 736.1

Brown SILT with some fine grave and trace of sand. (TOPSOIL)

Compact, grey, slightly moist, fine to medium SAND with some silt and gravel

CSA Standard Penetration Test

SM

At 2.7m, $k = 1.0 \times 10^{-5}$ cm/sec.

GP

Compact, grey, moist, coarse sandy GRAVEL, trace of silt

Loose, brown, moist, fine SAND with a trace of silt

UNIFIED SOIL CLASSIFICATION SYSTEM

SP

At 5.7m, $k = 3.6 \times 10^{-4}$ cm/sec.

USP

SP

At 8.5m, $k = 6.9 \times 10^{-3}$ cm/sec.

At 8.8m, k too low to measure.

Soft, brown wet SILT & CLAY

SP

Loose, brown, moist fine SAND with trace of silt.

(See Sheet 2)

SCALE: 1:50 FILE No 15-26-1

THURBER CONSULTANTS LTD.
Geotechnical Engineers

Sheet 2 of 2

TEST HOLE No 81-1

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay

PROJECT H.B. Mine Site

DATE May 5, 1981

METHOD Churn Drill

DRILLING Co Thomas Well Drilling

INSPECTOR C.A. Schmidt

LEGEND:
SAMPLES: Disturbed; Undisturbed; No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

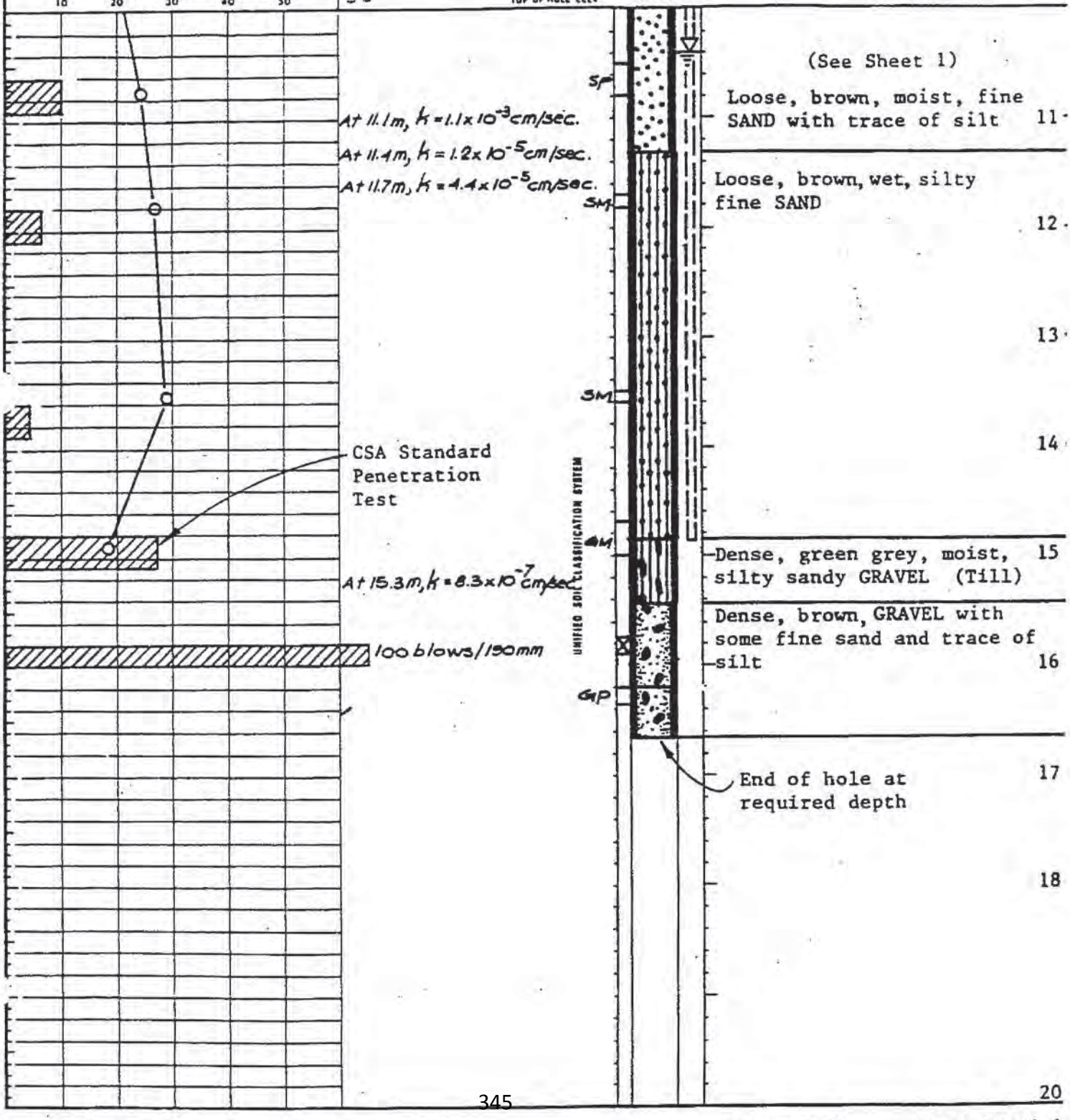
ELEVATION (METRES)

REMARKS

LOG

DEPTH (METRES)

TOP OF HOLE ELEV 735.9



(See Sheet 1)

Loose, brown, moist, fine SAND with trace of silt — 11

Loose, brown, wet, silty fine SAND — 12, 13, 14

Dense, green grey, moist, silty sandy GRAVEL (Till) — 15

Dense, brown, GRAVEL with some fine sand and trace of silt — 16

End of hole at required depth — 17

18

20

SCALE: 1:50

FILE No 15-26-1

0L00586

THURBER CONSULTANTS LTD.
Geotechnical Engineers

TEST HOLE No 81-2

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay

PROJECT H.B. Mine Site

DATE May 7, 1981

METHOD Churn Drill

DRILLING Co Thomas Well Drilling

INSPECTOR C.A. Schmidt

LEGEND:
SAMPLES: Disturbed, Undisturbed, No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

LOG

DEPTH (METRES)

TOP OF HOLE ELEV 713.5

Top of pipe el. 713.8

Brown SILT with some fine gravel and trace of sand (TOPSOIL)

Compact, brown, moist fine to medium SAND with some gravel and trace of silt

CSA Standard Penetration Test

SP

At 2.7 m, $k = 2.9 \times 10^{-3}$ cm/sec.

Stiff, moist, bluish grey sandy SILT with trace of gravel and trace of organics

ML

UNIFIED SOIL CLASSIFICATION SYSTEM

ML Soft, brown, wet gravelly SILT

SM Loose, yellowish green silty fine SAND

At 5.4 m, $k = 9.4 \times 10^{-5}$ cm/sec

SM Loose, brown, wet fine SAND with a trace of silt and thin layer of silt

End of hole at required depth

1 2 3 4 5 6 7 8 9 10

SCALE 1:50

FILE No 15-26-1

THURBER CONSULTANTS LTD.
Geotechnical Engineers

TEST HOLE No 81-3

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay
PROJECT H.B. Mine Site
DATE May 8, 1981
METHOD Churn Drill
DRILLING Co Thomas Well Drilling
INSPECTOR C.A. Schmidt

Δ = 16.22
736.82

LEGEND:
SAMPLES: Disturbed, Undisturbed, No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

TOP OF HOLE ELEV. 720.2

Top of pipe el. 720.6

LOG

DEPTH (METRES)

CSA Standard Penetration Test

At 2.8 m, $k = 1.4 \times 10^{-5}$ cm/sec.

60 blows/first 100mm

UNIFIED SOIL CLASSIFICATION SYSTEM

SP

SP

SM

SM

TOPSOIL

Dense, brown, slightly moist fine to coarse SAND with a trace of silt and some gravel

Very stiff, bluish grey, moist fine to coarse sandy SILT with a trace of gravel (Till)

Probable BEDROCK

End of hole at probable bedrock

1 2 3 4 5 6 7 8 9 10

SCALE: 1:50 FILE No 15-26-1

THURBER CONSULTANTS LTD.
Geotechnical Engineers

Sheet 1 of 2

TEST HOLE No 81-4

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

Δh = 16.33

731.23m

CLIENT R.D. of Central Kootenay
PROJECT H.R. Mine Site
DATE May 10, 1981
METHOD Churn Drill
DRILLING Co Thomas Well Drilling
INSPECTOR C.A. Schmidt

LEGEND:
SAMPLES: Disturbed, Undisturbed, No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

LOG

TOP OF HOLE ELEV. 714.7

Top of pipe el. 714.9

DEPTH (metres)

CSA Standard Penetration Test

At 2.8 m, $k = 1.5 \times 10^{-4}$ cm/sec.
90 blows/150mm

At 5.8 m, $k = 8.6 \times 10^{-3}$ cm/sec.

At 8.4 m, $k = 7.9 \times 10^{-6}$ cm/sec.

UNIFIED SOIL CLASSIFICATION SYSTEM

SP

SP

SP

ML

CL - SP

Brown SILT

Compact to dense, grey, fine to coarse SAND with some gravel and occasional cobble

Compact, light grey, slightly moist GRAVEL with some medium sand

Stiff, light, green, clayey SILT with layers of fine and medium SAND

Compact to loose, light green, fine to medium clean SAND

(See Sheet 2)

1 2 3 4 5 6 7 8 9 10

SCALE: 1:50 FILE No 15-26-1

THURBER CONSULTANTS LTD.
Geotechnical Engineers

Sheet 2 of 2

TEST HOLE No 81-4

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay

PROJECT H.B. Mine Site

DATE May 10, 1981

METHOD Churn Drill

DRILLING Co Thomas Well Drilling

INSPECTOR C.A. Schmidt

LEGEND:
SAMPLES: Disturbed, Undisturbed, No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm) & WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

TOP OF HOLE ELEV. 714.7

LOG

DEPTH (METRES)

UNIFIED SOIL CLASSIFICATION SYSTEM

CSA Standard Penetration Test

At 12.0m, $k = 4.7 \times 10^{-4}$ cm/sec.

SP

SP

(See Sheet 1)

Compact to loose, fine to medium, clean SAND

11

12

End of hole at required depth

13

14

SCALE: 1:50

FILE No 15-26-1

THURBER CONSULTANTS LTD.
Geotechnical Engineers

TEST HOLE No 81-5

LOG OF TEST HOLE

LOCATION See Dwg. 15-26-1-3

CLIENT R.D. of Central Kootenay

PROJECT H.B. Mine Site

DATE May 11, 1981

METHOD Churn Drill

DRILLING Co Thomas Well Drilling

INSPECTOR C.A. Schmidt

LEGEND:
SAMPLES: Disturbed; Undisturbed; No recovery
WATER CONTENT:
WATER LEVEL
W_L LIQUID LIMIT
W_P PLASTIC LIMIT

PENETRATION (blows per 300mm)
& WATER CONTENT (%)
10 20 30 40 50

ELEVATION (METRES)

REMARKS

TOP OF HOLE ELEV. 710.8

Top of pipe el. 711.1

LOG

DEPTH (METRES)

CSA Standard Penetration Test

100 blows/first 40 mm

At 2.85m, $k = 7.5 \times 10^{-3}$ cm/sec.

UNIFIED SOIL CLASSIFICATION SYSTEM

Brown, wet SILT with some gravel and trace of sand (TOPSOIL)

SP

Compact, greenish grey, wet fine to medium SAND with some gravel and trace of silt

GP

Very dense, brown, wet, coarse sandy GRAVEL with a trace of fines

SP-GP

End of hole at required depth

1 2 3 4 5 6 7 8 9 10

SCALE 1:50 FILE No 15-26-1

SALMO LANDFILL	SEE SITE PLAN FOR WELL LOCATION	BOREHOLE NO: S-MW-1
REGIONAL DISTRICT OF CENTRAL KOOTENAY	GREAT WEST DRILLING	Project No: 9523-002-00-02
PROJECT ENGINEER: JKL	BECKER AIR HAMMER RIG	ELEVATION: 1000.00 (m)

SAMPLE TYPE ■ DISTURBED ▨ SHELBY TUBE ⊠ GRAB SAMPLE ▤ NO RECOVERY ▥ SPT ▥ CORE SAMPLE

DEPTH (m)	USC	SOIL SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE TYPE	SAMPLE NO	PLASTIC / M.C. / LIQUID (20 40 60 80)	WELL INSTALLATION	WELL DESCRIPTION	ELEVATION(m)
0.0			GRAVELLY SAND – very fine to fine – slightly moist to dry – light brown					Bentonite pellets 50 mm SCH 40 PVC blank Casing	1000.0
1.0	SP				1				999.0
2.0								Sandpack (sil #9)	998.0
3.0					2			50 mm 0.01 inch slot PVC Screen	997.0
	SM-GP		SILTY SAND AND GRAVEL – some clay – wet to saturated – dark grey		3			▽: Apr-09	
4.0	BR		BEDROCK – weathered from 3.4 to 4.0 m – competent from 4.0 to 4.25 m		4 5			NOTE: Elevation Approximate	996.0
			END OF BOREHOLE AT 4.25 m Base of Monitoring Well Constructed at 4.25 m Water Level 2.85 m 94/08/15						
5.0									995.0
6.0									994.0
7.0									993.0
8.0									992.0
9.0									991.0
10.0									990.0

UMA Engineering Ltd.
Calgary, Alberta

LOGGED BY: JDQ
REVIEWED BY: JKL
Fig. No:

COMPLETION DEPTH: 4.3 m
COMPLETE: 08/12/94
Page 1 of

94/11/18 08:41AM

STARTED: 9/30/99 FINISHED: 10/1/99

DRILL METHOD: air rotary w/casing hammer

GROUND ELEV. (m): not surveyed

COORDINATES (m):

Casing O.D.: CLOSED END (blows/0.3m)

Hammer Energy: OPEN ENDED (blows/0.3m)

SPT N = BOUNCE PRESS (KPa)

W_P% W% W_L%

20 40 60 80

L	H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
	0					Sand - SM - fine to medium sand with silt - well graded, loose, brown/grey - dry - alluvium	
	3.0					Sand and gravel - SG - coarse to fine sand with gravel and boulders - well graded, loose to compacted - brown/grey - dry to moist, wet below 7.6 m - lot of quartz and quartzite - alluvium	
	8.9					Sand - SW - coarse sand, trace gravel, loose	
	9.8					- poorly graded, brownish - wet - alluvium	
						Sand and gravel - SG - coarse to fine sand with gravel, compacted - trace to some silt and clay - greyish - moist to wet - alluvium	
	14.6					Silty gravel - GM - fine to medium gravel, some sand and silt - compacted, rounded, greyish - wet to saturated - alluvium	
	17.4					Silty clay - CL-ML - plastic to firm, grey to dark grey - trace gravel - lacustrine or overbank sediment	

Continued Next Page

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05

PROJECT: Canex Landfill Impact Assessment

LOCATION: Salmo, B.C.

LOGGED BY: D.Beringer CHECKED BY:

SHEET 1 OF 2 HOLE NO.: MW99-1 (S) & (D)

STARTED: 9/30/99 FINISHED: 10/1/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): not surveyed
COORDINATES (m):

Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
SPT N BOUNCE PRESS (KPa)
W_p% · W% W_L%
20 40 60 80

...d (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
21						
22					22.5	
23					Clayey gravel - GC - fine gravel with dark grey silty clay - dense, rounded - wet - till	
24					24.1	
25					Bedrock - graphitic phyllite - fine, thinly bedded - dark grey, R=4-5 - dry	
26						
27						
28						
29					29.7	
3					End of Hole at: 29.7 m	
31					Monitoring well installation details: deeper piezometer: - screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 3 m long from 26.2 to 29.2 m - sand pack - silica sand size 10-20 from 25.3 to 29.7 m - riser pipe - PVC pipe I.D. 50 mm, schedule 40, flush threaded joints with "o" rings from 0.5 above g. surface to 25.3 m below ground surface - plug - bentonite chips from 17.4 to 25.3 m	
32						
33						
34						
35					shallower piezometer: - screen - as above, from 13.6 to 16.6 m - sand pack - silica sand size 10-20 from 12.2 to 17.4 m - riser pipe - as above, from 0.5 m above g. surface to 13.6 m below ground surface - plug - bentonite chips from 0.9 to 12.2 m - surface completion - steel pipe I.D. 150 mm from 1.3 m below ground surface to 0.5 m, lockable cap, concrete pad	
36						
37						
38					Groundwater level: shallow piezometer 13.16 m below TOC deeper piezometer 7.92 below TOC on October 8, 1999	
39						
40						

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: D.Beringer CHECKED BY:
SHEET 2 OF 2 HOLE NO.: MW99-1 (D)

TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.: CLOSED END (blows/0.3m)

Hammer Energy: OPEN ENDED (blows/0.3m)

● SPT N BOUNCE PRESS (kPa)

W_P% W% W_L%

20 40 60 80

STARTED: 10/2/99 FINISHED: 10/3/99

DRILL METHOD: air rotary w/casing hammer

GROUND ELEV. (m): 86.1

COORDINATES (m): N 4591.2 E 4668.4

ELEV (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
0					Silt - ML - silt with trace fine sand and clay - soft, trace organic debris - moist to wet	
1					- dark brownish, saturated below 1 m	
1.5 / 84.6					- fill (tailings)	
2					Gravel - GM	
2.1 / 84.0					- silty gravel, medium, angular - greyish, saturated - weathered bedrock ?	
3					Bedrock - grey phyllite, thinly bedded - quartzite, R=4-5 - grey to light grey - dry to moist - uniform	
4						
5						
6						
7						
8						
9						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Continued Next Page

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05

PROJECT: Canex Landfill Impact Assessment

LOCATION: Salmo, B.C.

LOGGED BY: V.Stastny CHECKED BY:

SHEET 1 OF 2 HOLE NO.: MW99-2

TEST HOLE LOG

STARTED: 10/2/99 FINISHED: 10/3/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 86.1
COORDINATES (m): N 4591.2 E 4668.4

BECKER PENETRATION TEST
Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N BOUNCE PRESS (KPa)

(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION	W_P% × — — o — — × W_L% 20 40 60 80
21							
22							
23							
24					24.4 61.7 End of Hole at: 24.4 m		
25							
26							
27							
28							
29							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

Monitoring well construction details:
deeper piezometer:
- screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 3 m long from 20.6 to 23.6 m
- sand pack - silica sand size 10-20 from 19.9 to 24.4 m
- riser pipe - blank PVC pipe I.D. 50 mm, schedule 40, flush threaded joints with o rings, from 0.55 m above ground surface to 20.6 m below ground surface
- plug - bentonite chips from 4.6 to 19.9 m

shallow piezometer:
- screen - as above, 1.5 m long from 2.4 to 3.9 m
- sand pack - as above from 2.3 to 4.6 m
- riser pipe - as above from 0.55 m above ground surface to 2.4 m below ground surface
- plug - bentonite chips from 0.9 to 2.3 m
- surface completion - steel pipe I.D. 150 mm from 0.55 m above to 1.2 m below ground surface, lockable cap and concrete pad

Groundwater level:
shallow piezometer 1.86m below TOC
deeper piezometer 1.22 m below TOC
on October 6, 1999

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 2 OF 2 HOLE NO.: MW99-2

TEST HOLE LOG

STARTED: 10/3/99 FINISHED: 10/3/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 101.0
COORDINATES (m): N 4787.6 E 5202

Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N REBOUNCE PRESS. (KPa)
W_P% W% W_L%
20 40 60 80

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
0					Silty sand - SM - fine sand with silt, loose - brown - dry to moist - alluvium/prolluvium	
2					2.4 98.6 Sand - SW - medium sand, trace silt, loose - well graded - moist to saturated - brown - producing only trace water	
4					4.3 96.7 - alluvium Silty clay - CL-ML - plastic, sticky, easy to drill - yellow/brown, poor recovery - overbank or lacustrine sediment	
8					8.5 92.5 Silty sand - SM - fine sand with silt and some fine gravel - loose - moist to saturated	
9					9.7 91.3 - dark brown 10.2 90.8 - alluvium Clayey gravel - GC - silty clay with fine gravel - dense to very dense, grey - till	
12					Bedrock - light grey quartz phyllite - R=4-5 - relatively dry, no obvious inflow	
14					14.1 86.9	
15					Monitoring well construction details: deeper piezometer: - screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 3 m long from 11.0 to 14.0 m - sand pack - silica sand size 10-20 from 10.8 to 14.05 m - riser pipe - blank PVC pipe I.D. 50 mm, schedule 40, flush threaded joints with o rings from 0.55 m above to 11.0 m below ground surface - plug - bentonite chips from 9.75 to 10.8 m shallow piezometer: - screen - as above, 1.5 m long from 8.0 to 9.5 m - sand pack - as above, from 7.6 to 9.75 m - plug - bentonite chips from 0.6 to 7.6 m	
20					Continued Next Page	

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 1 OF 2 HOLE NO.: MW99-3

TEST HOLE LOG

STARTED: 10/3/99 FINISHED: 10/3/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 101.0
COORDINATES (m): N 4787.6 E 5202

Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N BOUNCE PRESS (KPa)

W_p% W% W_L%
20 40 60 80

ELEV (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
21					- riser pipe - as above, from 0.55 m above to 8.0 m below ground surface surface completion - steel pipe 150 mm I.D. from 0.55 m above to 1.2 m below ground surface, lockable cap, concrete pad	
22						
23					Groundwater level: shallow piezometer 8.63 m below TOC deeper piezometer 8.50 m below TOC on October 5, 1999	
24						
25						
26						
27						
28						
29						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 2 OF 2 HOLE NO.: MW99-3

BECKER-SI CANEX.GPJ BECKER.GDT 4/7/00

TEST HOLE LOG

BECKER PENETRATION TEST
Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N BOUNCE PRESS. (KPa)
W_P% W% W_L%
20 40 60 80

STARTED: 10/4/99 FINISHED: 10/4/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 99.4
COORDINATES (m): N 4590.2 E 5068.1

L + (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
1					Sand and gravel - SG - fine to coarse sand with fine gravel - trace silt, well graded, rounded - loose, dry to moist - brown-grey - alluvium	
2						
3					3.0 96.4 Sand and gravel - SG - as above, some boulders - loose, wet	
4						
5					5.2 94.2 Sand and gravel - SG - coarse sand and bouldery gravel - loose to slightly compacted, poorly graded - rounded - grey brownish - saturated, limited inflow into borehole - alluvium	
6						
7						
8						
9						
10					9.8 89.6 Silty gravel - GM - silty sand with fine gravel - medium dense to dense - grey - moist - till	
11						
12						
13					13.1 86.3 Bedrock - grey phyllite, fine texture - thinly bedded; pyrite mineralization - dry to moist; R=4-5	
14						
15						
16						
17					16.8 82.6	
18					Monitoring well construction details: deeper piezometer: - screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 1.5 m long from 15.3 to 16.8 m - sand pack - silica sand size 10-20 from 12.2 to 16.8 m	
19						
20						

Continued Next Page

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 1 OF 2 HOLE NO.: MW99-4

TEST HOLE LOG

Casing O.D.:	CLOSED END (blows/0.3m)
Hammer Energy:	OPEN ENDED (blows/0.3m)
● SPT N	BOUNCE PRESS. (KPa)
W_P% × — — o — — × W_L%	20 40 60 80

STARTED: 9/30/99 FINISHED: 9/30/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 107.4
COORDINATES (m): N 4995.9 E 5235.98

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
1					Sand and gravel - SG - fine to coarse sand, fine to bouldery gravel - well graded, loose, rounded - brown-grey - dry - alluvium	
2						
3						
4						
5						
6						
7						
7.8 / 99.6					Silty sand - SM - fine to medium sand with silt - trace fine gravel - loose, wet, brown - alluvium	
8.8 / 98.6					Silty gravel - GM - fine gravel with silt and sand - dense, well graded, moist, grey - till	
10.0 / 97.4 / 97.1					Bedrock - grey quartz phyllite, R=4-5, dry	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Monitoring well construction details:
- screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 3 m long from 5.5 to 8.5 m
- sand pack - silica sand size 10-20 from 4.6 to 10.3 m
- riser pipe - blank PVC pipe I.D. 50 mm from 0.6 m above to 5.5 m below ground surface
- plug - bentonite chips from 0.6 to 4.6 m
- surface protection - steel pipe I.D. 150 mm from 0.6 m above to 1.2 m below ground surface, lockable cap and concrete pad

Groundwater level:
piezometer was dry from Oct. 2 to Oct. 9, 1999

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: D.Beringer CHECKED BY:
SHEET 1 OF 1 HOLE NO.: MW99-5

BECKER-SI CANEX.GPJ BECKER.GDT 4/7/00

TEST HOLE LOG

STARTED: 10/5/99 FINISHED: 10/6/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 98.2
COORDINATES (m): N 4845.76 E 5104.93

Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N SOUNCE PRESS (KPa)
W_p% W% W_L%
20 40 60 80

Depth (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
0					Silty sand - SM - fine sand and silt, loose to cohesive, bedded - trace angular fragments, moist to wet	
0.9 / 97.3					- grey-brown and rusty - tailings?	
1					Silty clay - CL-ML - some fine sand - plastic, soft, sticky, wet - ochre brown - overbank sediment?	
5.2 / 93.0					Silty sand - SM - fine sand and silt, loose - grey, bedded - saturated - lacustrine sediment?	
9.7 / 88.5					Sand - SW - fine to medium sand, loose, some coarse sand - finer sand below 12.0 m - saturated - brown to brown-grey - alluvium	
12.8 / 85.4					Sand and gravel - SG - some fine gravel with fine to coarse sand - trace silt - loose, saturated - brown-grey - significant water inflow - alluvium	
15.8 / 82.4					Sand and gravel - SG - clean coarse sand and fine gravel - trace pebbles and boulders - loose, brown-grey - saturated, producing about 2 L/sec during drilling - alluvium	
18.3 / 79.9					Bedrock - dark grey graphitic phyllite - thinly bedded, R=4- to 4.5 - no obvious inflow	

Continued Next Page

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 1 OF 2 HOLE NO.: MW99-6

BECKER-S1 CANEX.GPJ BECKER.GDT 4/7/00

TEST HOLE LOG

STARTED: 10/5/99 FINISHED: 10/6/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 98.2
COORDINATES (m): N 4845.76 E 5104.93

BECKER PENETRATION TEST
Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
SPT N SOURCE PRESS (KPa)
W_P% W% W_L%
20 40 60 80

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
21						
21.6 / 76.6					End of Hole at: 21.6 m	
22						
23					Monitoring well installation details: deeper piezometer: - screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 0.9 m long from 20.0 to 20.9 m - sand pack - silica sand size 10-20 from 20.1 to 21.6 m - riser pipe - PVC pipe I.D. 50 mm, schedule 40, flush threaded joints with "o" rings from 0.4 above to 20.0 m below ground surface - plug - bentonite chips from 18.6 to 20.1 m shallow piezometer: - screen - as above, 3 m long from 14.9 to 17.9 m - sand pack - natural sand collapsed from 10.7 to 18.6 m - riser pipe - as above, from 0.4 m above to 14.9 m below ground surface - plug - bentonite chips from 0.9 to 10.7 m - surface completion - steel pipe I.D. 150 mm from 0.4 m above to 1.3 m below ground surface, lockable cap, concrete pad Groundwater level: shallow piezometer 5.97 m below TOC deeper piezometer 6.45 m below TOC on October 6, 1999	
24						
25						
26						
27						
28						
29						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 2 OF 2 HOLE NO.: MW99-6

TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.: CLOSED END (blows/0.3m)

Hammer Energy: OPEN ENDED (blows/0.3m)

● SPT N BOUNCE PRESS (KPa)

W_P% W% W_L%

20 40 60 80

STARTED: 10/6/99 FINISHED: 10/7/99

DRILL METHOD: air rotary w/casing hammer

GROUND ELEV. (m): 104.8

COORDINATES (m): N 4974.03 E 5183.25

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER	INSTALLATION
0					Sand and gravel - SG - fine to coarse sand, trace silt, fine to bouldery gravel - loose to compact - dry to moist - lot of quartzite, brown-grey - alluvium		
6.7							
98.1					Sand and gravel - SG - medium sand with fine gravel, some pebbles - loose, well graded - dry - brownish to grey - alluvium		
9.4							
95.4					Sand and gravel - SG		
10.0					- fine sand and fine gravel, loose		
94.8					- well graded, brown-grey, dry - alluvium		
					Sand - SW - coarse to medium sand, trace gravel and silt - loose, brown - wet to saturated		
11.9					- alluvium		
92.9					Clayey silt - CL-ML - some fine sand, plastic, sticky - brownish to light grey, rusty below 16 m - soft, easy to drill - overbank or lacustrine sediment		
17.4							
87.4					Sand - SW - coarse sand, clean, loose - saturated, high inflow into borehole - brown to rusty and olive - alluvium		
19.2							
85.6					Silty gravel - GM - silty fine to medium gravel, loose		

Continued Next Page

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05

PROJECT: Canex Landfill Impact Assessment

LOCATION: Salmo, B.C.

LOGGED BY: V.Stastny CHECKED BY:

SHEET 1 OF 2 HOLE NO.: MW99-7

BECKER-SI CANEX GPJ BECKER GDT 4/7/00

Klohn-Crippen

TEST HOLE LOG

STARTED: 10/6/99 FINISHED: 10/7/99
DRILL METHOD: air rotary w/casing hammer
GROUND ELEV. (m): 104.8
COORDINATES (m): N 4974.03 E 5183.25

Casing O.D.: CLOSED END (blows/0.3m)
Hammer Energy: OPEN ENDED (blows/0.3m)
● SPT N BOUNCE PRESS (KPa)
W_P% W% W_L%
20 40 60 80

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
21					- some fine to coarse sand, rusty brown - saturated, distinct waste smell - low inflow into borehole 21.0 / 83.8 - alluvium Clayey gravel - GC - silty clay with sand and fine gravel 21.9 / 82.9 - dense, grey to dark grey - moist - till	

Monitoring well installation details:
deeper piezometer:
- screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 3 m long from 18.75 to 20.25 m
- sand pack - silica sand size 10-20 from 20.0 to 21.9 m, natural sand collapsed from 14.6 to 20.0 m
- riser pipe - PVC pipe I.D. 50 mm, schedule 40, flush threaded joints with "o" rings from 0.55 above to 18.75 m below ground surface
- plug - bentonite chips from 11.6 to 14.6 m

shallow piezometer:
- screen - as above, 1.5 m long from 9.55 to 11.05 m
- sand pack - silica sand size 10-20 from 9.1 to 11.6 m
- riser pipe - as above, from 0.55 m above to 9.55 m below ground surface
- plug - bentonite chips from 0.6 to 0.9 m and from 7.9 to 9.1 m separated by native material
- surface completion - steel pipe I.D. 150 mm from 0.55 m above to 1.2 m below ground surface, lockable cap, concrete pad

Groundwater level:
shallow piezometer dry
deeper piezometer 15.54 m below TOC on October 9, 1999

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05
PROJECT: Canex Landfill Impact Assessment
LOCATION: Salmo, B.C.
LOGGED BY: V.Stastny CHECKED BY:
SHEET 2 OF 2 HOLE NO.: MW99-7

BECKER.SI CANEX.GPJ BECKER.GDT 4/7/00

TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.: CLOSED END (blows/0.3m)

Hammer Energy: OPEN ENDED (blows/0.3m)

■ SPT N ▷ BOUNCE PRESS (KPa)

W_p% × — — o — — × W_L%

20 40 60 80

STARTED: 10/7/99 FINISHED: 10/7/99

DRILL METHOD: air rotary w/casing hammer

GROUND ELEV. (m): 103.5

COORDINATES (m): N 4802.79 E 5265.61

H (m)	SPT BLOWS PER 0.15m	OTHER TESTS	SOIL CORE RECOVERY (%)	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER INSTALLATION
1					Gravel - GM - silty, sandy gravel, fine to medium - same waste, loose, moist to wet - dark grey, waste odour - fill	
2					2.1 / 101.4 Sand - SW - medium sand, poorly graded - dry to moist, light grey - sulphur smell - resembling tailings material	
3					3.6 - fill	
4					99.9 Silt - ML - uniform silt with some fine sand, trace clay - soft, wet - grey, olive to brown	
5					4.9 / 98.6 - lacustrine sediment?	
6					Sand and gravel - SG - fine to coarse sand with fine gravel - trace silt, loose, saturated 6.1 / 97.4 - ochre to brown - alluvium	
7					6.7 / 96.8 Silt - ML - silt to sandy silt, loose to soft - trace clay, bedded - light grey to ochre - overbank or lacustrine sediment	
8						
9						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Monitoring well construction details:
- screen - slotted PVC pipe I.D. 50 mm, schedule 40, slot size 10, 1.5 m long from 4.8 to 6.3 m
- sand pack - silica sand size 10-20 from 4.7 to 6.7 m
- riser pipe - blank PVC pipe I.D. 50 mm from 0.6 m above to 4.8 m below ground surface
- plug - bentonite chips from 0.9 to 4.7 m
surface protection - steel pipe I.D. 150 mm from 0.6 above to 1.2 m below ground surface, lockable cap and concrete pad

Groundwater level:
4.97 m below TOC
on October 9, 1999

KLOHN-CRIPPEN

PROJECT NO.: PG8748 02 05

PROJECT: Canex Landfill Impact Assessment

LOCATION: Salmo, B.C.

LOGGED BY: V.Stastny CHECKED BY:

SHEET 1 OF 1 HOLE NO.: MW99-8

BECKER-SI CANEX.GPJ BECKER.GDT 4/7/00

BORING NUMBER : BGC-BH-00-1

DRILLING METHOD : Hollow Stem Auger
DRILLING CONTRACTOR : Thorman
START : 12:15 am, Oct. 30/00
FINISH : 5:00 pm, Oct. 31/00
SAMPLE LEGEND : SPT ⋈ GRAB G

LOCATION : Dam crest, 3m south of centerline

DEPTH BELOW SURFACE (m)	NUMBER	RECOVERY	STANDARD PENETRATION 6"-6"-6"- (N)	SAMPLE SYMBOL	USCS SYMBOL	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	INSTRUMENT
1	Grab 1	N/A	N/A	G	SM		***Sandy SILT*** Trace gravel, compact, moist, olive grey, rootlets. [Fill]	P1 (24m) (3/4 " PVC) → P2 (13.3m) (3/4" PVC) →	
2	SPT 1	18/18	14/12/6	⋈					
3					ML		***SILT*** Trace sand and clay, compact, moist, brown. [Fill]	Bentonite Chips	
4	SPT 2	17.5/18	30/23/17	⋈	SM To ML		***Sandy, gravelly SILT*** Some clay, compact to dense, moist, olive grey to medium brown. Contains limestone pebbles. Clay content increases with depth. Cobble at 5.2m. [Fill] Small cobble at 6.7m.		
5	SPT 3	16.5/18	13/13/11	⋈					
6	SPT 4	18/18	4/7/10	⋈					
7								Bentonite Grout	
8	SPT 5	18/18	4/7/12	⋈					
9	SPT 6	15/18	25/55/65	⋈	SW		***SAND and GRAVEL*** Some silt, dense to very dense, almost dry at top,		
10									

BORING NUMBER : BGC-BH-00-1

DRILLING METHOD : Hollow Stem Auger
DRILLING CONTRACTOR : Thorman
START : 12:15 am, Oct. 30/00
FINISH : 5:00 pm, Oct. 31/00
SAMPLE LEGEND : SPT ⋈ GRAB ⊔

LOCATION : Dam crest, 3m south of centerline

DEPTH BELOW SURFACE (m)	NUMBER	RECOVERY	STANDARD PENETRATION 6"-6"-6"- (N)	SAMPLE SYMBOL	USCS SYMBOL	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	INSTRUMENT
11	SPT 7	17/18	16/23/25	⋈			moisture content increases with depth, light grey. [Fill - Drain material]		
12					SM		***Silty SAND*** Some gravel and trace clay, very loose, wet, medium grey to brown. [Fill] Drilling becomes very smooth at 11.6m. Tried SPT 8 but spoon sank under hammer weight.	Bentonite Chips Dec. 3/00 3:45 pm, Nov. 1/00	
13	SPT 8	18/18	0/0/1	⋈					
14	SPT 9	18/18	1/2/4	⋈	SM		***SAND and SILT*** Some gravel and clay. Loose to compact, dark grey to olive grey, moist, contains decomposed wood fragments. [Fill]	Sand Dec. 3/00	
15									
16	SPT 10	17/18	3/3/6	⋈				Bentonite Chips	
17	SPT 11	18/18	2/5/5	⋈					
18									
19	SPT 12	7/18	4/9/8	⋈					
20	SPT 13	14/18	6/8/15	⋈	ML		***Clayey SILT*** Some sand, compact, light brown, mottled, moist. [Fill]	3:45 pm, Nov. 1/00	

BORING NUMBER : BGC-BH-00-1

DRILLING METHOD : Hollow Stem Auger
DRILLING CONTRACTOR : Thorman
START : 12:15 am, Oct. 30/00
FINISH : 5:00 pm, Oct. 31/00
SAMPLE LEGEND : SPT ⋈ GRAB ⊔

LOCATION : Dam crest, 3m south of centerline

DEPTH BELOW SURFACE (m)	NUMBER	RECOVERY	STANDARD PENETRATION 6"-6"-6" - (N)	SAMPLE SYMBOL	USCS SYMBOL	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	INSTRUMENT
21				⋈					
	SPT 14	18/18	6/7/7	⋈					
22					ML		***Sandy SILT*** Trace clay, dark grey, wet, compact. [Glaciolacustrine]		
23	SPT 15	16/18	4/10/16	⋈	SM		***Gravelly Silty SAND*** Some clay, moist, olive grey, compact. [Till] Increasing cobble content at 23.45m, based on rough drill action.	Sand	
24							End of Hole	Casagrande Tip (Auger Refusal) Suspect Bedrock	
25									
26									
27									
28									
29									
30									

BORING NUMBER : BGC-BH-00-2

DRILLING METHOD : Hollow Stem Auger
DRILLING CONTRACTOR : Thorman
START : 8:00 am, Nov. 1/00
FINISH : 3:30 pm, Nov. 1/00
SAMPLE LEGEND : SPT ⋈ GRAB ⊓

LOCATION : 15m West of Dam Toe

DEPTH BELOW SURFACE (m)	NUMBER	RECOVERY	STANDARD PENETRATION 6"-6"-6"- (N)	SAMPLE SYMBOL	USCS SYMBOL	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	INSTRUMENT
					OL		Organics, wet, soft.	Cement	
	Grab 1	N/A	N/A	G	GM		***Sandy GRAVEL*** Some silt and large boulders, wet. [Fill]	Bentonite Chips	
1							***Sandy SILT*** Trace clay, moist, compact, grey, weakly stratified with light grey sand layers containing minor muscovite, and thin organic layers at a 5-30 cm spacing. [Glaciolacustrine]	P3 (17.5m) →	
	SPT 1	18/18	5/9/13	⋈	ML				
2									
3	SPT 2	18/18	7/9/13	⋈					
4								Dec. 3/00	
	SPT 3	18/18	5/11/16	⋈			Silt content increases and organic content decreases with depth.	Drill Cuttings	
5									
6	SPT 4	18/18	8/13/15	⋈					
							1mm thick white volcanic ash layer at 6.40m depth.		
7									
	SPT 5	18/18	7/12/15	⋈					
8									
9	SPT 6	?	11/11/17	⋈			SPT blow counts for samples 6-11 logged by Thorman Drill Crew.		
10									

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Vancouver, B.C. Phone: (604) 684-5900

Logged by:	MJP	Client: Regional District of Central Kootenay
Checked by:	BW	Project: HB Tailings Pond Decommissioning
Reviewed by:	IGB	Project No: 0268-001-02

BORING NUMBER : BGC-BH-00-2

DRILLING METHOD : Hollow Stem Auger
DRILLING CONTRACTOR : Thorman
START : 8:00 am, Nov. 1/00
FINISH : 3:30 pm, Nov. 1/00
SAMPLE LEGEND : SPT ⋈ GRAB

LOCATION : 15m West of Dam Toe

DEPTH BELOW SURFACE (m)	NUMBER	RECOVERY	STANDARD PENETRATION 6"-6"-6"- (N)	SAMPLE SYMBOL	USCS SYMBOL	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	INSTRUMENT
11	SPT 7	?	9/11/18	⋈				Bentonite Chips	
12	SPT 8	?	7/12/18	⋈	ML				
13									
14	SPT 9	?	8/12/18	⋈					
15									
	SPT 10	?	7/10/16	⋈			***CLAY and SILT*** Moist, compact, contains thin sand layers,olive grey. [Glaciolacustrine]		
16					CL			4:00 pm, Nov. 1/00	
17							Increasing content of small, subrounded pebbles at depth.	Sand	
18									
	SPT 11	?	11/13/37	⋈					
19							End of Hole		
20									

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Vancouver, B.C. Phone: (604) 684-5900

Logged by:	MJP	Client: Regional District of Central Kootenay
Checked by:	BW	Project: HB Tailings Pond Decommissioning
Reviewed by:	IGB	Project No: 0268-001-02

MAGLIO INSTALLATIONS LTD.
NELSON, BC V1L 6H9
250-352-7939 FAX: 250-352-5441

INTER-OFFICE MEMO № 286

Date Sept 9, 2005

To BGC Engineering Inc

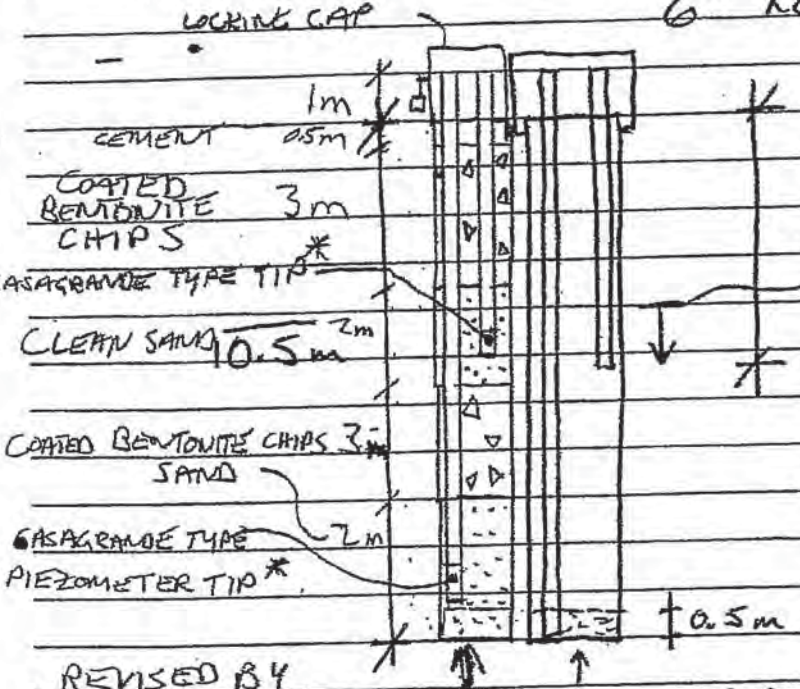
From

Re: Drilling & Installing Piezometer

Equipment - Thorman Drilling

Schramm T 450 Air Rotary, Track mount and Flatdeck with Hiab support truck.

- Drill and case 6" casing
  6" locking protective pipe



Install Piezometer 1 @ 10m 1 @ 5m

*SAMPLE CASAGRANDE TYPE PIEZOMETER TIP ATTACHED

Sept 16, 2005

P5 and P6

MAGLIO INSTALLATIONS LTD.
186 JOHNSTONE ROAD,
NELSON, BC V1L 6H9
250-352-7939 FAX: 250-352-5441

Sept

INTER-OFFICE MEMO № 286

Date Sept 9, 2005

To BGC Engineering Inc

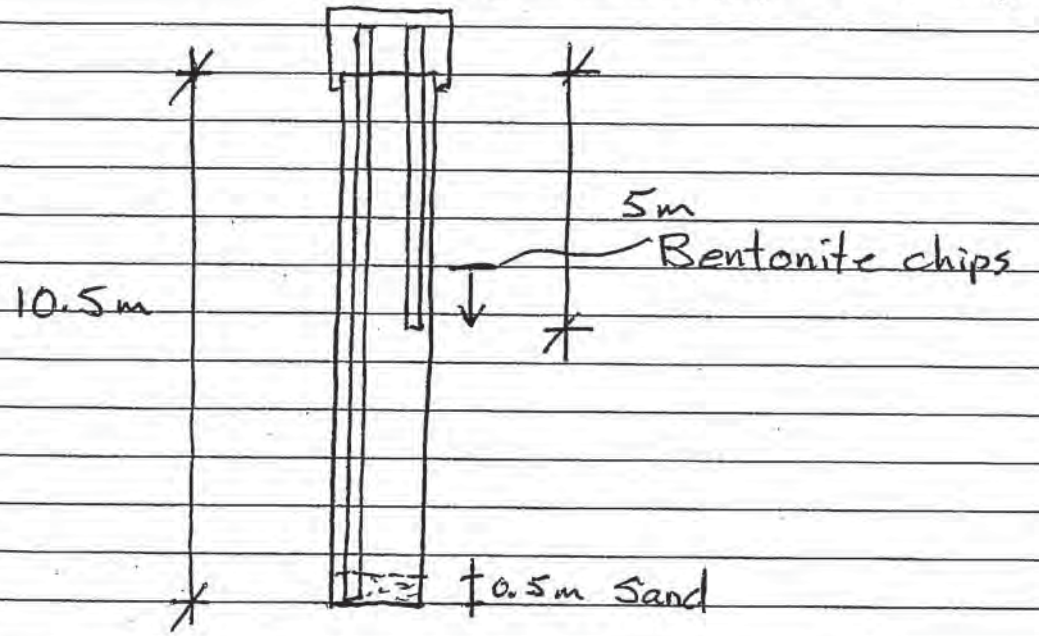
From

Re: Drilling & Installing Piezometer

Equipment - Thorman Drilling

Schramm T450 Air Rotary, Truck mount and flatdeck with Hiab support truck.

- Drill and case 6" casing
  6" locking protective pipe
-



Install Piezometer 1 @ 10m 1 @ 5m

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-06)
Page 1 of 2

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (ROCK)
LOCATION: CELL #2 (SOUTHWEST AREA OF CELL)

HOLE DESIGNATION: LW-02A-01 (LEACHATE WELL)
DATE COMPLETED: MAY 31, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	995.420 994.80					
	SAND/TRASH, grey, dry		CONCRETE				
0.5							
1.0							
1.5							
2.0							
2.5			BENTONITE SEAL				
3.0							
3.5							
4.0							
4.5			102mm Ø PVC PIPE				
5.0							
5.5							
6.0			PEA GRAVEL				
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

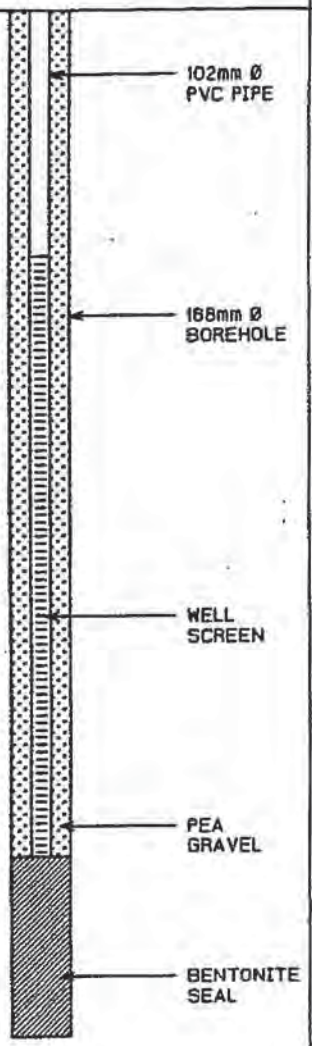
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-06)
Page 2 of 2

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (ROCK)
LOCATION: CELL #2 (SOUTHWEST AREA OF CELL)

HOLE DESIGNATION: LW-02A-01 (LEACHATE WELL)
DATE COMPLETED: MAY 31, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
7.5							
8.0							
8.5							
9.0	- moist						
9.5							
10.0		984.74					
	SW/GW-SAND and GRAVEL (FILL), medium grained light grey sand, rounded fine grained grey gravel, dry	984.44					
10.5	SW/GW-SAND and GRAVEL (NATIVE), medium grained golden brown sand, rounded fine grained brown gravel, dry						
11.0							
		983.52					
11.5	BEDROCK, (phyllite) grey and brown, dry (small angular chips and rock flour)						
12.0							
		982.61					
	END OF HOLE @ 12.19m BGS						
12.5	NOTES: 1. Methane noted during well completion.						
13.0							
13.5							



SCREEN DETAILS
Screened Interval:
8.23 to 11.28m BGS
Length: 3.05m
Diameter: 102mm
Slot Size: 6mm Ø
Material: PVC
Pea Gravel Pack:
3.05 to 11.28m BGS
Material: 10mm Pea Gravel

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-07)
Page 1 of 2

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: CELL #1 (LOWER AREA – NORTHWEST CORNER)

HOLE DESIGNATION: LW-03-01 (LEACHATE WELL)
DATE COMPLETED: JUNE 1, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	981.820 981.24					
0.5	SAND/GRAVEL/TRASH, grey, dry		CONCRETE				
1.0			BENTONITE SEAL				
1.5							
2.0							
2.5			51mm Ø PVC PIPE				
3.0		978.19					
	SW-SAND (NATIVE), with gravel, fine to medium grained, grey, moist to dry						
3.5				D08GS			
		977.28					
4.0	SW/GW-SAND and GRAVEL, fine to medium grained sand, fine grained gravel (subrounded), grey, moist		168mm Ø BOREHOLE				
4.5				D09GS			
	– wet @ 4.88m BGS	976.36					
5.0	SW/GW-SAND and GRAVEL, fine to medium grained sand, fine grained gravel, grey sand, red and grey gravel, moist		WELL SCREEN				
5.5				D10GS			
6.0			SAND PACK				
6.5							
		974.53					
	CL/SM-CLAY and SAND, fine grained, plastic, grey, wet						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊽ STATIC WATER LEVEL ⊻
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: CELL #1 (LOWER AREA - NORTHWEST CORNER)

HOLE DESIGNATION: LW-03-01 (LEACHATE WELL)
DATE COMPLETED: JUNE 1, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
7.5			WELL SCREEN; SAND PACK				
8.0	CI/SM-CLAY and SAND, some silt, very fine grained, plastic, wet	973.32	BENTONITE SEAL				
8.5							
9.0				D11GS			
9.5			168mm Ø BOREHOLE				
	END OF HOLE @ 9.75m BGS	971.49					
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							

SCREEN DETAILS
Screened interval:
4.72 to 7.77m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
1.83 to 7.92m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-13)
Page 1 of 3

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01A-01
DATE COMPLETED: JULY 17, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	908.980 908.45					
0.5	SW-SAND, some fine white and grey angular gravel, fine grained, dry fine grained, brown, moist		CONCRETE				
1.0							
1.5							
2.0							
2.5	– some fine grey angular gravel, medium grained sand		BENTONITE SEAL				
3.0							
3.5							
4.0							
4.5	GP-GRAVEL, some light brown sand, coarse grained, angular, grey, dry	904.18	51mm Ø PVC PIPE				
5.0							
5.5	SP-SAND, with coarse and fine angular gravel, fine grained, dark brown, dry	902.96					
6.0			185mm Ø BOREHOLE				
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01A-01
DATE COMPLETED: JULY 17, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
7.5			BENTONITE SEAL				
8.0							
8.5			51mm Ø PVC PIPE				
9.0							
9.5							
10.0							
10.5	GW-GRAVEL, with coarse dark brown sand, coarse grained, rounded, dry	898.09	165mm Ø BOREHOLE				
11.0							
11.5							
12.0							
12.5	SW-SAND, some fine rounded gravel, medium grained, dark brown, moist	896.26	SAND PACK				
13.0							
13.5			WELL SCREEN				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ · STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01A-01
DATE COMPLETED: JULY 17, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	CI-CLAY, with medium brown sand, light brown, moist	894.43	WELL SCREEN				
-14.5							
-15.0							
	SC-SAND, trace clay, fine grained, dark brown, dry	893.21	SAND PACK				
-15.5							
	SP-SAND, fine grained, trace medium grained, dark brown, dry	892.60	BENTONITE SEAL				
-16.0							
-16.5							
-17.0							
-17.5							
	BEDROCK, (grey phyllite), dry	890.77	165mm Ø BOREHOLE				
-18.0							
	END OF HOLE @ 18.29m BGS	890.16					
-18.5							
-19.0							
-19.5							
-20.0							
-20.5							

SCREEN DETAILS
Screened interval:
12.80 to 15.85m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
9.14 to 15.85m BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-08)
Page 1 of 2

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: NORTH OF SHEEP CREEK

HOLE DESIGNATION: MW-02A-01
DATE COMPLETED: JUNE 4, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*929.120* *928.38*					
0.5	TOPSOIL/SAND (NATIVE), vegetation (roots), trace gravel, brown, moist		CONCRETE				
	SP/GP-SAND and GRAVEL, fine grained, subrounded, brown, moist	*927.77*					
1.0							
1.5			BENTONITE SEAL				
	– boulder (1.8 to 2.7m BGS)						
2.0							
2.5							
	GP/SP-GRAVEL and SAND, coarse grained gravel, medium grained sand, moist to dry	*925.64*					
3.0	– boulder		51mm Ø PVC PIPE				
3.5	– wet @ 3.66m BGS						
4.0							
4.5			188mm Ø BOREHOLE				
5.0							
5.5			WELL SCREEN				
6.0	– boulders (6.1 to 7.6m BGS)						
6.5			SAND PACK				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (ROCK)
LOCATION: NORTH OF SHEEP CREEK

HOLE DESIGNATION: MW-02A-01
DATE COMPLETED: JUNE 4, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
7.5			WELL SCREEN				
	GC-GRAVEL (TILL), sand, clay, plastic, moist to wet	920.76					
8.0	- boulder (7.8 to 8.5m BGS)		SAND PACK				
			168mm Ø BOREHOLE				
8.5	- refusal	919.85					
	END OF HOLE @ 8.53m BGS						
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							

SCREEN DETAILS
Screened Interval:
5.33 to 8.38m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: PVC
Sand Pack:
2.44 to 8.53m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-09)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: NORTHEAST OF LANDFILL

HOLE DESIGNATION: MW-03A-01
DATE COMPLETED: JUNE 4, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

Δh 247.53
TOC ~ 704.64

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	952.840 952.23					
0.5	GP-GRAVEL (NATIVE), with coarse sand, coarse grained gravel, grey, moist		CONCRETE				
1.0							
1.5							
2.0	GC-GRAVEL, with sand, trace clay, coarse grained, grey brown, wet	950.40					
2.5	SM/ML-SAND and SILT, trace clay, trace gravel, moist	949.79	BENTONITE SEAL				
3.0	GM-SILT and GRAVEL, some sand, fine grained, saturated	949.18					
3.5							
4.0							
4.5			51mm Ø PVC PIPE				
5.0							
5.5							
6.0							
6.5			168mm Ø BOREHOLE				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: NORTHEAST OF LANDFILL

HOLE DESIGNATION: MW-03A-01
DATE COMPLETED: JUNE 4, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	– moist		BENTONITE SEAL				
7.5							
8.0			51mm Ø PVC PIPE				
8.5							
9.0		943.09					
	GC–GRAVEL, with sand, coarse grained, grey, moist		SAND PACK				
9.5		942.48					
	GM–SILT and GRAVEL, some fine grained sand, coarse grained gravel, grey, moist			D28GS			
10.0							
10.5							
11.0			168mm Ø BOREHOLE				
11.5							
12.0							
12.5							
13.0			WELL SCREEN				
13.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: NORTHEAST OF LANDFILL

HOLE DESIGNATION: MW-03A-01
DATE COMPLETED: JUNE 4, 2001.
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GP-GRAVEL, some sand, trace silt, wet	938.21	WELL SCREEN SAND PACK 168mm Ø BOREHOLE				
14.5							
15.0							
	END OF HOLE @ 15.24m BGS	936.99					
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							
19.0							
19.5							
20.0							
20.5							

SCREEN DETAILS
Screened interval:
12.04 to 15.09m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
7.32 to 15.24m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

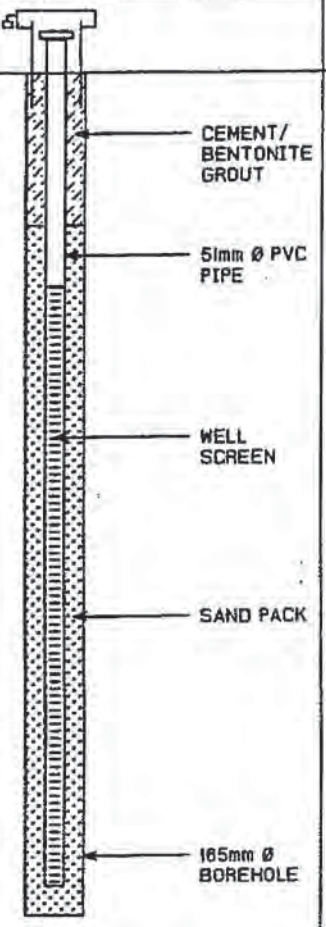
(WL-14)
Page 1 of 1

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-04-01
DATE COMPLETED: JULY 16, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

738.7
TOC ~ 986m

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	986.270 985.78					
0.5	SP-SAND, with fine rounded gravel, coarse grained, dark brown, dry						
		985.17					
1.0	SW-SAND, some fine rounded gravel, fine grained, light brown, dry - boulder						
1.5							
2.0	- some coarse gravel, dark grey						
2.5							
3.0		982.73					
3.5	SP-SAND, some fine angular gravel, fine grained, light pink and grey, dry						
		982.12					
4.0	BEDROCK, (light grey phyllite), dry						
		981.51					
4.5	END OF HOLE @ 4.27m BGS						
5.0							
5.5							
6.0							
6.5							



SCREEN DETAILS
Screened Interval:
1.07 to 4.11m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
0.76 to 4.27m BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-10)
Page 1 of 1

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: BACKGROUND – EAST OF TAILINGS POND

HOLE DESIGNATION: MW-05-01
DATE COMPLETED: JUNE 2, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

TOC = 740.6 ~~TOC = 740.62~~

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*988.150* *987.51*					
0.5	SM-SAND (NATIVE), some fine angular gravel, brown, damp		CONCRETE	012GS			
1.0	– some silt, trace clay, moist		BENTONITE SEAL 51mm Ø PVC PIPE	013GS			
1.5							
2.0	CL-SILTY CLAY (NATIVE), with trace fine sand, brown, moist	*985.68*	WELL SCREEN				
2.5				014GS			
3.0			SAND PACK				
3.5	– some fine sand, trace fine gravel (rounded), moist		168mm Ø BOREHOLE	015GS			
4.0				016GS			
4.5	END OF HOLE @ 4.42m BGS	*983.09*					
5.0							
5.5							
6.0							
6.5							

SCREEN DETAILS
Screened Interval:
1.07 to 4.11m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
1.07 to 4.42m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

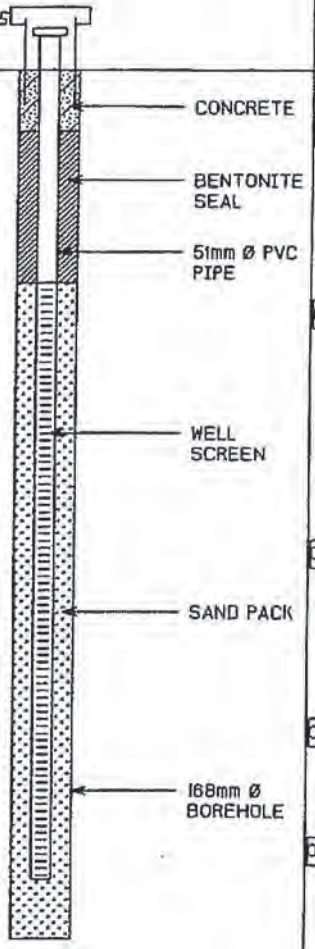
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-10)
Page 1 of 1

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: BACKGROUND - EAST OF TAILINGS POND

HOLE DESIGNATION: MW-05-01
DATE COMPLETED: JUNE 2, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*988.150* *987.51*					
0.5	SM-SAND (NATIVE), some fine angular gravel, brown, damp			012GS			
	- some silt, trace clay, moist						
1.0							
1.5				013GS			
		985.68					
2.0	CL-SILTY CLAY (NATIVE), with trace fine sand, brown, moist						
2.5				014GS			
3.0							
3.5	- some fine sand, trace fine gravel (rounded), moist			015GS			
4.0				016GS			
		983.09					
4.5	END OF HOLE @ 4.42m BGS						
5.0							
5.5							
6.0							
6.5							



SCREEN DETAILS
Screened interval:
1.07 to 4.11m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
1.07 to 4.42m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-11)
Page 1 of 1

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: TAILINGS AREA - NORTH

HOLE DESIGNATION: MW-06-01
DATE COMPLETED: JUNE 2, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD/D. MILLARD

TOC = ~~965.070~~ 715 m

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	962.550 961.72					
0.5	TAILINGS, sand like, some organic debris (i.e. roots), moist - medium sand like, damp - sandy silt like, moist		CONCRETE BENTONITE SEAL 51mm Ø PVC PIPE	D17GS D18GS D19GS			
1.0	- fine sandy silt like			D20GS			
1.5	- silt like, saturated			D21GS D22GS			
2.0			WELL SCREEN	D23GS			
2.5				D24GS D25GS			
3.0			SAND PACK	D26GS			
3.5			168mm Ø BOREHOLE				
4.0	END OF HOLE @ 3.96m BGS	357.76					
4.5							
5.0							
5.5							
6.0							
6.5							

SCREEN DETAILS
Screened interval:
0.76 to 3.81m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
0.76 to 3.96m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-12)
Page 1 of 1

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: BACKGROUND - EAST OF CELL #1

HOLE DESIGNATION: MW-07-01
DATE COMPLETED: JUNE 2, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: D. MILLARD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	1049.780 1049.38					
0.5	SM-SAND (NATIVE), some gravel (angular and subangular), fine grained, brown, moist		CONCRETE BENTONITE SEAL				
1.0							
1.5	- fine to medium grained sand, fine grained gravel, moist to wet		51mm Ø PVC PIPE				
2.0							
2.5	SM/ML-SAND and SILT, very fine grained, brown becoming olive, wet	1046.94	WELL SCREEN				
3.0							
3.5							
4.0			SAND PACK				
4.5	CL/ML-CLAY and SILT, plastic, olive, wet	1045.11					
5.0			168mm Ø BOREHOLE				
5.5	END OF HOLE @ 5.49m BGS	1043.89					
6.0							
6.5							

SCREEN DETAILS
Screened interval:
2.28 to 5.33m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
1.68 to 5.49m BGS
Material: 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-15)
Page 1 of 2

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-08-01
DATE COMPLETED: JULY 17, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

TOC = 731.23

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	979.450					
	GROUND SURFACE	978.83					
1.0	SP-SAND, some fine rounded gravel, medium grained, light brown, dry - coarse grained gravel, orange brown sand, moist	977.61	CONCRETE				
2.0	SW-SAND, fine angular rounded gravel, medium grained, light brown, moist		BENTONITE SEAL				
3.0		975.78					
4.0	GW-GRAVEL, some medium brown sand, fine grained, sub-rounded, grey and green, moist - coarse gravel, grey sand	974.56					
5.0	SP-SAND, with fine subangular gravel, medium grained, light brown, moist - coarse gravel, grey/brown sand		SAND PACK				
6.0							
7.0			165mm Ø BOREHOLE				
		971.52					
8.0	SW-SAND, fine grained, light brown, moist						
9.0			51mm Ø PVC PIPE				
10.0		969.08					
11.0	SM-SAND, with some silt, fine grained, grey, damp		WELL SCREEN				
		967.25					
12.0	SW-SAND, some fine rounded gravel, fine grained, grey, moist						
		966.03					
13.0	SP-SAND, some sub-angular fine gravel, medium grained, brown, moist						
14.0			BENTONITE SEAL				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-08-01
DATE COMPLETED: JULY 17, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
16.0	BEDROCK, (grey phyllite)	*962.98*	165mm Ø BOREHOLE				
	END OF HOLE @ 15.85m BGS	*962.98*	SCREEN DETAILS Screened Interval: 9.14 to 12.19m BGS Length: 3.05m Diameter: 51mm Slot Size: #10 Material: PVC Sand Pack: 4.57 to 12.19m BGS Material: Silica Sand				
17.0							
18.0							
19.0							
20.0							
21.0							
22.0							
23.0							
24.0							
25.0							
26.0							
27.0							
28.0							
29.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-16)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (ROCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-01
DATE COMPLETED: JULY 18, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

TOC = 732.06m

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	979.590 979.04					
	SP-SAND, trace fine rounded gravel, fine grained, light brown, dry		CONCRETE				
-1.0	- coarse sub-angular gravel, medium grained, grey						
-2.0							
-3.0			BENTONITE SEAL				
-4.0							
-5.0							
-6.0							
			51mm Ø PVC PIPE				
-7.0							
-8.0							
-9.0							
-10.0			165mm Ø BOREHOLE				
-11.0							
	- some fine rounded gravel, light brown, moist						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-01
DATE COMPLETED: JULY 18, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-13.0	CI-CLAY, silty, grey, moist	985.63	BENTONITE SEAL	1SS			
-14.0							
-15.0			51mm Ø PVC PIPE	2SS			
-16.0							
-17.0	SC-SAND, fine grained, light grey, moist	981.97					
-18.0			SAND PACK				
-19.0							
-20.0	SW-SAND, some fine rounded gravel, medium grained, light brown, moist	959.53					
-21.0							
-22.0	SP-SAND, fine sub-angular gravel, trace clay, medium grained, dark brown, moist	957.09	165mm Ø BOREHOLE				
-23.0							
		955.27					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-01
DATE COMPLETED: JULY 18, 2001
DRILLING METHOD: AIR ROTARY/CASE HAMMER
CRA SUPERVISOR: R. MacLEOD

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
25.0	GW-GRAVEL, some medium grey sand, fine grained, angular, rounded, dry		WELL SCREEN				
26.0							
27.0			SAND PACK				
28.0				3SS			
29.0	BEDROCK, (phyllite), dry	950.39	165mm Ø BOREHOLE				
30.0	END OF HOLE @ 29.87m BGS	949.17					
31.0							
32.0							
33.0							
34.0							
35.0							

SCREEN DETAILS
Screened interval:
24.38 to 27.43m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
17.07 to 29.87m BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-02(S)
DATE COMPLETED: October 29, 2002
DRILLING METHOD: Air Rotary/ Case Hammer
FIELD PERSONNEL: T. Dhara

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF RISER GROUND SURFACE	979.950 979.14					
0	SP-SAND, trace fine rounded gravel, fine grained, light brown, dry		Concrete Surface Seal				
1	- coarse sub-angular gravel, medium grained, grey at 0.91m BGS						
2							
3							
4							
5			50 mm Sch 40 Riser Pipe				
6			Bentonite Seal				
7							
8							
9			185 mm Borehole				
10							
11							
12	- some fine rounded gravel, light brown, moist at 11.89m BGS		Silica Sand Sch 40 PVC Screen				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-01.GPJ CRA_CORP.GDT 12/17/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-02(S)
DATE COMPLETED: October 29, 2002
DRILLING METHOD: Air Rotary/ Case Hammer
FIELD PERSONNEL: T. Dhara

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	
13	END OF BOREHOLE @ 13.11m BGS Note: Soil descriptions reproduced from original stratigraphic and instrumentation (MW-09-01). On Oct. 29, 2002 this original monitoring well was abandoned and replaced with this monitoring well installation, MW-09-02(S), plus the deeper monitoring well MW-09-02(D)	968.34	 WELL DETAILS Screened Interval: 967.98 to 968.34m 11.28 to 12.80m BGS Length: 1.52m Diameter: 51mm Slot Size: 10 Material: Sch 40 PVC Seal: 978.53 to 968.17m 0.81 to 10.07m BGS Material: Bentonite Sand Pack: 968.17 to 968.34m 10.97 to 12.80m BGS Material: Silica Sand					
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-2 GPJ CRA_CORP.GDT 12/17/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-02(D)
DATE COMPLETED: October 30, 2002
DRILLING METHOD: Air Rotary/ Case Hammer
FIELD PERSONNEL: T. Dhara

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF RISER GROUND SURFACE	979.930 979.24					
0	SP-SAND, trace fine rounded gravel, fine grained, light brown, dry		Concrete Surface Seal				
1	- coarse sub-angular gravel, medium grained, grey at 0.91m BGS						
2							
3			165 mm Borehole				
4							
5			Bentonite Seal				
6							
7			50 mm SCH 40 PVC Riser Pipe				
8							
9							
10							
11							
12	- some fine rounded gravel, light brown, moist at 11.89m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-31.SPJ CRA_CORP.GDT 12/17/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-09-02(D)
DATE COMPLETED: October 30, 2002
DRILLING METHOD: Air Rotary/ Case Hammer
FIELD PERSONNEL: T. Dhara

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
13							
	CL-CLAY, silty, grey, moist	968.83	Bentonite Seal				
14							
15			50 mm SCH 40 PVC Riser Pipe				
16							
17	SC-SAND, fine grained, light grey, moist	962.17					
18			165 mm Borehole				
19							
	SW-SAND, some fine rounded gravel, medium grained, light brown, moist	958.73					
20							
21							
22	SP-SAND, fine sub-angular gravel, trace clay, medium grained, dark brown, moist	957.29					
23			Silica Sand Pack				
	GW-GRAVEL, some medium grey sand, fine grained, angular, rounded, dry	955.47	50 mm SCH 40 PVC Well Screen				
24							
	BEDROCK (PHYLLITE). Dry	954.55					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275 01.GPJ CRA_COMP.GDT 12/17/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Canex 2004 Drilling Program
PROJECT NUMBER: 17275-11
CLIENT: Regional District of Central Kootenay
LOCATION: Canex Landfill Site, Salmo, B.C.

HOLE DESIGNATION: MW-01-2004(S)
DATE COMPLETED: June 22, 2004
DRILLING METHOD: Air Rotary (ODEX)
FIELD PERSONNEL: DSG & GM

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF RISER GROUND SURFACE	0.71 m above ground surface 682.00 m				
0.5	OL - ORGANIC SOIL, SANDY SILT, BROWN, DRY		CEMENT			
0.91						
1.0	MLS - SANDY SILT, SOME SUBROUNDED GRAVEL, GREYISH, MOIST.		BENTONITE			
1.5						
2.0						
2.5			▽			
3.0		3.05				
3.5	GWS - SANDY GRAVEL, SOME SILT, GREY-BROWN, MOIST TO WET.					
4.0			SCREEN SILICA SAND			
4.5		4.57				
5.0	SM - SILTY SAND, SOME SUBROUNDED GRAVEL, GREYISH, WET.					
5.5						
6.0		6.10				
6.5	END OF BOREHOLE @ 6.10m BGS					
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						

WELL DETAILS
Screened interval:
2.44 to 5.49m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 0.010in
Seal:
0.91 to 2.13m BGS
Material: BENTONITE
Sand Pack:
2.13 to 6.10m BGS
Material: SILICA SAND

Seal:
0.00 to 0.91m BGS
Material: CEMENT

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

BEDROCK LOG 17275-11 JUNE 2004 DRILLING.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Canex 2004 Drilling Program
PROJECT NUMBER: 17275-11
CLIENT: Regional District of Central Kootenay
LOCATION: Canex Landfill Site, Salmo, B.C.

HOLE DESIGNATION: MW-01-2004(D)
DATE COMPLETED: June 22, 2004
DRILLING METHOD: Air Rotary (ODEX)
FIELD PERSONNEL: DSG & GM

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF RISER GROUND SURFACE	0.75 m above ground surface 682.00 m				
0	OL - ORGANIC SOIL, SANDY SILT, BROWN, DRY.		CEMENT			
1	MLS - SANDY SILT, SOME SUBROUNDED GRAVEL, GREYISH, MOIST.	0.91				
2			▽			
3	GWS - SANDY GRAVEL, SOME SILT, GREY-BROWN, MOIST TO WET.	3.05				
4						
5	SM - SILTY SAND, SOME SUBROUNDED GRAVEL, GREYISH, WET.	4.57				
6	MLS - SANDY SILT, SOME CLAY, BLUE-GREY, WET.	6.10				
7	MH - CLAYEY SILT, TRACE SAND, DARK GREY, MOIST TO WET.	6.71				
8			BENTONITE			
9	GW-GC - CLAYEY GRAVEL, SOME SILT, DARK GREY, MOIST.	9.14				
10						
11						
12						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

BEDROCK LOG 17275-11 JUNE 2004 DRILLING.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Canex 2004 Drilling Program
PROJECT NUMBER: 17275-11
CLIENT: Regional District of Central Kootenay
LOCATION: Canex Landfill Site, Salmo, B.C.

HOLE DESIGNATION: MW-01-2004(D)
DATE COMPLETED: June 22, 2004
DRILLING METHOD: Air Rotary (ODEX)
FIELD PERSONNEL: DSG & GM

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
14	BEDROCK (PRESENCE OF PHYLLITE AND QUARTZITE), GREY.	14.33					
15							
16							
17							
18			SCREEN				
19			SILICA SAND				
20							
21	END OF BOREHOLE @ 20.73m BGS	20.73					
22							
23							
24							
25							

WELL DETAILS
Screened interval:
16.15 to 19.20m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 0.010in
Seal:
0.91 to 15.52m BGS
Material: BENTONITE
Sand Pack:
15.52 to 20.73m BGS
Material: SILICA SAND

Seal:
0.00 to 0.91m BGS
Material: CEMENT

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

BEDROCK LOG 17275-11 JUNE 2004 DRILLING.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Canex 2004 Drilling Program
PROJECT NUMBER: 17275-11
CLIENT: Regional District of Central Kootenay
LOCATION: Canex Landfill Site, Salmo, B.C.

HOLE DESIGNATION: MW-02-2004(S)
DATE COMPLETED: June 23, 2004
DRILLING METHOD: Air Rotary (ODEX)
FIELD PERSONNEL: DSG & GM

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF RISER GROUND SURFACE	0.75 m above ground surface 638.06 m				
0	OL - ORGANIC SOIL, SILTY SAND, SOME SUBROUNDED GRAVEL, SOME CLAY, BROWN, DAMP.		CEMENT			
0.91	SWG - GRAVELLY SAND, SOME SILT, BROWN, DAMP TO MOIST.					
			BENTONITE			
7.32	SM- SILTY SAND, TRACE GRAVEL, BROWN, WET.		SILICA SAND SCREEN			
9.75	SP - SAND, CLEAN, POORLY-GRADED, NO GRAVEL, BROWN, WET.		BENTONITE			

WELL DETAILS
Screened interval:
6.71 to 9.75m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 0.010in
Seal:

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

BEDROCK LOG 17275-11 JUNE 2004 DRILLING.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Canex 2004 Drilling Program
PROJECT NUMBER: 17275-11
CLIENT: Regional District of Central Kootenay
LOCATION: Canex Landfill Site, Salmo, B.C.

HOLE DESIGNATION: MW-02-2004(S)
DATE COMPLETED: June 23, 2004
DRILLING METHOD: Air Rotary (ODEX)
FIELD PERSONNEL: DSG & GM

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
13			0.91 to 6.25m BGS Material: BENTONITE Sand Pack: 6.25 to 9.75m BGS Material: SILICA SAND				
14	SP - COARSE SAND, POORLY-GRADED, TRACE GRAVEL, NO FINES, BROWN, WET.	13.41	Seal: 9.75 to 10.36m BGS Material: BENTONITE				
15			Seal: 0.00 to 0.91m BGS Material: CEMENT				
16							
17	SM - SILTY SAND, TRACE CLAY, BROWN, WET.	16.46					
18							
19							
20	SP - FINE SAND, POORLY-GRADED, NO GRAVEL, BROWN, WET.	19.51					
21							
22	SP - FINE SAND, POORLY-GRADED, TRACE MICA FLAKES AND FINE PYRITE, BROWN, WET.	21.03					
23	END OF BOREHOLE @ 22.56m BGS	22.56					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

BEDROCK LOG 17275-11 JUNE 2004 DRILLING.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-02-2004(D)
DATE COMPLETED: August 18, 2004
DRILLING METHOD: Air Rotary/Drive Casing
FIELD PERSONNEL: M. Acre

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
	GROUND SURFACE	638.06 m	0.41m Stick Up			
0	SM - Silty SAND, with gravel, very fine grained, brown, damp		Concrete			
2	- with silt, fine to coarse grained sand, brown, moist at 1.83m BGS					
	- and gravel at 2.74m BGS					
4	- slight increase in moisture content at 3.66m BGS		165mm Ø Borehole			
	- with gravel at 3.96m BGS					
6						
8						
10	SW - SAND, trace gravel, fine to medium grained, well graded, brown, damp	9.75				
12	SP - SAND, trace fine gravel, fine grained, poorly graded, pale brown, moist	10.97				
	- saturated at 12.19m BGS					
14	SW - SAND, trace gravel, medium to coarse grained, well graded, brown, saturated	13.72				
16	- fine to medium grained, trace silt at 15.85m BGS					
18	SM - SAND and SILT, very fine grained, brown, saturated, highly dilatent	17.68				
20						
22	ML - SILT with sand, no plasticity, brown, saturated, highly dilatent	21.34	Bentonite Holeplug			
24						
26	ML - SILT, trace sand, no plasticity, grey, saturated, highly dilatent	24.99	50.1mm Ø PVC Riser			
28						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 17275-01.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-02-2004(D)
DATE COMPLETED: August 18, 2004
DRILLING METHOD: Air Rotary/Drive Casing
FIELD PERSONNEL: M. Acre

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
32	ML - SILT and CLAY, no plasticity, grey, saturated, dilatent	29.87				
34						
36						
38	GM - GRAVEL with sand, with silt, fine to medium grained angular rock fragments, brown, saturated	38.10				
40						
42	GW - GRAVEL and SAND, fine to coarse grained, well graded, brown, saturated	41.15	Native Cave			
44						
46	GM - Clayey GRAVEL, fine to medium grained, moderate plasticty, grey, saturated	45.42				
48	BEDROCK - Dark Grey to Black, little moisture	47.85	Bentonite Holeplug			
50						
52			Sand Pack 50.1mm ø PVC Screen			
54	END OF BOREHOLE @ 53.19m BGS	53.19				
56						
58						

WELL DETAILS
Screened interval:
50.14 to 53.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: PVC
Seal:
46.33 to 49.38m BGS
Material: Bentonite Holeplug
Sand Pack:
49.38 to 53.19m BGS
Material: OCL 10-20 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 17275-01.GPJ CRA_CORP.GDT 9/1/04

SALMO LANDFILL

REGIONAL DISTRICT OF CENTRAL KOOTENAY | GREAT WEST DRILLING | Project No: 9523-002-00-02

PROJECT ENGINEER: JKL | BECKER AIR HAMMER RIG | ELEVATION: 980.00 (m)

SAMPLE TYPE: DISTURBED | SHELBY TUBE | GRAB SAMPLE | NO RECOVERY | SPT | CORE SAMPLE

DEPTH (m)	USC	SOIL SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE TYPE	SAMPLE NO	PLASTIC / M.C. / LIQUID (20 40 60 80)	WELL INSTALLATION	WELL DESCRIPTION	ELEVATION (m)
0.0			SILT – trace fine gravel – trace very fine sand, dry – dry – light brown		1			Elevation Approximate	980
1.0	ML								975
2.0	GW		SILTY, SANDY GRAVEL – fine to medium gravel – abundant cobbles – slightly moist to moist – medium brown		2			Bentonite pellets	978
3.0					3			50 mm SCH 40 PVC Blank Casing	977
4.0	SP		SAND – fine – trace fine gravel – slightly moist – medium brown		4				976
5.0	SW		GRAVELLY SAND – moist – abundant pebbles – very moist to wet – medium brown		5				975
6.0					6			Sandpack (silf 9)	974
7.0					7			50 mm 0.01 inch slot PVC Screen	97.
8.0	SM		GRAVELLY, SILTY SAND – medium sand – abundant pebbles – very moist to wet – medium brown		8				97
9.0					9				97
10.0	CL		SILTY CLAY – hard to very hard – low plastic – moist – medium brown		10			Borehole plugged back with bentonite pellets from 9.1 m to 10.7 m	97
	SP-SM								

UMA Engineering Ltd.
Calgary, Alberta

LOGGED BY: JDO
REVIEWED BY: JKL
Fig. No:

COMPLETION DEPTH: 10.7 m
COMPLETE: 08/13/94
Page 1 o

[illegible]	See Site Plan for Well Location	BOREHOLE NO: S-MW-2
REGIONAL DISTRICT OF CENTRAL KOOTENAY	GREAT WEST DRILLING	Project No: 9523-002-00-02
PROJECT ENGINEER: JKL	BECKER AIR HAMMER RIG	ELEVATION: 980.00 (m)

SAMPLE TYPE: DISTURBED | SHELBY TUBE | GRAB SAMPLE | NO RECOVERY | SPT | CORE SAMPLE

DEPTH (m)	USC	SOIL SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE TYPE	SAMPLE NO	PLASTIC / W.C. / LIQUID (20 40 60 80)	WELL INSTALLATION	WELL DESCRIPTION	ELEVATION (m)
10.0	CP-SP		GRAVEL AND SAND (Continued) - fine to medium sand - fine gravel - slightly moist to moist - brownish grey		11 12			Borehole plugged back with bentonite pellets from 9.1 m to 10.7 m	970.0
			END OF BOREHOLE AT 10.7 m Base of Monitoring Well Constructed at 9.1 m Water Level 7.75 m 94/08/15						
11.0									969.0
12.0									968
13.0									967.0
14.0									966
15.0									965.0
16.0									964.0
17.0									963
18.0									962.0
19.0									961
20.0									960

UMA Engineering Ltd.
Calgary, Alberta

LOGGED BY: JDO
REVIEWED BY: JKL
Fig. No:

COMPLETION DEPTH: 10.7 m
COMPLETE: 08/13/94

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 2.45

HOLE DESIGNATION: MW01A-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING GROUND SURFACE	0.76 above 961.25	ground surface (m)				
0.5	Tailings MLS- Silt with fine sand, grey is dominant color, mottled with brown, homogenous, plant organics are mixed with the tailings for the first 2 feet		CEMENT				
1.0							
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 2.45

HOLE DESIGNATION: MW01A-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5							
8.0			GROUT				
8.5							
9.0							
9.5							
10.0	SC- Clayey fine sand with silt, very wet, brown, medium plasticity, trace gravel	951.49					
	SM- Silty sand with some gravel, dark brown, damp, medium to coarse-grained sand, fine gravel	951.19					
10.5							
11.0							
11.5	CI- Clay, brown, wet, medium plasticity, trace sand and gravel, pieces of gravel are very angular	949.67					
12.0							
12.5							
13.0	Till- Reworked till? Brown, very wet, no clay/silt, subangular gravel, some sand in matrix, much wetter than underlying material	948.14					
13.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 2.45

HOLE DESIGNATION: MW01A-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
14.5							
15.0							
	Till- Grey, clay/silt matrix with gravel sized particles, wet, low plasticity, subangular gravel	946.01					
15.5							
16.0							
16.5							
17.0							
17.5			BENTONITE CHIPS				
	Bedrock, grey	943.26					
18.0							
18.5							
19.0							
19.5							
20.0							
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 2.45

HOLE DESIGNATION: MW01A-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21.5			SANDPACK				
22.0							
22.5							
23.0	END OF BOREHOLE @ 22.86m BGS	938.39	WELL DETAILS Screened interval: 941.44 to 938.39m 19.81 to 22.86m BGS Length: 3.05m Seal: 943.26 to 942.10m 17.98 to 19.15m BGS Material: BENTONITE CHIPS Sand Pack: 942.10 to 938.39m 19.15 to 22.86m BGS ---------- Seal: 958.20 to 943.26m 3.05 to 17.98m BGS Material: GROUT ---------- Seal: 960.64 to 958.20m 0.61 to 3.05m BGS Material: BENTONITE CHIPS ---------- Seal: 961.25 to 960.64m 0.00 to 0.61m BGS Material: CEMENT				
23.5							
24.0							
24.5							
25.0							
25.5							
26.0							
26.5							
27.0							
27.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 1.62

HOLE DESIGNATION: MW01B-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING GROUND SURFACE	0.82 above 961.25	ground surface (m)				
0.5	Tailings MLS- Silt with fine sand, grey is dominant color, mottled with brown, homogenous		CEMENT				
1.0							
1.5			BENTONITE CHIPS				
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 1.62

HOLE DESIGNATION: MW01B-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5			GROUT				
8.0							
8.5							
9.0							
9.5	SM- Silty sand with some gravel, dark brown, damp, medium to coarse-grained sand, fine gravel	952.10					
10.0							
10.5							
11.0							
11.5							
12.0	Cl- Clay, brown, wet, medium plasticity, trace sand and gravel, pieces of gravel are very angular	949.67	BENTONITE CHIPS				
12.5							
13.0							
13.5	Till- Reworked till? Brown, very wet, no clay/silt, subangular gravel, some sand in matrix, much wetter than underlying material	947.84	SANDPACK				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 1.62

HOLE DESIGNATION: MW01B-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
14.5							
15.0	Till- Grey, clay/silt matrix with gravel sized particles, wet, low plasticity, subangular gravel	946.62					
15.5	END OF BOREHOLE @ 15.34m BGS	945.70	WELL DETAILS Screened interval: 947.68 to 946.16m 13.56 to 15.09m BGS Length: 1.52m Seal: 949.97 to 949.06m 11.28 to 12.19m BGS Material: BENTONITE CHIPS Sand Pack: 949.06 to 945.91m 12.19 to 15.34m BGS ---------- Seal: 958.50 to 949.97m 2.74 to 11.28m BGS Material: GROUT ---------- Seal: 960.64 to 958.50m 0.61 to 2.74m BGS Material: BENTONITE CHIPS ---------- Seal: 961.25 to 960.64m 0.00 to 0.61m BGS Material: CEMENT				
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							
19.0							
19.5							
20.0							
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 1.44

HOLE DESIGNATION: MW01C-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING GROUND SURFACE	0.73 above 961.25	ground surface (m)				
0.5	Tailings MLS- Silt with fine sand, grey is dominant color, mottled with brown, homogenous		CEMENT				
1.0			NATIVE FILL				
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5			BENTONITE CHIPS				
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): 1.44

HOLE DESIGNATION: MW01C-03
DATE COMPLETED: October 29, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5							
8.0							
8.5							
9.0							
9.5			SANDPACK				
10.0	SM- Silty sand with some gravel, dark brown, damp, medium to coarse-grained sand, fine gravel	951.49					
10.5							
11.0							
11.5							
12.0	END OF BOREHOLE @ 11.73m BGS	949.51					
12.5							
13.0							
13.5							

WELL DETAILS
Screened interval:
952.56 to 949.51m
8.69 to 11.73m BGS
Length: 3.05m
Seal:
960.64 to 953.63m
0.61 to 7.62m BGS
Material: BENTONITE CHIPS + NATIVE FILL
Sand Pack:
953.63 to 949.51m
7.62 to 11.73m BGS

Seal:
961.25 to 960.64m
0.00 to 0.61m BGS
Material: CEMENT

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 2.32

HOLE DESIGNATION: MW02-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 2.42

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING GROUND SURFACE	0.68S 0.7D 962.45	above ground surface (m)				
	Plant Organics						
	Tailings MLS- Silt with fine sand, grey is dominant color, mottled with brown, homogenous	962.14	CEMENT BENTONITE CHIPS SANDPACK				
5.5	SW - Gravely sand with silt, grey, very wet, sand is medium to coarse grained At 6.7m material becomes more gravely (half gravel, half sand)	956.96	BENTONITE CHIPS				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 2.32

HOLE DESIGNATION: MW02-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 2.42

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5							
8.0							
8.5							
9.0							
9.5			SANDPACK				
10.0							
10.5							
11.0	GW - Sandy gravel, very wet, dark grey, gravel is fine to coarse grained, mostly sub-angular, trace silt	951.48					
11.5	Bedrock	950.87					
12.0	END OF BOREHOLE @ 11.73m BGS						
12.5							
13.0							
13.5							

WELL DETAILS
Screened interval:
953.76 to 950.71m
8.69 to 11.73m BGS
Length: 3.05m
Seal:
957.27 to 954.83m
5.18 to 7.62m BGS
Material: BENTONITE CHIPS
Sand Pack:
954.83 to 950.71m
7.62 to 11.73m BGS

Screened interval:
961.08 to 958.03m
1.37 to 4.42m BGS
Length: 3.05m
Seal:
961.84 to 961.23m

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 2.32

HOLE DESIGNATION: MW02-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 2.42

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	
14.5			0.61 to 1.22m BGS Material: BENTONITE CHIPS Sand Pack: 961.23 to 957.27m 1.22 to 5.18m BGS ---------- Seal: 962.45 to 961.84m 0.00 to 0.61m BGS Material: CEMENT					
15.0								
15.5								
16.0								
16.5								
17.0								
17.5								
18.0								
18.5								
19.0								
19.5								
20.0								
20.5								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING GROUND SURFACE	0.79S 0.76D above ground surface (m) 960.96					
0.5	Tailings MLS- Silt with fine sand, grey is dominant color, mottled with brown, homogenous At 15.9m strong cedar odour (cedar tree intercepted)		CEMENT				
1.0							
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5			BENTONITE CHIPS				
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5			SANDPACK				
13.0							
13.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							
19.0							
19.5							
20.0	Cl - Clay mixed with native organics (tree stumps), wet, medium plasticity, dark grey	940.84					
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	CI - Clay, very wet, medium to high plasticity, brown	939.92	BENTONITE CHIPS				

21.5
22.0
22.5
23.0
23.5
24.0
24.5
25.0
25.5
26.0
26.5
27.0
27.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
28.5							
29.0							
29.5							
30.0							
30.5							
31.0							
31.5							
32.0							
32.5	SW - Well graded sand, dark grey,different than material above, damp, trace gravel, gravel is fine to coarse-grained and subangular	928.65					
33.0							
33.5							
34.0			SANDPACK				
34.5	GW - Sandy gravel, very wet, grey, trace silts, gravel is mostly sub-angular, sand is medium to	926.21					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): 1.31

HOLE DESIGNATION: MW03-03
DATE COMPLETED: October 30, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): 1.27

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
35.5	coarse grained						
36.0	END OF BOREHOLE @ 35.97m BGS	924.99	WELL DETAILS Screened interval: 928.04 to 924.99m 32.92 to 35.97m BGS Length: 3.05m Seal: 944.50 to 928.95m 16.46 to 32.00m BGS Material: BENTONITE CHIPS Sand Pack: 928.95 to 924.99m 32.00 to 35.97m BGS ---------- Screened interval: 951.71 to 945.61m 9.24 to 15.34m BGS Length: 6.1m Seal: 960.35 to 952.42m 0.61 to 8.53m BGS Material: BENTONITE CHIPS Sand Pack: 952.42 to 944.50m 8.53 to 16.46m BGS ---------- Seal: 960.96 to 960.35m 0.00 to 0.61m BGS Material: CEMENT				
36.5							
37.0							
37.5							
38.0							
38.5							
39.0							
39.5							
40.0							
40.5							
41.0							
41.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): Dry

HOLE DESIGNATION: MW04-03
DATE COMPLETED: October 31, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): Dry

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING		0.43S and D above ground surface (m)				
0.5	Till- Clay rich till, brown, medium plasticity, damp, clasts are clay-coated, first 1.5m was very sandy		CEMENT				
1.0							
1.5							
2.0			BENTONITE CHIPS				
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5			SANDPACK				
6.0							
6.5							
	Till- Clay rich till, percentage of clay is increasing, slightly wet, higher plasticity	6.71					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): Dry

HOLE DESIGNATION: MW04-03
DATE COMPLETED: October 31, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): Dry

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5							
8.0							
8.5							
9.0							
9.5							
10.0			NATIVE TILL & GROUT				
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
	Till- Clay loses some plasticity, higher percentage of sand and gravel, grey, damp.	13.72	BENTONITE CHIPS				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): Dry

HOLE DESIGNATION: MW04-03
DATE COMPLETED: October 31, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): Dry

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5			SANDPACK				
18.0							
18.5							
19.0							
19.5							
20.0	SWG-Gravelly sand, trace silt, dark brown, damp, grains of different lithologies, barely any clay	19.81					
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
SHALLOW WATER LEVEL (meters BTOC): Dry

HOLE DESIGNATION: MW04-03
DATE COMPLETED: October 31, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON
DEEP WATER LEVEL (meters BTOC): Dry

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21.5			– BENTONITE CHIPS				
22.0							
22.5							
23.0	END OF BOREHOLE @ 22.86m BGS	22.86	WELL DETAILS Seal: 19.96 to 22.86m BGS Material: BENTONITE CHIPS ---------- Screened interval: 16.61 to 19.66m BGS Length: 3.05m Seal: 7.62 to 15.54m BGS Material: BENTONITE CHIPS & NATIVE TILL Sand Pack: 15.54 to 19.96m BGS ---------- Screened interval: 4.27 to 7.32m BGS Length: 3.05m Seal: 0.61 to 3.66m BGS Material: BENTONITE CHIPS & NATIVE TILL Sand Pack: 3.66 to 7.62m BGS ---------- Seal: 0.00 to 0.61m BGS Material: CEMENT				
23.5							
24.0							
24.5							
25.0							
25.5							
26.0							
26.5							
27.0							
27.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Canex Landfill
PROJECT NUMBER: 17275-5
CLIENT: Regional District of Central Kootenay
LOCATION: Salmo, British Columbia
WATER LEVEL (meters BTOC): Dry

HOLE DESIGNATION: MW05-03
DATE COMPLETED: November 1, 2003
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: CODY CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING	0.46 above	ground surface (m)				
0.5	Clay-rich till, brown, dry, gravel present.		CEMENT BENTONITE CHIPS SANDPACK				
1.0	- Bedrock at 1.22m BGS	1.22					
1.5	END OF BOREHOLE @ 1.22m BGS		WELL DETAILS Screened interval: 0.61 to 1.22m BGS Length: 0.61m Seal: 0.15 to 0.61m BGS Material: BENTONITE CHIPS Sand Pack: 0.61 to 1.22m BGS ---------- Seal: 0.00 to 0.15m BGS Material: CEMENT				
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-5-CANEX DRILLING.GPJ CRA_CORP.GDT 5/31/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: CANEX-SALMO, BC
PROJECT NUMBER: 17275-01
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-02-2004(D)
DATE COMPLETED: August 18, 2004
DRILLING METHOD: Air Rotary/Drive Casing
FIELD PERSONNEL: M. Acre

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
32	ML - SILT and CLAY, no plasticity, grey, saturated, dilatent	29.87				
34						
36						
38	GM - GRAVEL with sand, with silt, fine to medium grained angular rock fragments, brown, saturated	38.10				
40						
42	GW - GRAVEL and SAND, fine to coarse grained, well graded, brown, saturated	41.15	Native Cave			
44						
46	GM - Clayey GRAVEL, fine to medium grained, moderate plasticty, grey, saturated	45.42				
48	BEDROCK - Dark Grey to Black, little moisture	47.85	Bentonite Holeplug			
50			Sand Pack 50.1mm @ PVC Screen			
52						
54	END OF BOREHOLE @ 53.19m BGS	53.19				
56						
58						

WELL DETAILS
Screened interval
50.14 to 53.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: PVC
Seal:
46.33 to 49.38m BGS
Material: Bentonite Holeplug
Sand Pack:
49.38 to 53.19m BGS
Material: OCL 10-20 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 17275-01.GPJ CRA_CORP.GDT 9/1/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01-05
DATE COMPLETED: March 31, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	730.30 0.91	0.91 Stick-up				
1	Tailings - Fine silt and sand, grey, mottled.						
2							
3			Grout				
4							
5							
6							
7			Bentonite Chips				
8							
9							
10							
11			Sand Screened PVC				
12							
13							
14							
15	END OF BOREHOLE @ 14.63m BGS	715.67					
16							
17							
18							
19							

WELL DETAILS
Screened interval:
721.77 to 715.67m
8.53 to 14.63m BGS
Length: 6.1m
Seal:
723.14 to 722.38m
7.16 to 7.92m BGS
Material: Bentonite Chips
Sand Pack:
722.38 to 715.67m
7.92 to 14.63m BGS
Material: Sand

Seal:

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR-05-MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01-05
DATE COMPLETED: March 31, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE
			730.30 to 723.14m 0.00 to 7.16m BGS Material: Grout					

21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR 05-MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-01C-03
DATE COMPLETED: April 1, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Replacement Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	712.62 0.91	0.91 Stick-up				
0	Tailings - Fine silt and sand, grey, mottled.		Grout				
10	END OF BOREHOLE @ 10.67m BGS	701.95	Bentonite Chips Sand Screened PVC				

WELL DETAILS
Screened interval:
705.00 to 701.95m
7.62 to 10.67m BGS
Length: 3.05m
Seal:
706.37 to 705.76m
6.25 to 6.86m BGS
Material: Bentonite Chips
Sand Pack:
705.76 to 701.95m
6.86 to 10.67m BGS
Material: Sand

Seal:
712.62 to 706.37m
0.00 to 6.25m BGS
Material: Grout

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(26-MAR-05-MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-02-05
DATE COMPLETED: March 30, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	716.28 0.91	0.91 Stick-up				
0	Tailings - Fine silt and sand, grey, mottled.		Grout				
1							
2							
3							
4							
5							
6							
7			Bentonite Chips				
8							
9							
10							
11							
12			Sand Screened PVC				
13							
14							
15	END OF BOREHOLE @ 15.24m BGS	701.04					
16							
17							
18							
19							

WELL DETAILS
Screened interval:
707.14 to 701.04m
9.14 to 15.24m BGS
Length: 6.1m
Seal:
708.66 to 708.05m
7.62 to 8.23m BGS
Material: Bentonite Chips
Sand Pack:
708.05 to 701.04m,
8.23 to 15.24m BGS
Material: Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR-05:MR):BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-02-05
DATE COMPLETED: March 30, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE
21			Seal: 716.28 to 708.66m; 0.00 to 7.62m BGS; Material: Grout					
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR-05-MR)BH-VA001.GPJ CRA_CORP.GDT 5/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-03S-05
DATE COMPLETED: March 29, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	708.96 0.91	0.91 Stick-up				
0	Tailings - Fine silt and sand, grey, mottled.						
1							
2							
3							
4							
5			Grout				
6							
7							
8							
9							
10							
11			Bentonite Chips				
12							
13							
14							
15			Sand Screened PVC				
16							
17							
18							
19		689.15					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR 05-MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-03S-05
DATE COMPLETED: March 29, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	
21	END OF BOREHOLE @ 19.81m BGS		WELL DETAILS Screened interval: 696.77 to 690.68m 12.19 to 18.29m BGS Length: 6.1m Seal: 697.38 to 696.77m 11.58 to 12.19m BGS Material: Bentonite Chips Sand Pack: 697.38 to 689.15m 11.58 to 19.81m BGS Material: Sand ——— Seal: 708.96 to 697.84m 0.00 to 11.13m BGS Material: Grout					
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275 05\28-MAR-05 MR\BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-04S-05
DATE COMPLETED: March 28, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	714.15 0.91	0.91 Stick-up				
0	Tailings - Fine silt and sand, grey, mottled.		Cement				
1							
2							
3							
4							
5			Grout				
6			Solid PVC				
7							
8							
9							
10							
11			Bentonite Chips				
12							
13							
14							
15			Sand Screened PVC				
16							
17							
18	END OF BOREHOLE @ 17.98m BGS	696.16					
19							

WELL DETAILS
Screened interval:
702.26 to 696.16m
11.89 to 17.98m BGS
Length: 6.1m

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05\28-MAR-05-MR\BH-VA001.GPJ CRA_CORP.GDT 6/8/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-04S-05
DATE COMPLETED: March 28, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21			Seal: 703.63 to 703.17m 10.52 to 10.97m BGS Material: Bentonite Chips Sand Pack: 703.17 to 696.16m 10.97 to 17.98m BGS Material: Sand --- Seal: 713.54 to 703.63m 0.61 to 10.52m BGS Material: Grout --- Seal: 714.15 to 713.54m 0.00 to 0.61m BGS Material: Cement				
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAY-05 MR)BH VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-05-05
DATE COMPLETED: March 31, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	710.79 0.91	0.91 Stick-up				
0.5	Tailings - Fine silt and sand, grey, mottled.						
1.0							
1.5							
2.0							
2.5							
3.0							
3.5			Grout				
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05(28-MAR-05 MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-05-05
DATE COMPLETED: March 31, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
7.5			Bentonite Chips				
8.0							
8.5							
9.0							
9.5							
10.0							
10.5							
11.0							
11.5			Sand				
12.0			Screened PVC				
12.5							
13.0							
13.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 17275-05[2]8-MAR-05 MR\BH VA001.GPJ CRA_CORP.GDT 6/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CENTRAL LANDFILL
PROJECT NUMBER: 17275-05
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: SALMO, BC

HOLE DESIGNATION: MW-05-05
DATE COMPLETED: March 31, 2005
DRILLING METHOD: HOLLOW STEM AUGER
FIELD PERSONNEL: C. CAMERON

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
14.5							
15.0		695.55					
	END OF BOREHOLE @ 15.24m BGS		WELL DETAILS Screened interval: 701.85 to 695.55m 9.14 to 15.24m BGS Length: 6.1m Seal: 703.17 to 702.56m 7.62 to 8.23m BGS Material: Bentonite Chips Sand Pack: 702.56 to 695.55m 8.23 to 15.24m BGS Material: Sand Seal: 710.79 to 703.17m 0.00 to 7.62m BGS Material: Grout				
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							
19.0							
19.5							
20.0							
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

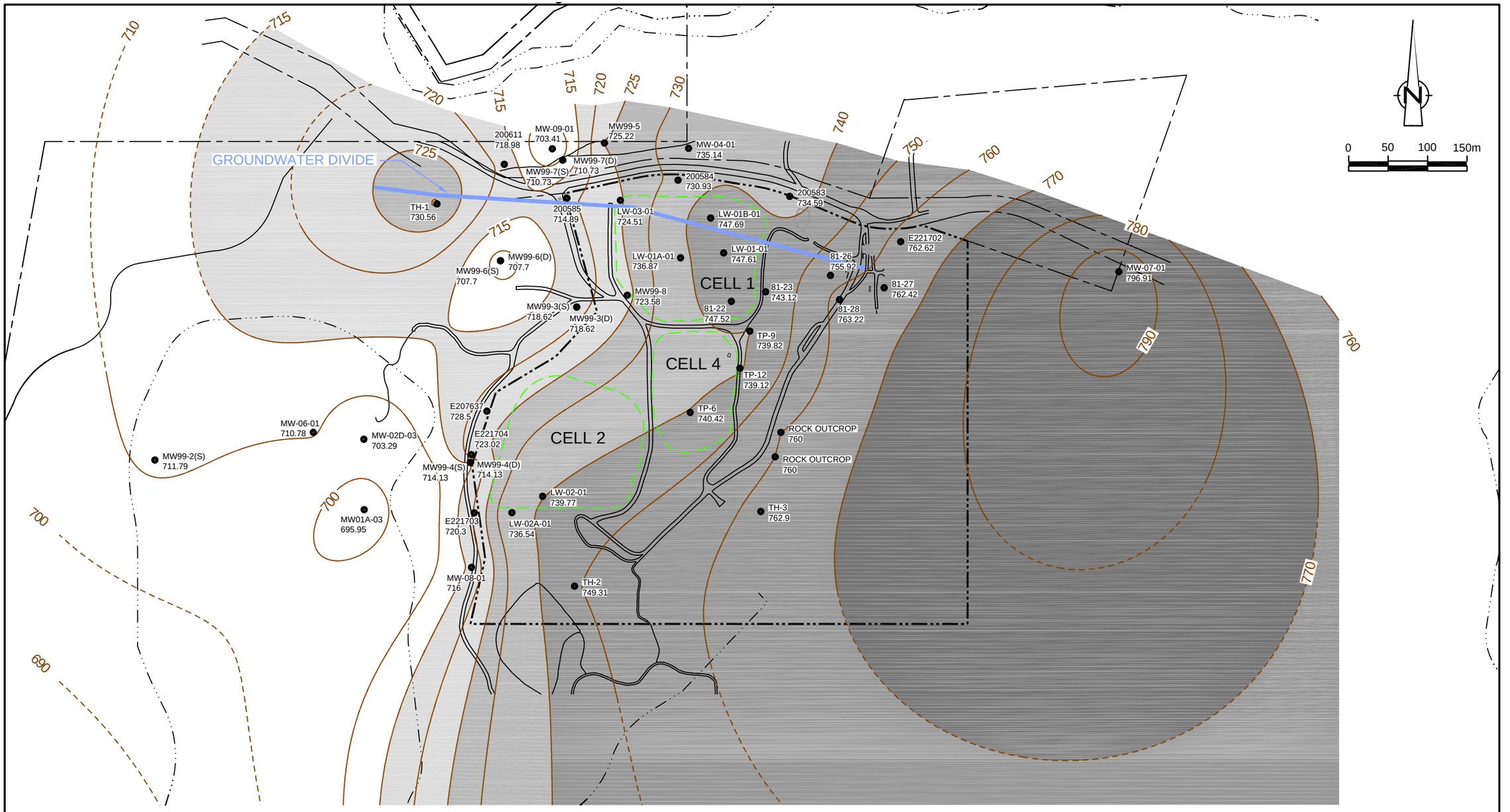
OVERBURDEN LOG 17275-05(26-MAR 05-MR)BH-VA001.GPJ CRA_CORP.GDT 6/9/05

Appendix E

Bedrock Contours and Geologic Cross Sections

Appendix E1

Bedrock Contours (CRA 2001)



LEGEND

- PROPERTY BOUNDARY
- LANDFILL BOUNDARY
- 750 BEDROCK CONTOUR (m AMSL)
- EXTRAPOLATED BEDROCK CONTOUR (m AMSL)
- LANDFILL CELL
- MW-07-01 796.91 SAMPLE LOCATION BEDROCK ELEVATION (m AMSL)

- AREA BETWEEN 770m AND 800m (AMSL)
- AREA BETWEEN 740m AND 770m (AMSL)
- AREA BETWEEN 725m AND 740m (AMSL)
- AREA BETWEEN 715m AND 725m (AMSL)

figure 2.2

BEDROCK CONTOURS - JUNE 2004
CENTRAL LANDFILL, SALMO, BC
Regional District of Central Kootenay

17275-06(014)GN-WA007 JAN 24/2005

Appendix E2

Geologic Cross Sections (CRA 2001)

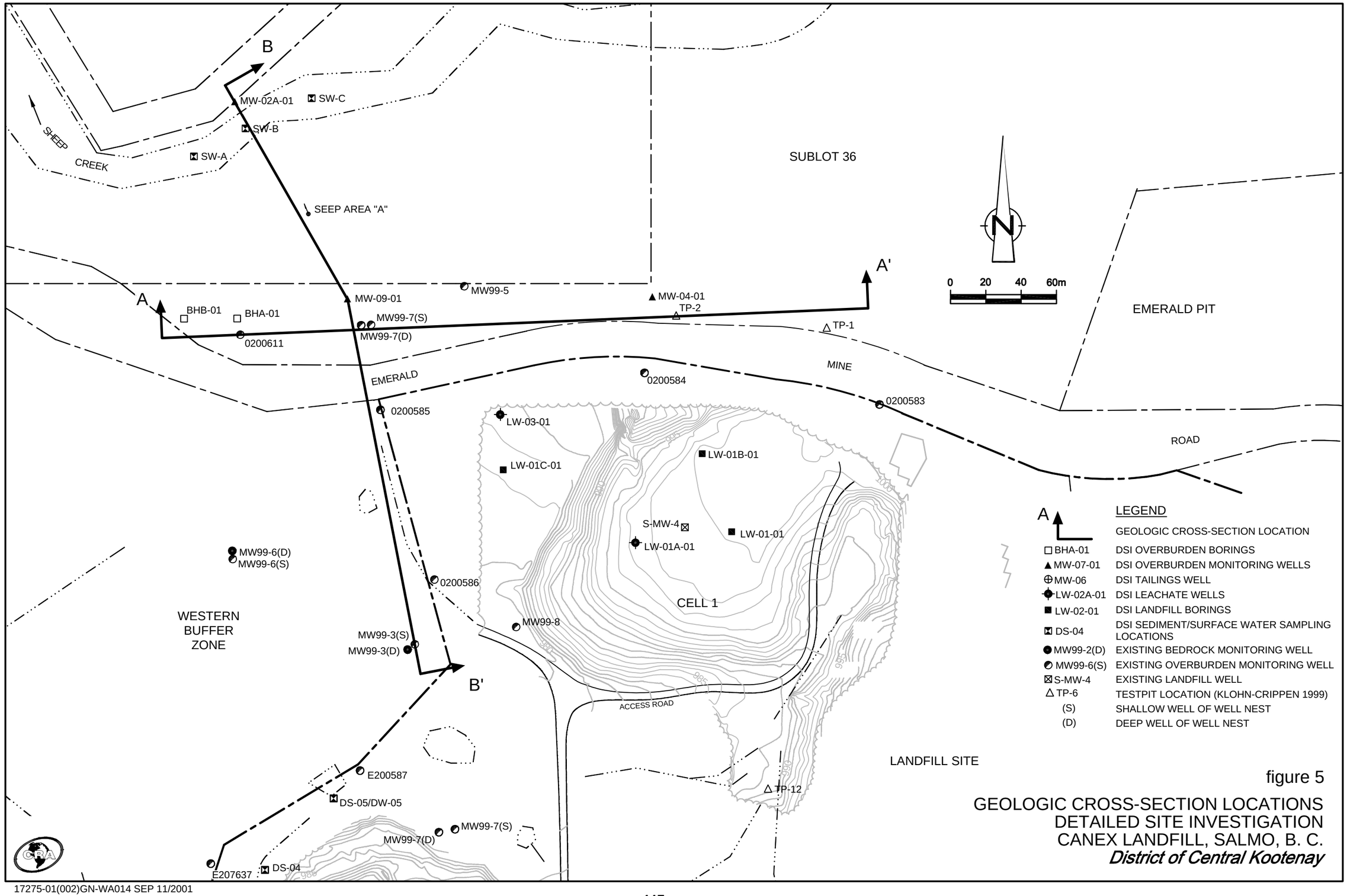
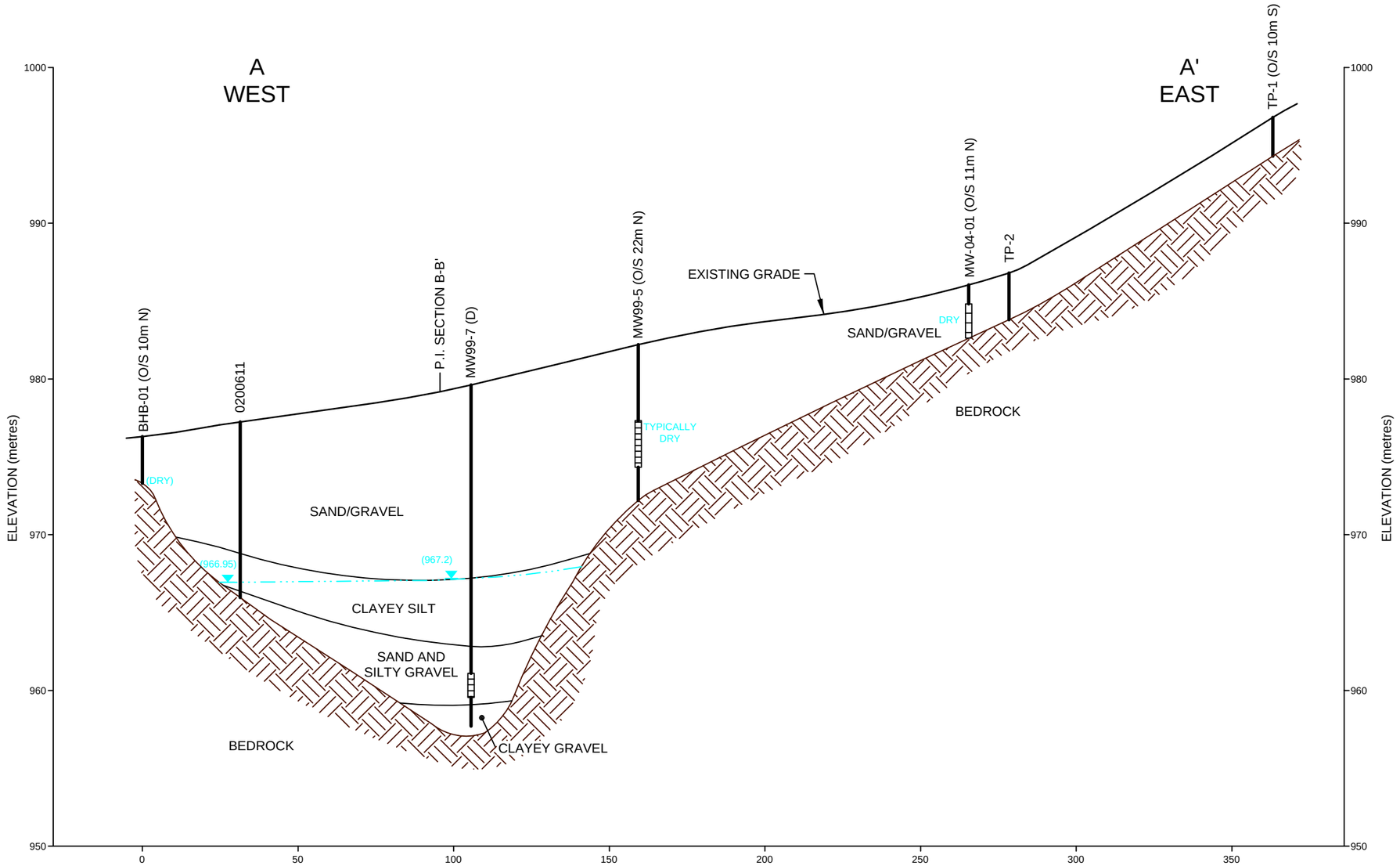


figure 5

GEOLOGIC CROSS-SECTION LOCATIONS
DETAILED SITE INVESTIGATION
CANEX LANDFILL, SALMO, B. C.
District of Central Kootenay

17275-01(002)GN-WA014 SEP 11/2001



LEGEND

MONITORING WELL/TEST PIT DESIGNATION

MW99-7

GROUNDWATER ELEVATION (JULY 16, 2001)

SCREEN

DISTANCE (metres)
VERTICAL TO HORIZONTAL EXAGGERATION: 5:1

figure 6

GEOLOGIC CROSS-SECTION A-A'
DETAILED SITE INVESTIGATION
CANEX LANDFILL SITE, SALMO, BC
District of Central Kootenay

17275-01(002)GN-WA008 SEP 12/2001

B
NORTH

B'
SOUTH

– PROPERTY BOUNDARY
MW-09-01
P.I. SECTION A-A'
MW99-7 (D) (O/S 9m E)
PROPERTY BOUNDARY
EMERALD MINE ROAD
PROPERTY BOUNDARY
0200585 (O/S 6m E)
EXISTING GRADE
MW99-3 (S)

SAND/GRAVEL
SAND/GRAVEL
(972.01)
SANDY CLAY
(967.2)
CLAY/SILT
SAND
(967.76)
CLAY
CLAYEY GRAVEL
(960.39)
BEDROCK
SAND/GRAVEL
SEEP AREA "A"
℄ SHEEP CREEK (CREEK BASE 923.8 m)
MW-02A-01
BEDROCK
SAND/GRAVEL
(924.27)
CLAYEY GRAVEL

ELEVATION (metres)
980
970
960
950
940
930
920

0
50
100
150
200
250
300
350

DISTANCE (metres)
VERTICAL TO HORIZONTAL EXAGGERATION: 5:1

LEGEND
MONITORING WELL
MW99-7
GROUNDWATER ELEVATION (JULY 16, 2001)
SCREEN

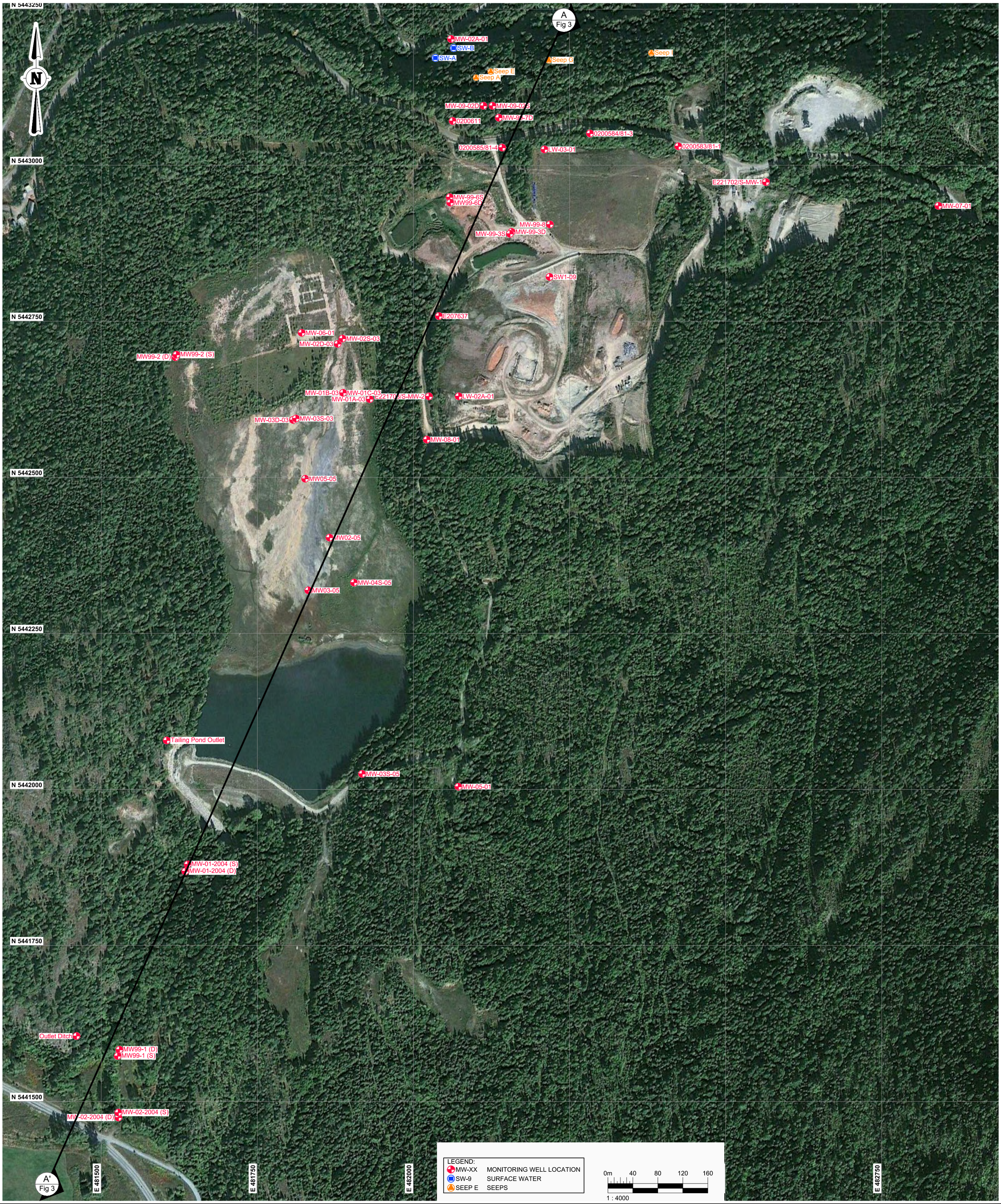
figure 7

GEOLOGIC CROSS-SECTION B-B'
DETAILED SITE INVESTIGATION
CANEX LANDFILL SITE, SALMO, BC
District of Central Kootenay

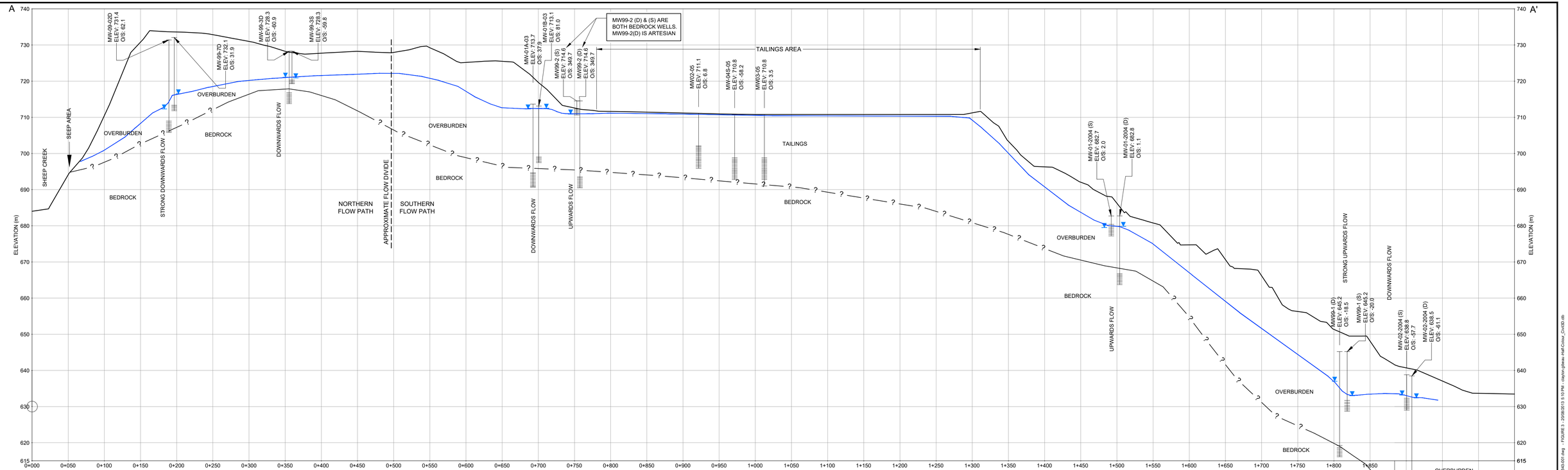
17275-01(002)GN-WA016 SEP 12/2001

Appendix E3

Geologic Cross Sections (AMEC 2014)



CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY (RDCK)	DWN BY: ES	PROJECT: CENTRAL LANDFILL SALMO, BC	DATE: MAY, 2014
	CHK'D BY: LH		PROJECT No.: CE04343
	DATUM: NAD 83	TITLE: SITE PLAN SHOWING MONITORING WELL LOCATIONS	REV. No.: B
AMEC Environment & Infrastructure 5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6 PHONE 780-436-2152, FAX 780-435-8425	PROJECTION: UTM Zone 11		FIGURE No.: FIGURE 2
	SCALE: 1:4000		



0m 30 60 90 120
1 : 3000 HORIZONTAL SCALE

0m 6 12 18 24
1 : 600 VERTICAL SCALE
5X EXAGGERATION

CLIENT:
REGIONAL DISTRICT OF
CENTRAL KOOTENAY (RDCK)

AMEC Environment & Infrastructure
5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6
PHONE 780-436-2152, FAX 780-435-8425

amec

DWN BY:	CMG
CHK'D BY:	LH
DATUM:	NAD 83
PROJECTION:	UTM Zone 11
SCALE:	1:3000

PROJECT:
CENTRAL LANDFILL
SALMO, BC

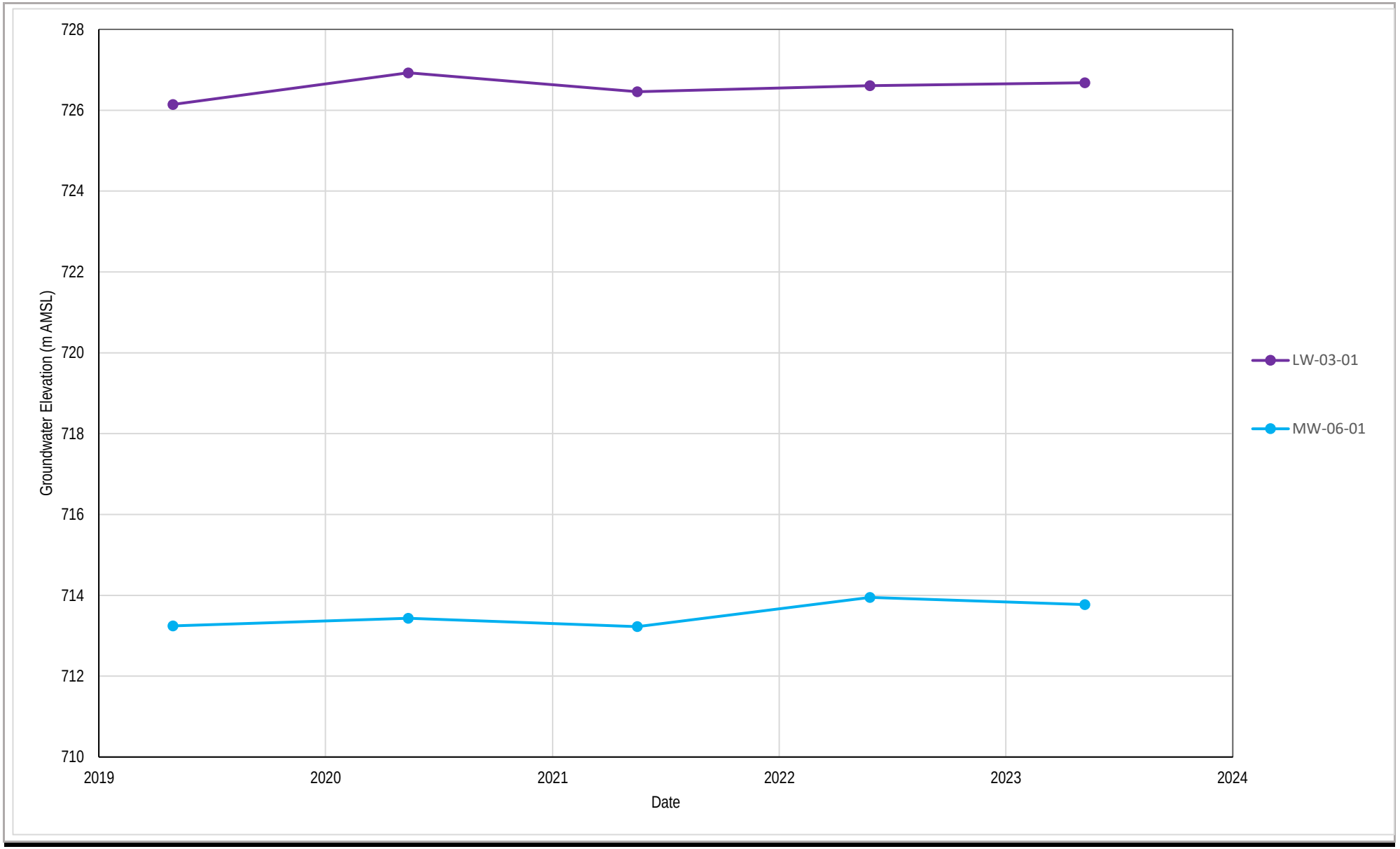
TITLE:
CROSS SECTION A-A'

DATE:	AUGUST, 2013
PROJECT No.:	CE04343
REV. No.:	A
FIGURE No.:	FIGURE 3

S:\Calgary\Projects\CE\CE04343\CE04343-001.dwg - FIGURE 3 - 2013/08/13 5:10 PM - clayton.gibeau-mah\Cross_Ch450.ctb

Appendix F

Groundwater Elevation Hydrographs



REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

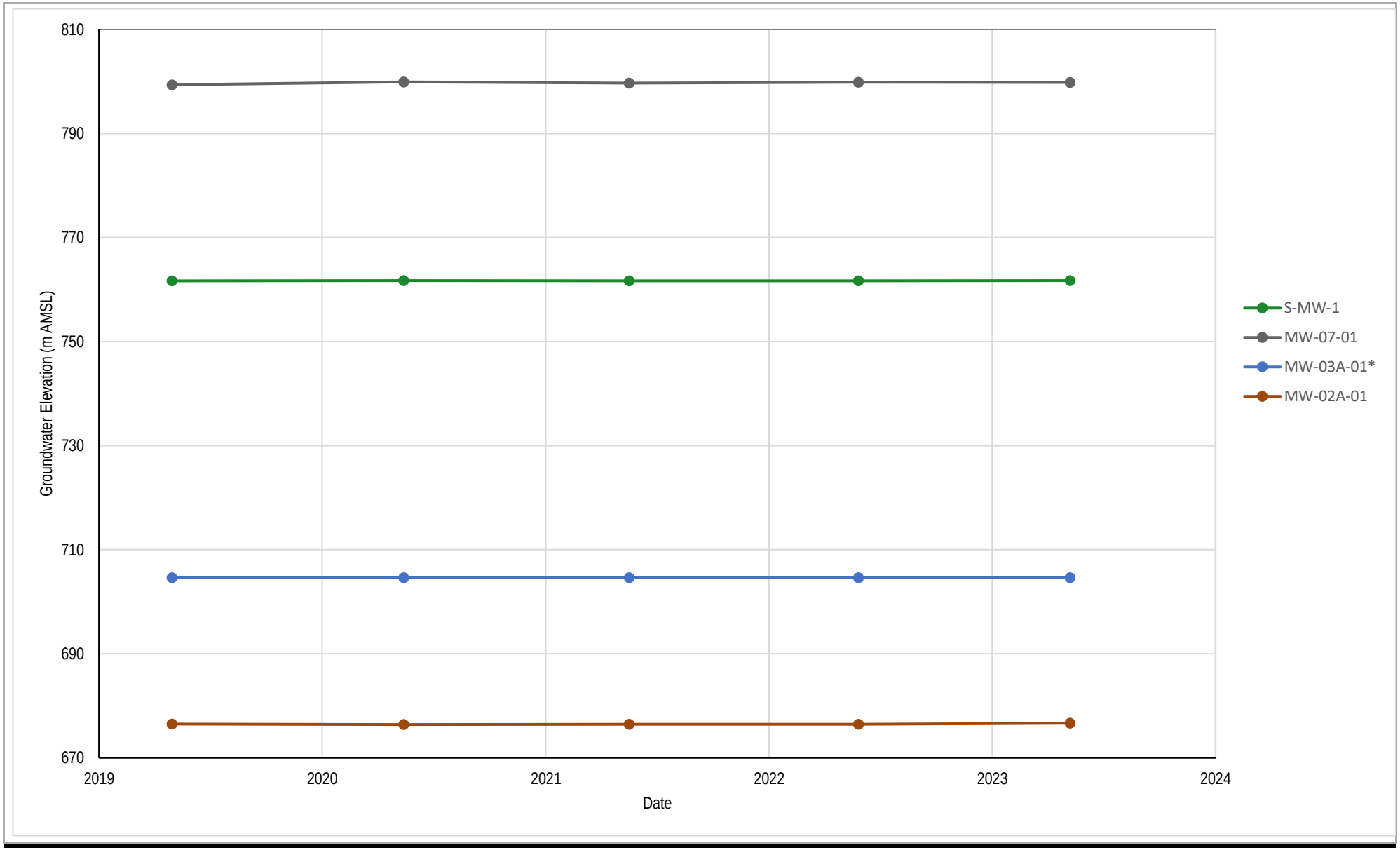
CENTRAL LANDFILL - LEACHATE WELLS
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

Project No. 12630729
Date July 2024

FIGURE F-1

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Data Source: RDCK Central Landfill Annual Reports



*Artesian conditions were observed at MW-03A-01 during all monitoring events from 2019-2023. Top of riser elevations were used as groundwater elevations.

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

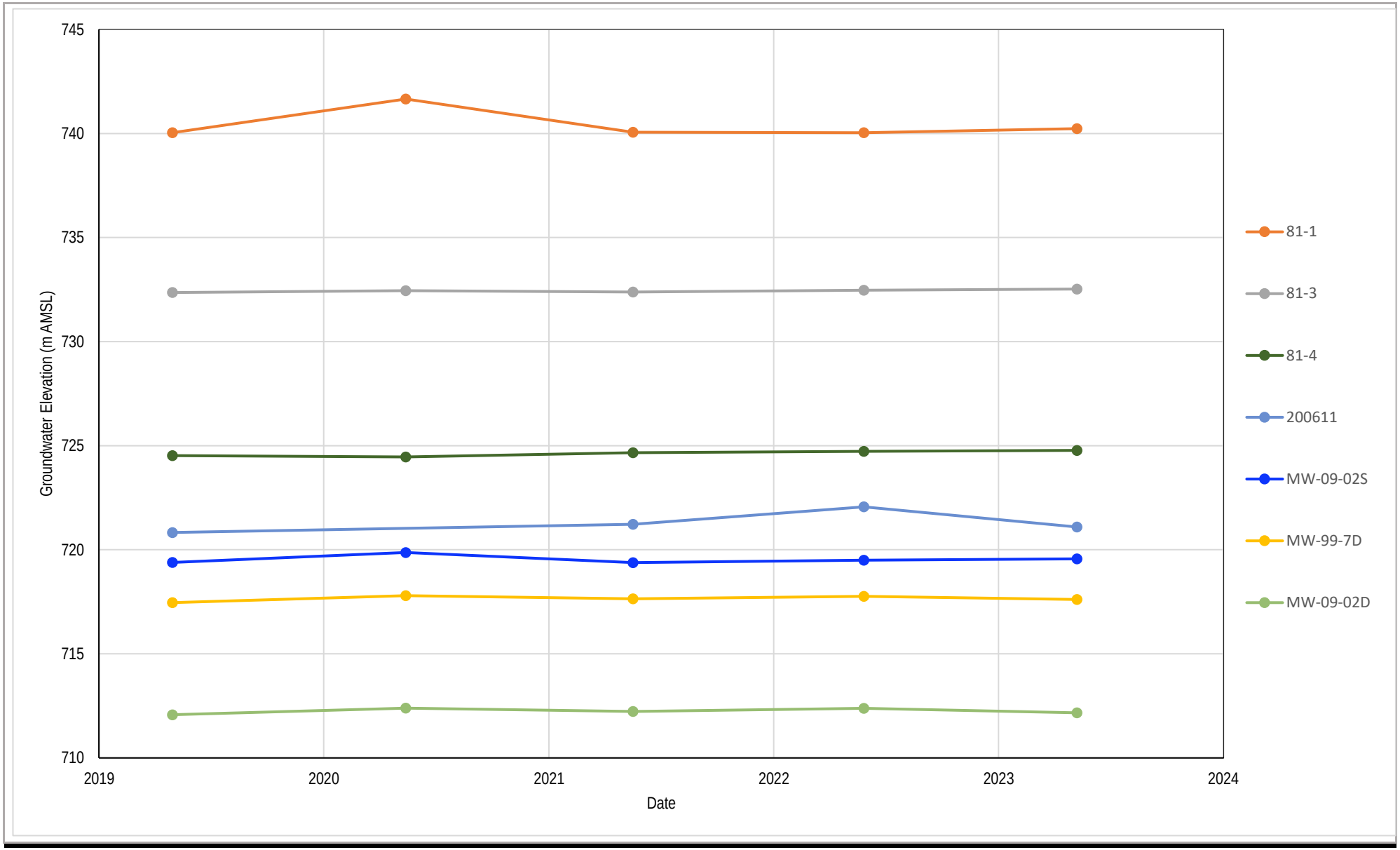
CENTRAL LANDFILL - BACKGROUND WELLS
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

Project No. 12630729
Date July 2024

FIGURE F-2

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Data Source: RDCK Central Landfill Annual Reports



REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

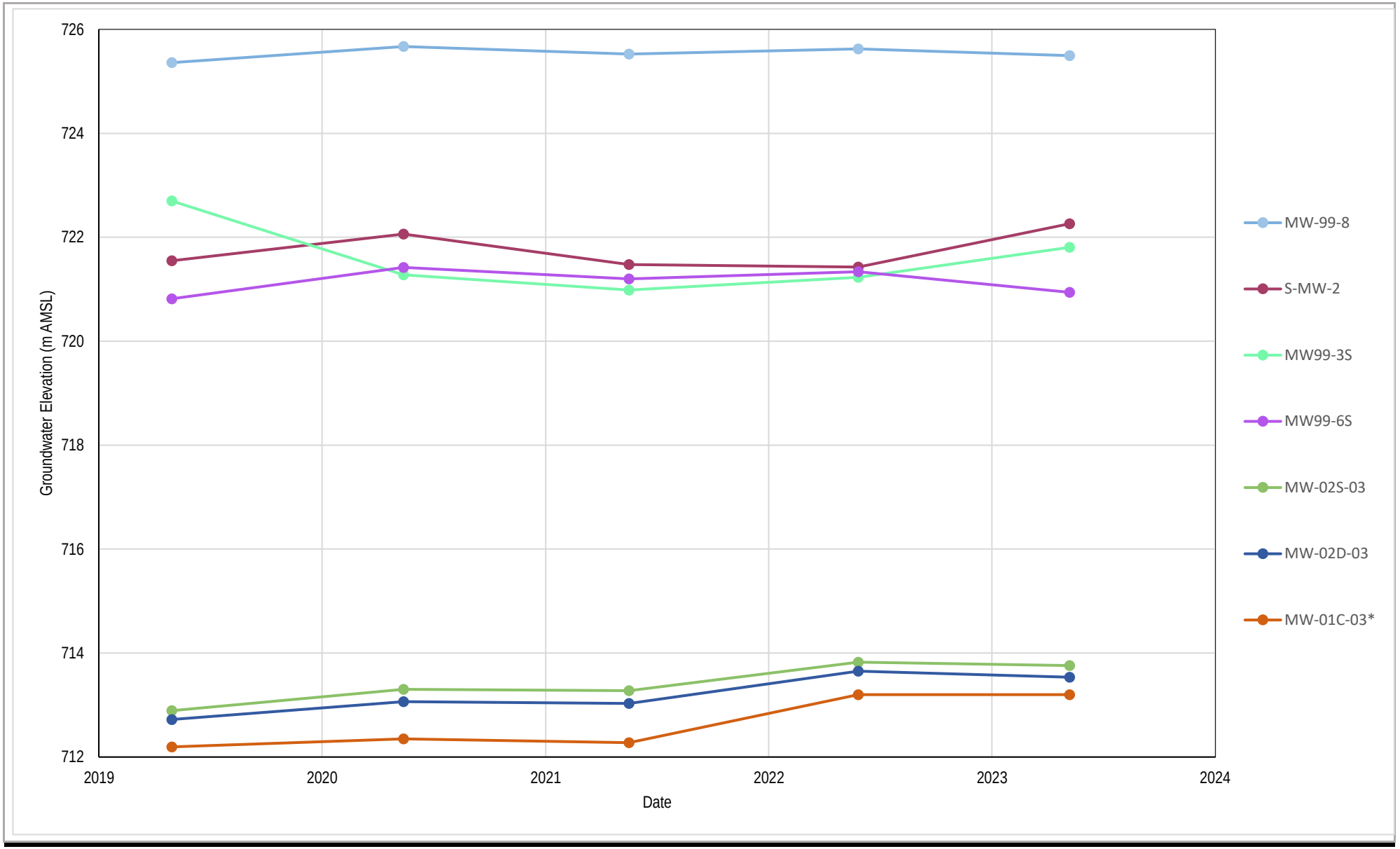
CENTRAL LANDFILL - NCAZ WELLS
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

Project No. 12630729
Date July 2024

FIGURE F-3

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Data Source: RDCK Central Landfill Annual Reports



*Artesian conditions were observed at MW-01C-03 on May 2022 and May 2023. Top of riser elevations were used as groundwater elevations.

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

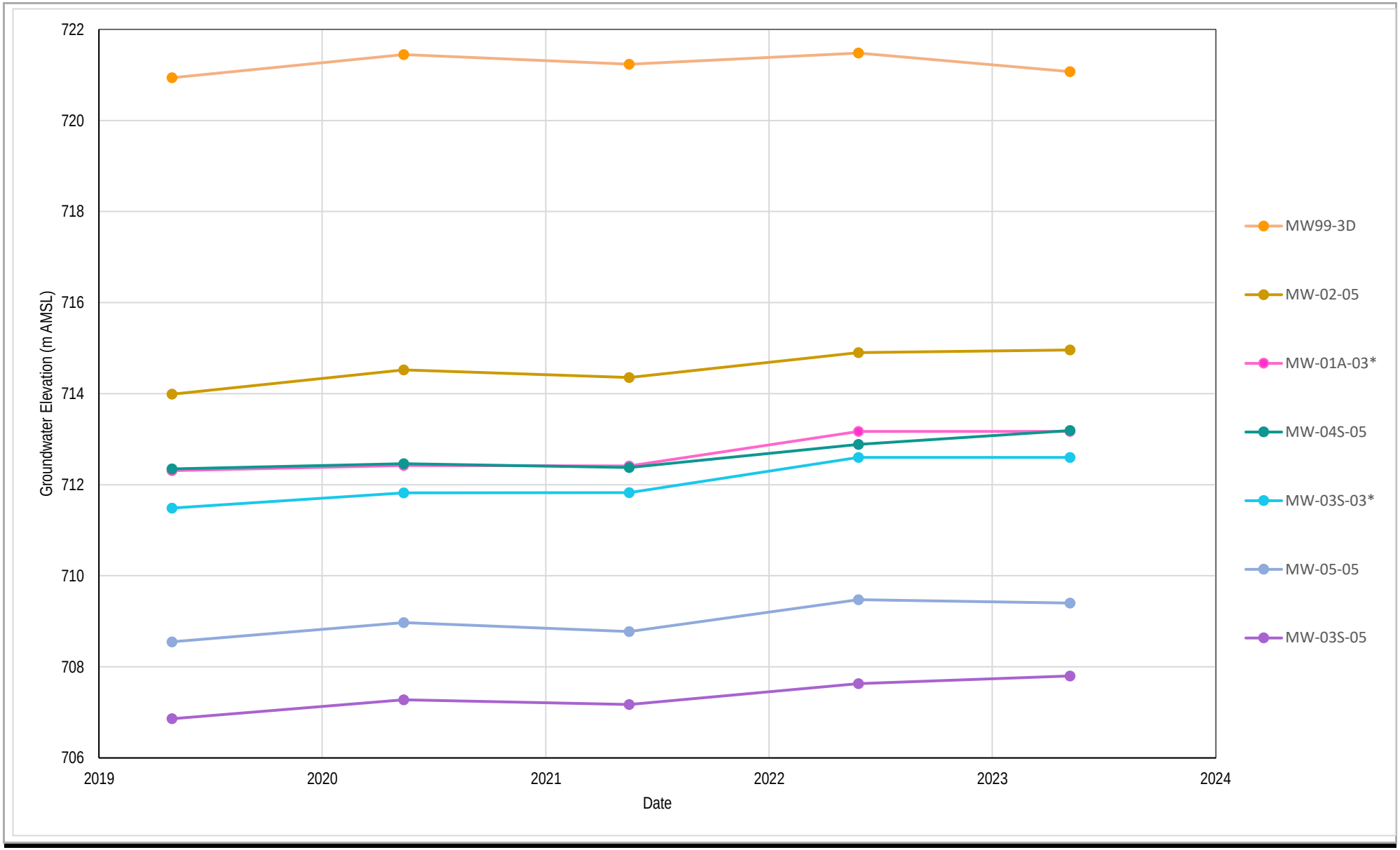
CENTRAL LANDFILL - SCAZ WELLS (UPGRADIENT)
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

Project No. 12630729
Date July 2024

FIGURE F-4

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Data Source: RDCK Central Landfill Annual Reports



*Artesian conditions were observed at MW-01A-03 and MW-03S-03 on May 2022 and May 2023. Top of riser elevations were used as groundwater elevations.

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

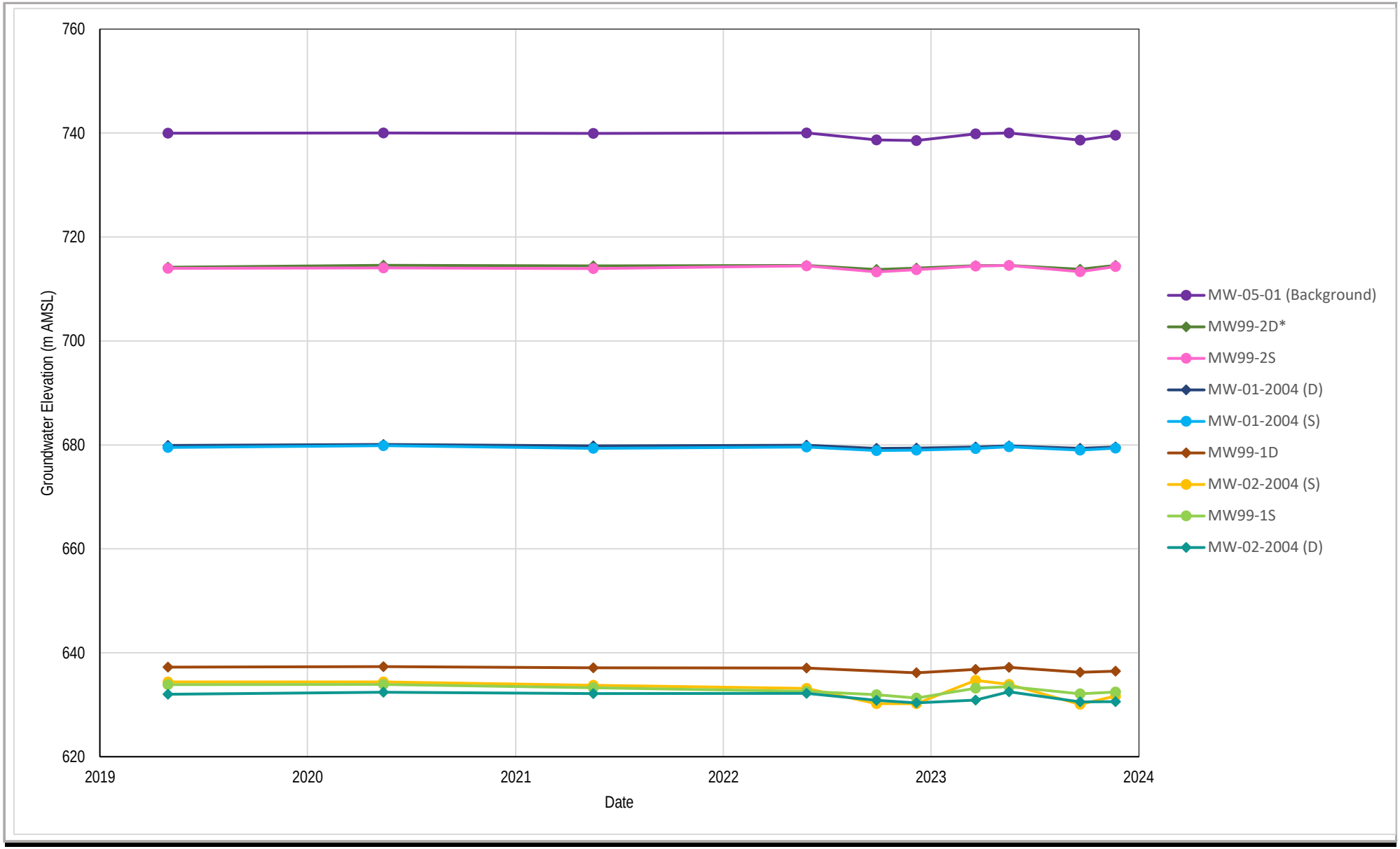
CENTRAL LANDFILL - SCAZ WELLS (DOWNGRADIENT)
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

Project No. 12630729
Date July 2024

FIGURE F-5

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Data Source: RDCK Central Landfill Annual Reports



*Artesian conditions were observed at MW99-2D on May 2023 and top of riser elevation was used as groundwater elevation.

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

TSF DOWNGRADIENT
GROUNDWATER ELEVATION HYDROGRAPH 2019-2023

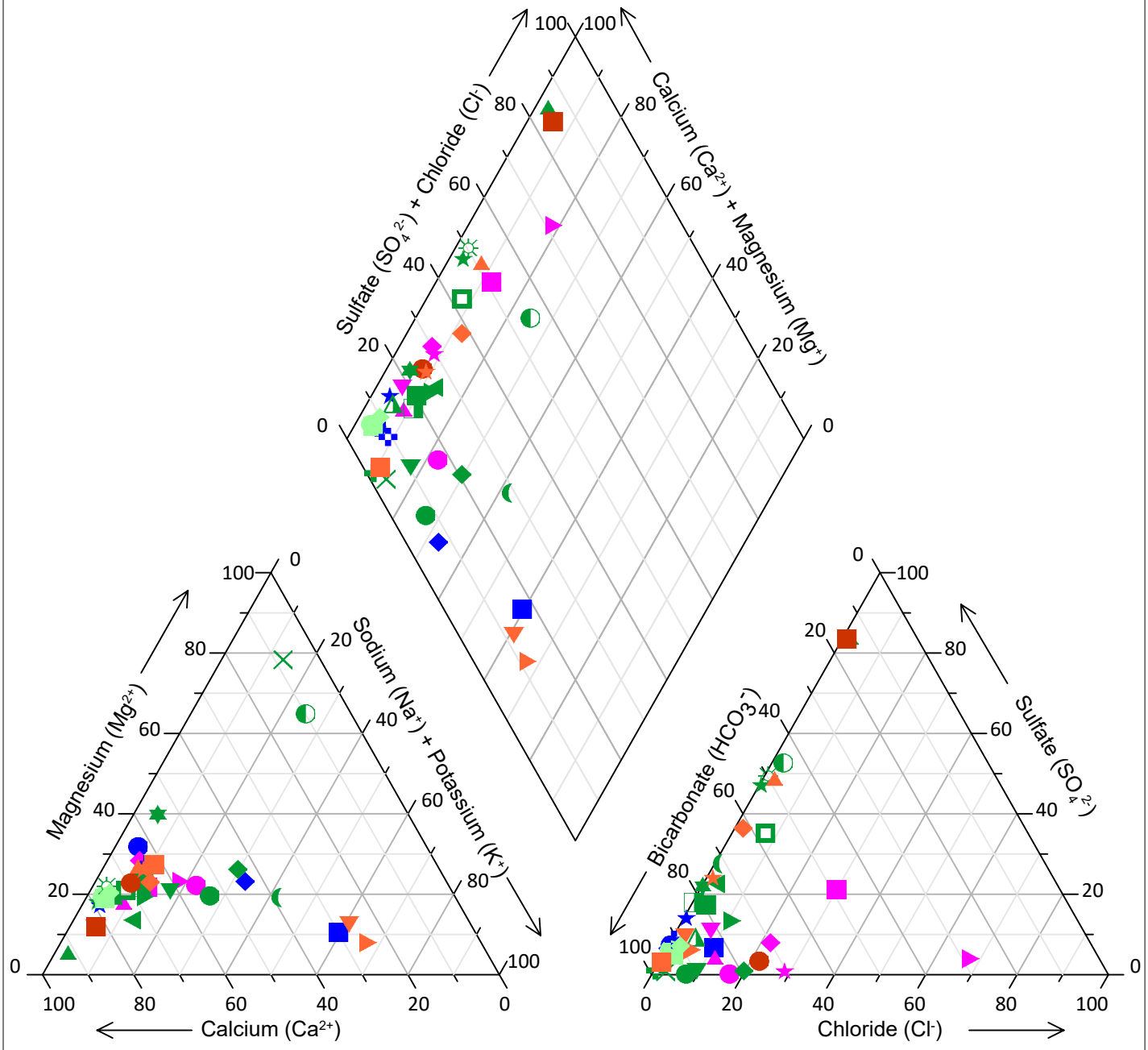
Project No. 12630729
Date July 2024

FIGURE F-6

Filename: https://projects-northamerica.ghd.com/sites/na03_08/rdckcentrallandfillh/ProjectDocs/Appendices/Appendix F - Hydrographs/Central Landfill_HHCR_Hydrographs.xlsx
Plot Date: 5 Jul 2024 05:20 PM

Appendix G

Piper Plots



LEGEND

BACKGROUND
- S-MW-1
- MW-02A-01
- MW-03A-01
- MW-07-01
- MW-05-01

NCAZ
- MW-99-7D
- MW-09-02S
- MW-09-02D
- 81-1
- 81-3
- 81-4
- 200611

SCAZ
- 207637
- S-MW-2
- MW-99-3S
- MW-99-6S
- MW-99-8
- MW-02S-03
- MW-02D-03
- MW-01C-03
- MW-03S-03
- MW-02-05
- MW-03S-05
- MW-04S-05
- MW-05-05
- MW-99-3D
- MW-01A-03
- MW99-2S
- MW99-2D

SOURCE
- LW-03-01
- MW-06-01

RESIDENTIAL
- 111 Emerald Rd.
- 1780 Airport Rd.
- 110 Emerald Rd.

TSF DOWNGRADIENT
- MW-01-2004(S)
- MW-01-2004(D)
- MW99-1S
- MW99-1D
- MW-02-2004(S)
- MW-02-2004(D)

NOTES

- Total metal concentrations were used where dissolved metal concentrations were unavailable.
- 110 Emerald Rd. data is from May 2021 (most recent).

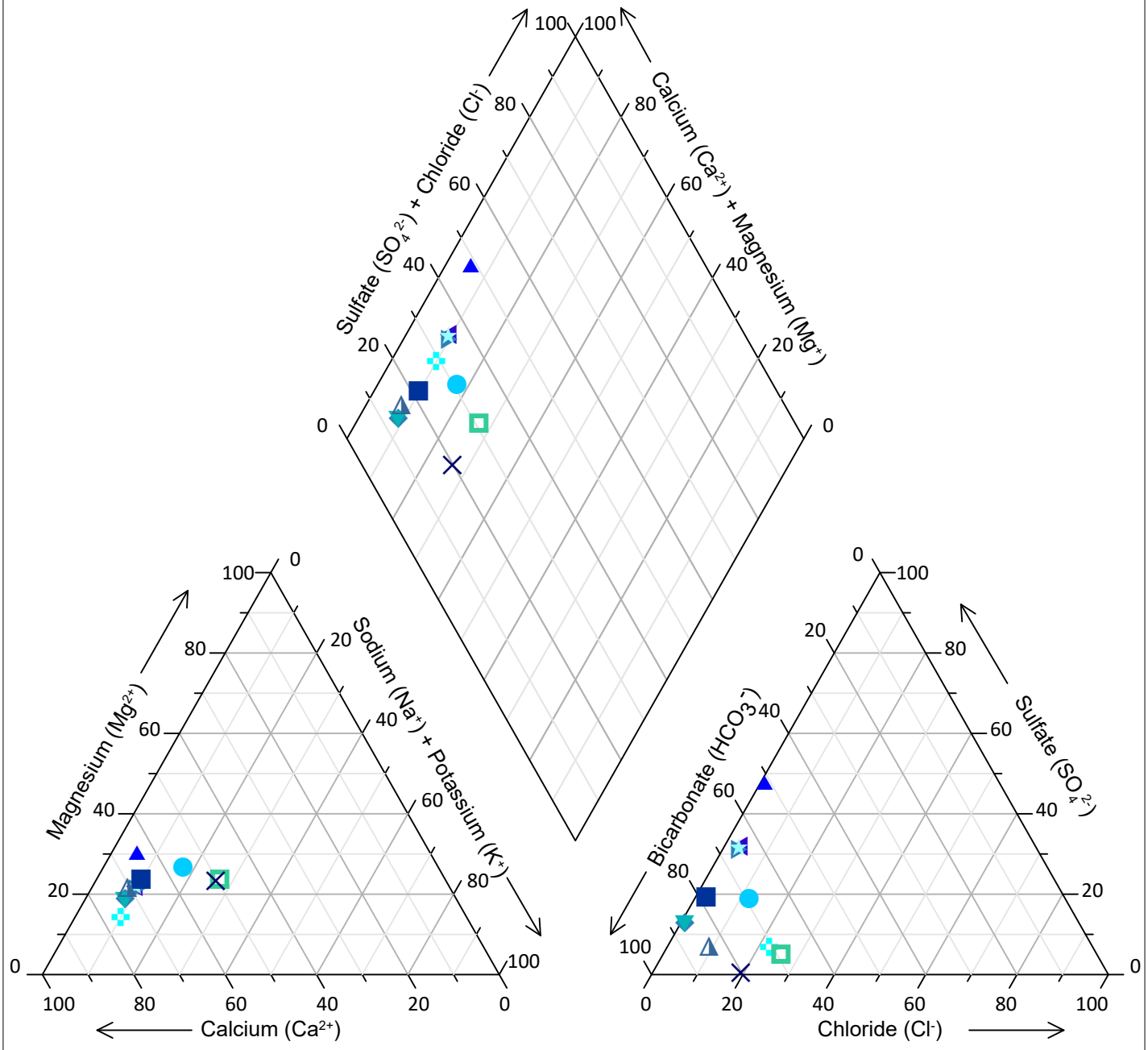
REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

GROUNDWATER PIPER PLOT - MAY 2023

Project No. 12630729
Date September 2024

FIGURE G-1

\\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\Piper Plot\12630729_Central Landfill_HHCR_Piper_Plot_May 2023.gpj



LEGEND

SURFACE WATER

- SW1-07
- SW2-07
- SW3-07
- Outlet Ditch
- SW5-19
- Seepage Weir
- Spillway Inlet
- Spillway Outlet
- Seep A
- Seep E
- Seep G
- Seep I

NOTES

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

SURFACE WATER PIPER PLOT - MAY 2023

Project No. **12630729**
Date **July 2024**

FIGURE G-2

\\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\Piper Plot\12630729_Central Landfill_HHCR_Piper_Plot_May 2023 - SW.gpj
Plot Date: July 05 2024 5:07 PM

Appendix H

Historical Concentration Versus Time Plots (2004-2022)

Appendix H1

Landfill Historical Concentration Versus Time Plots (2004-2022) (RDCK, 2023a)

Groundwater Figures:

Figure 1

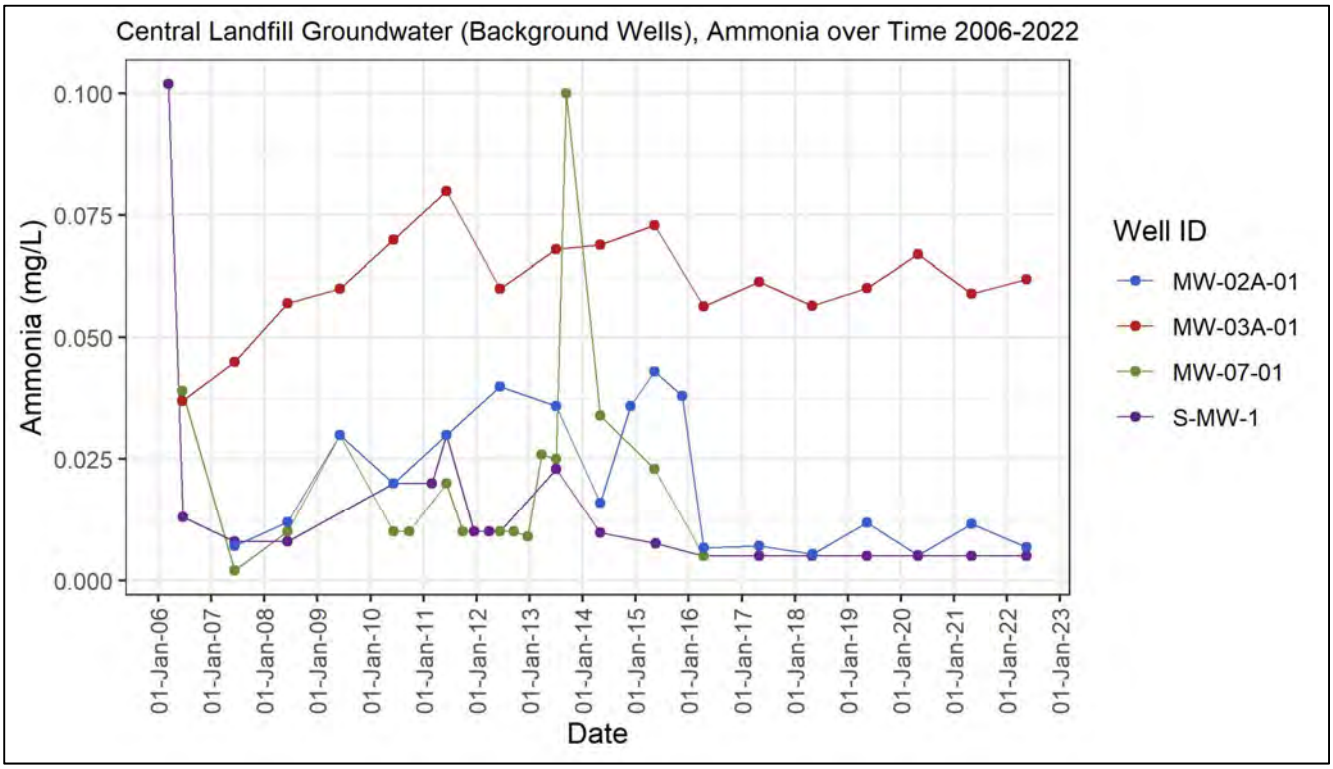


Figure 2

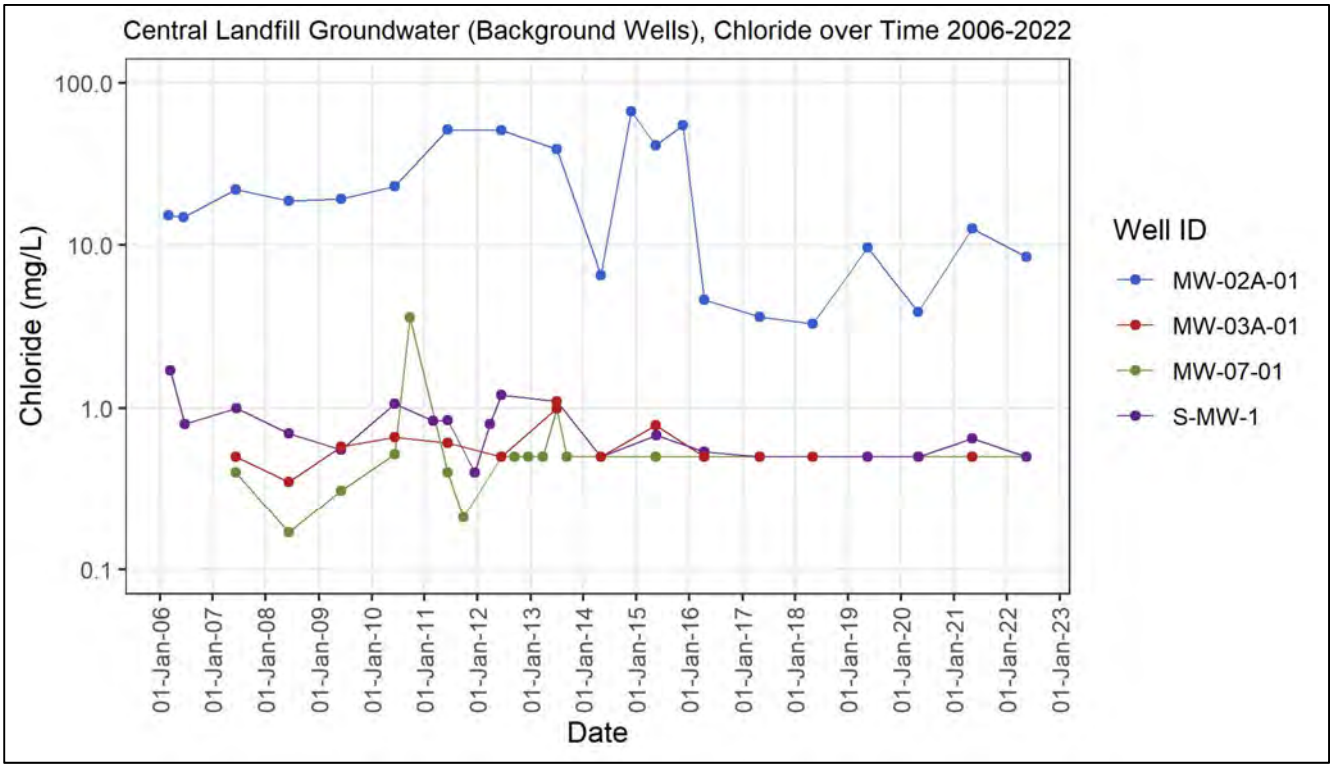


Figure 3

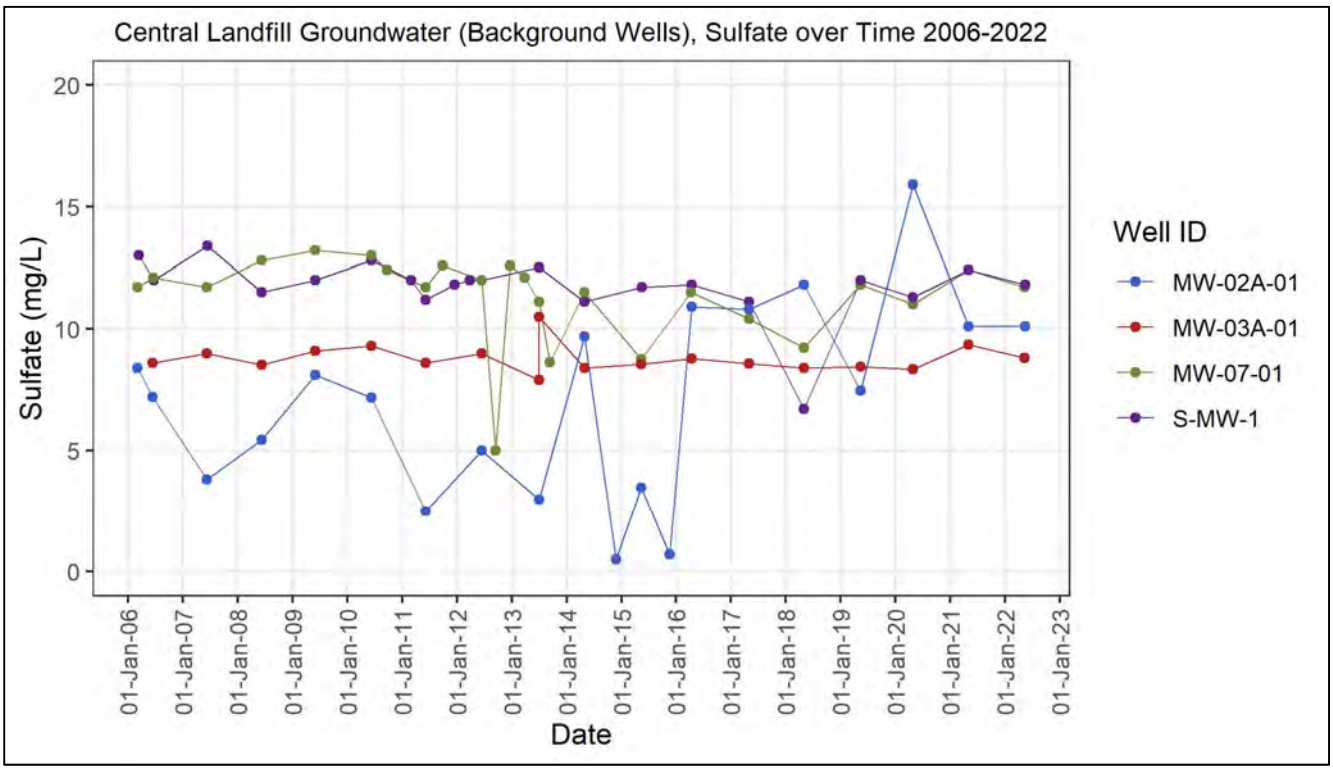


Figure 4

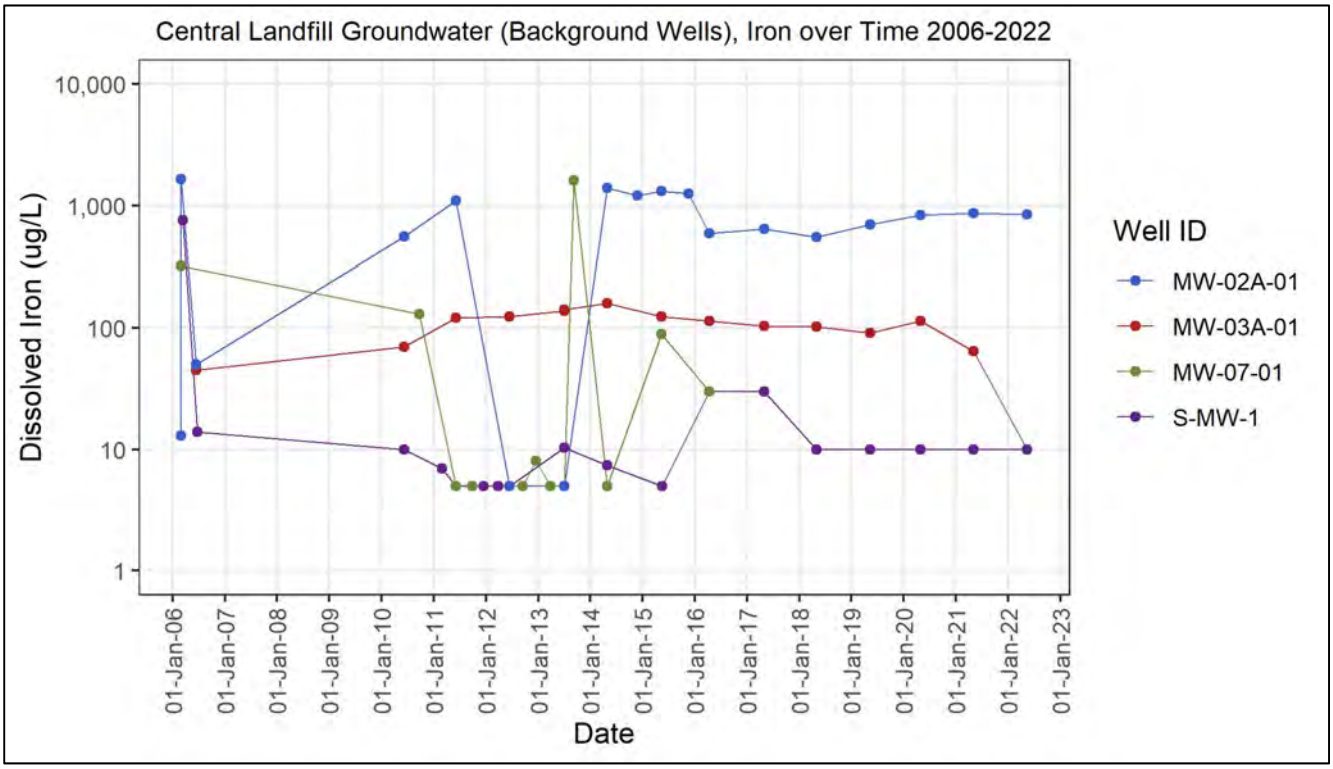


Figure 5

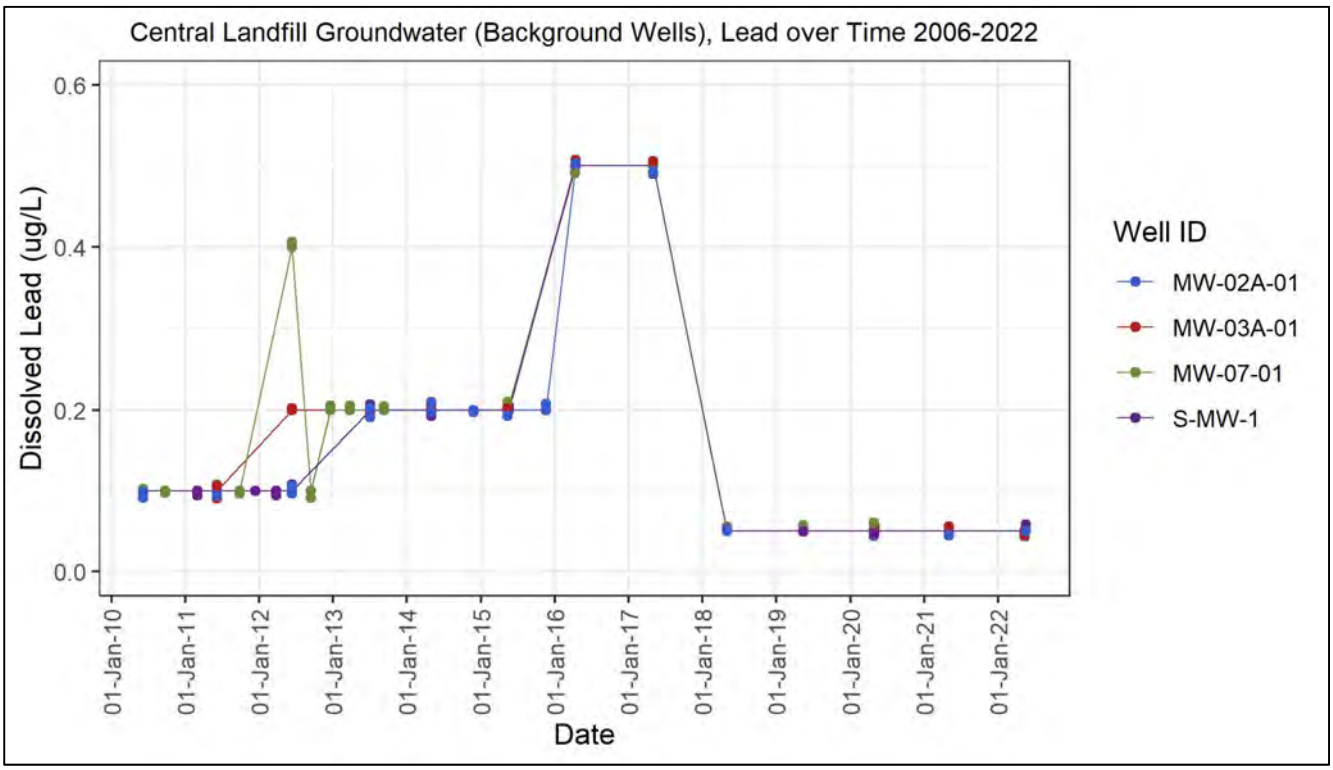


Figure 6

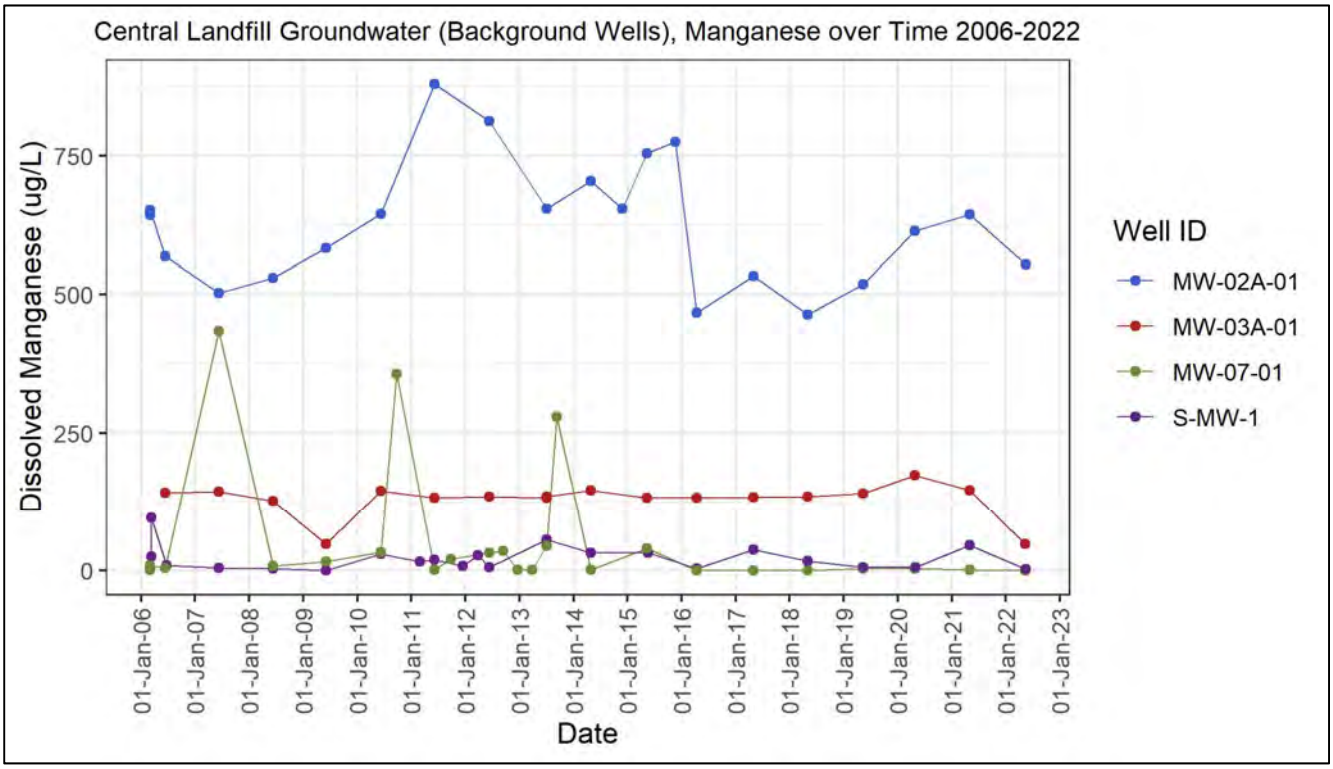


Figure 7

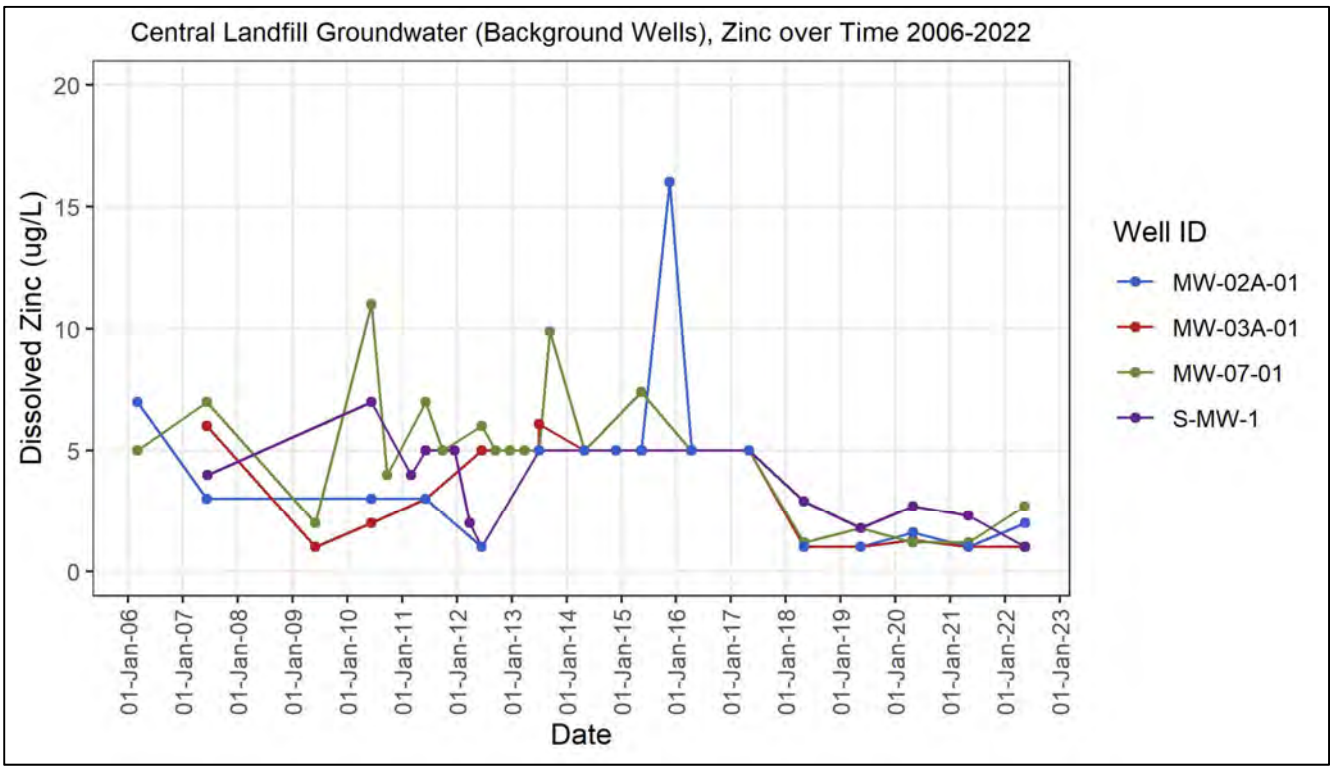


Figure 8

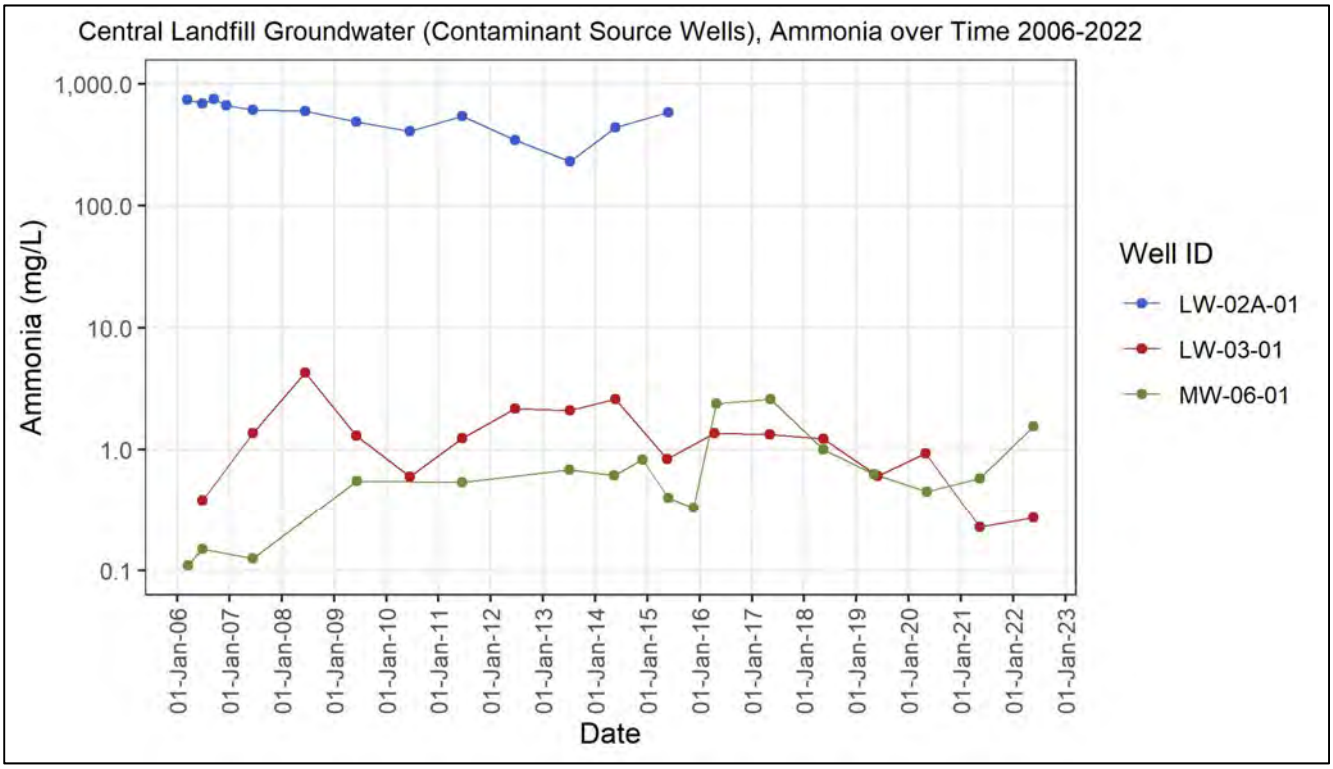


Figure 9

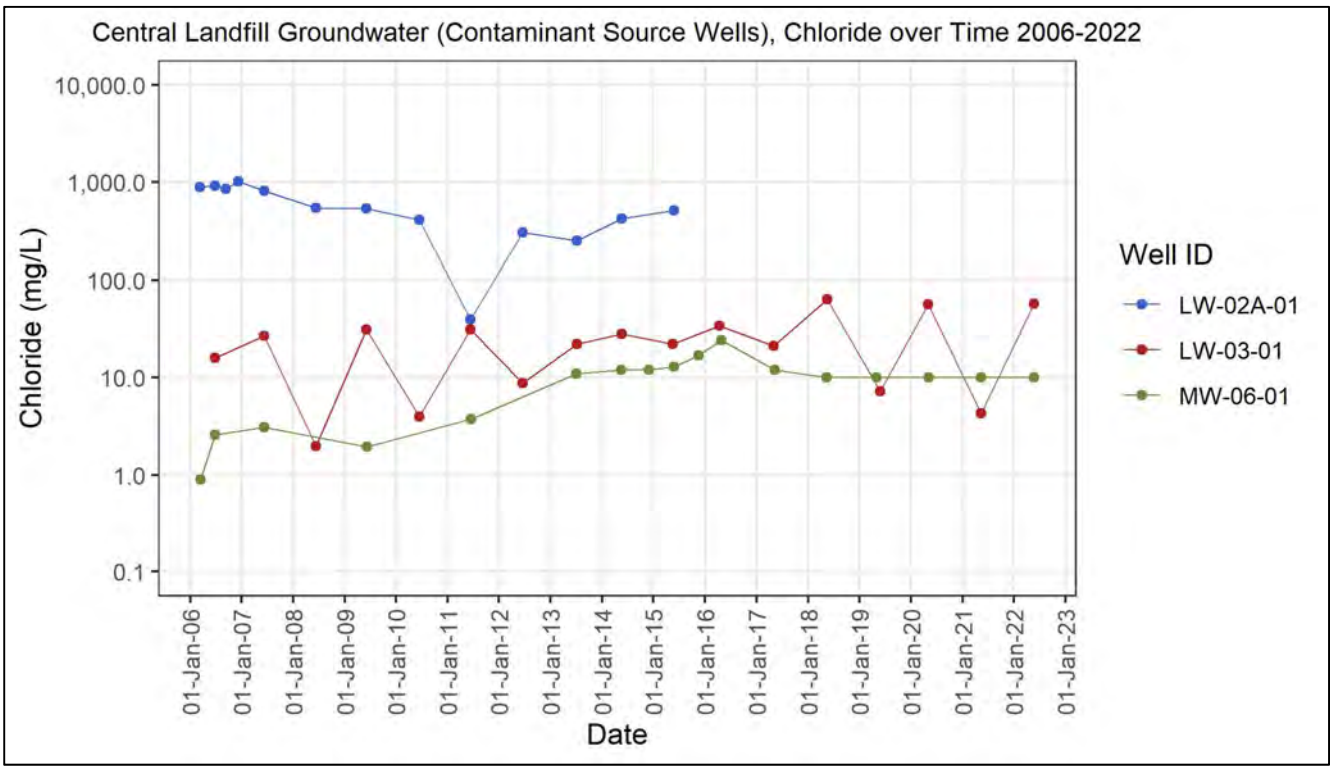


Figure 10

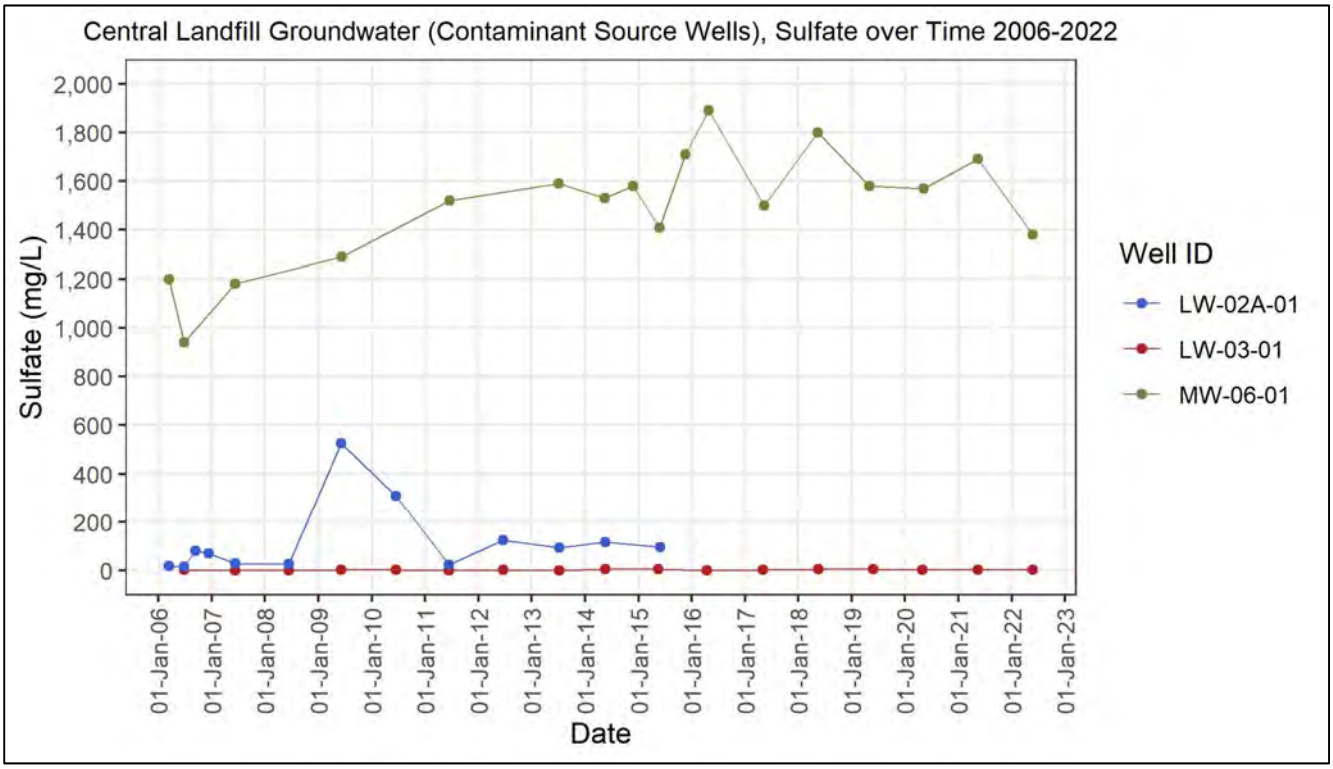


Figure 11

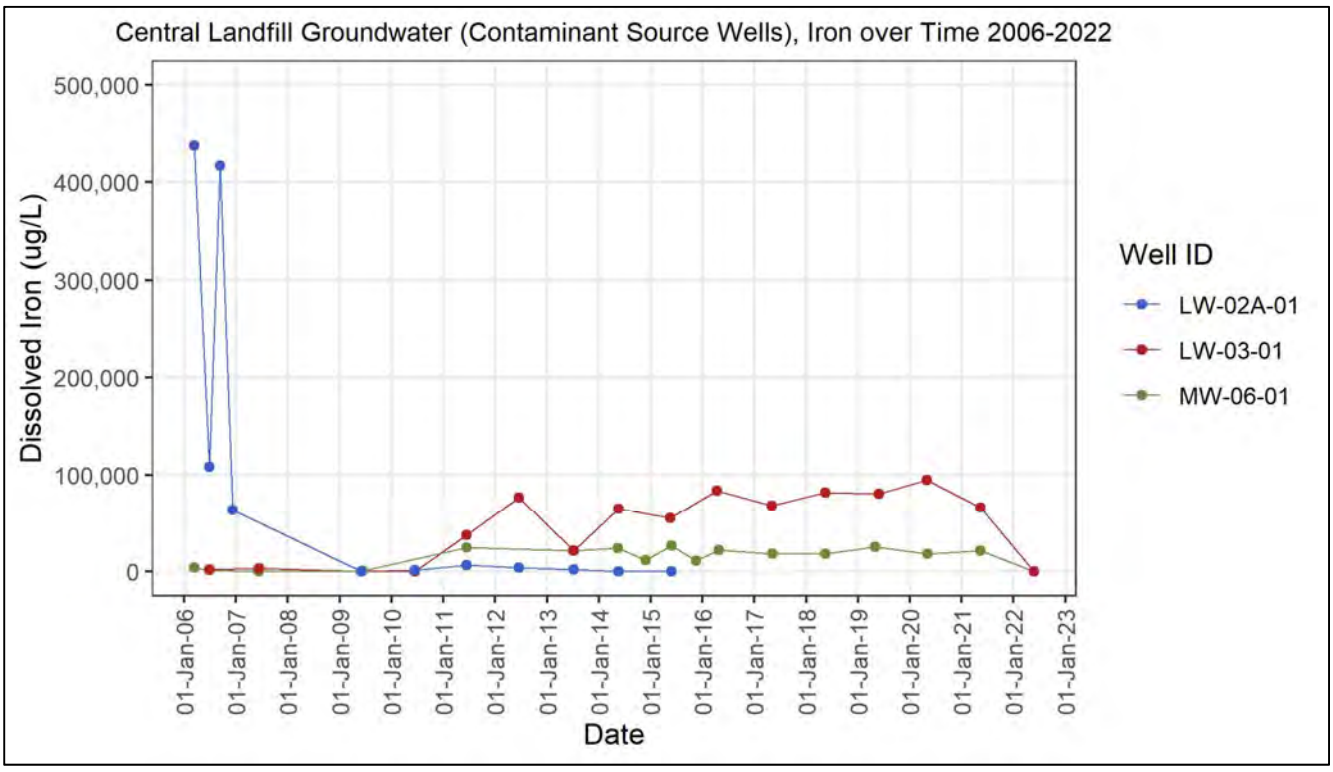


Figure 12

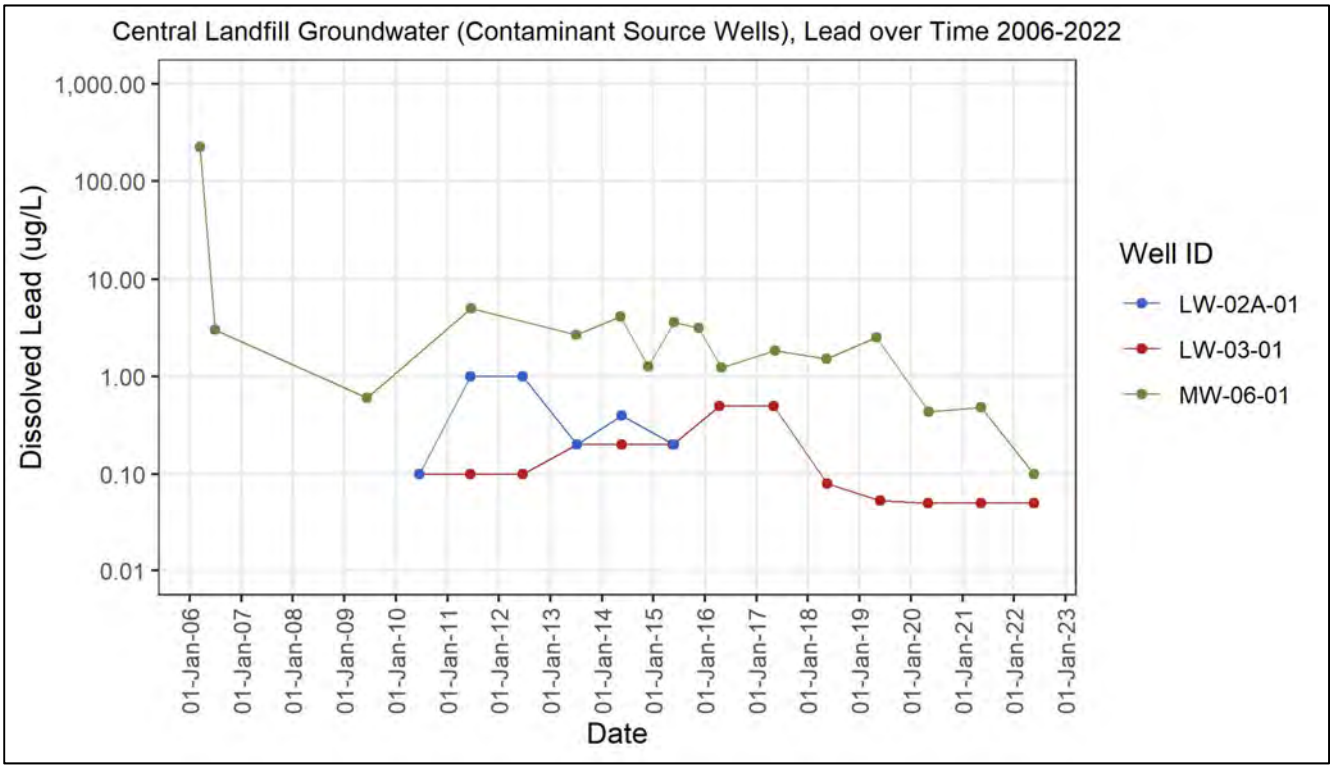


Figure 13

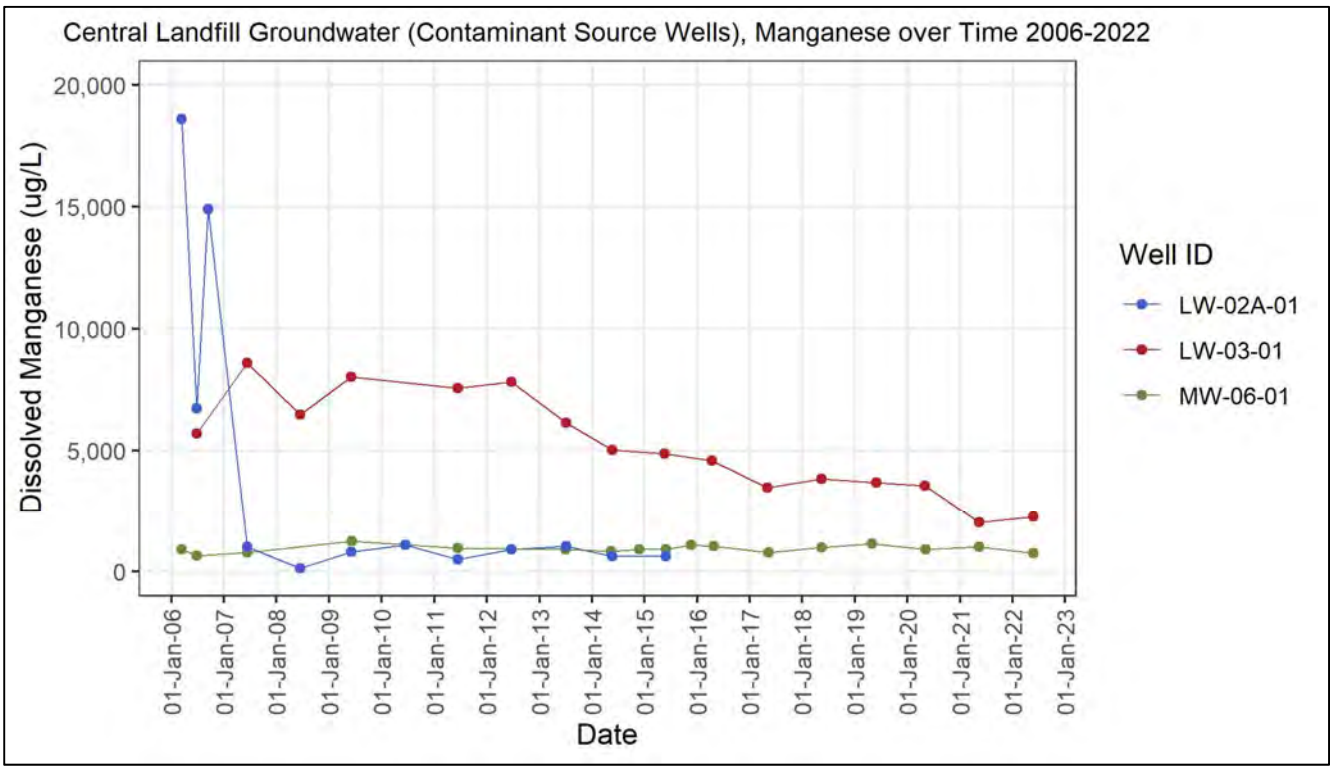


Figure 14

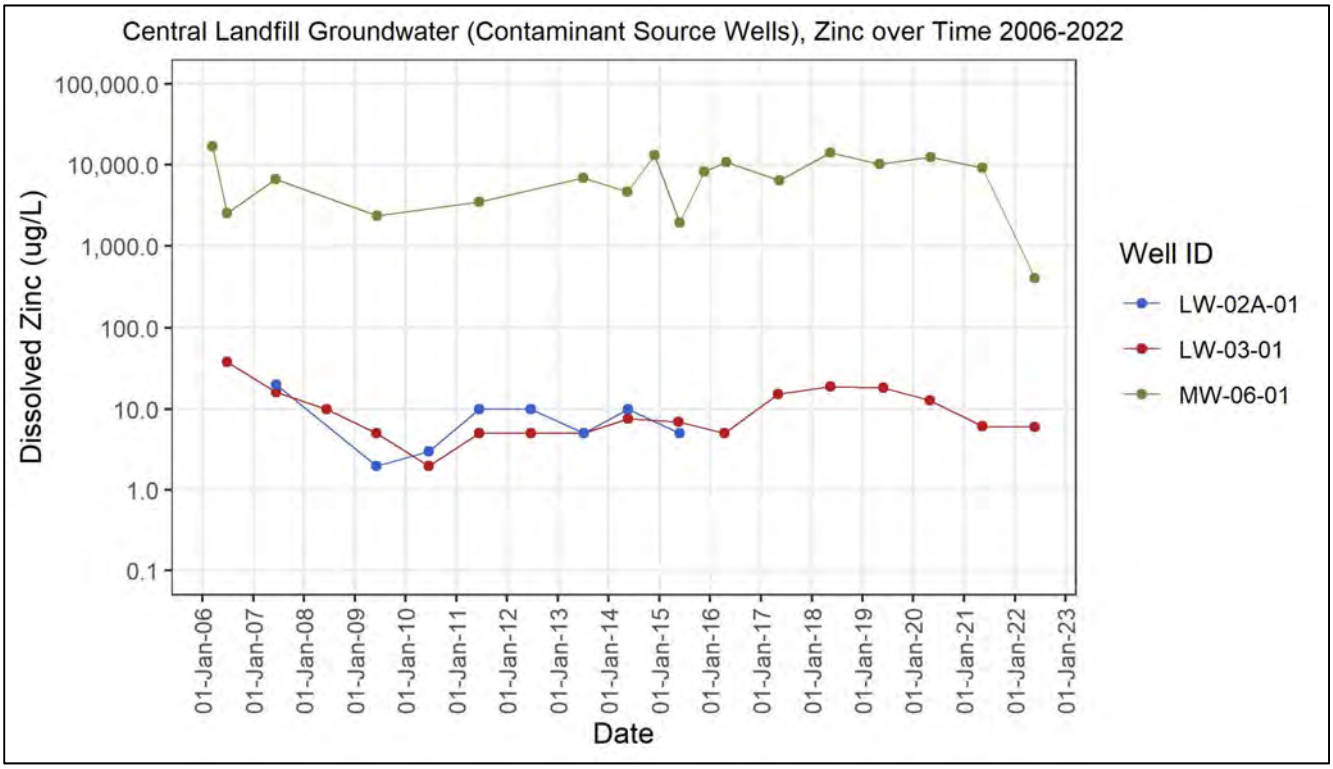


Figure 15

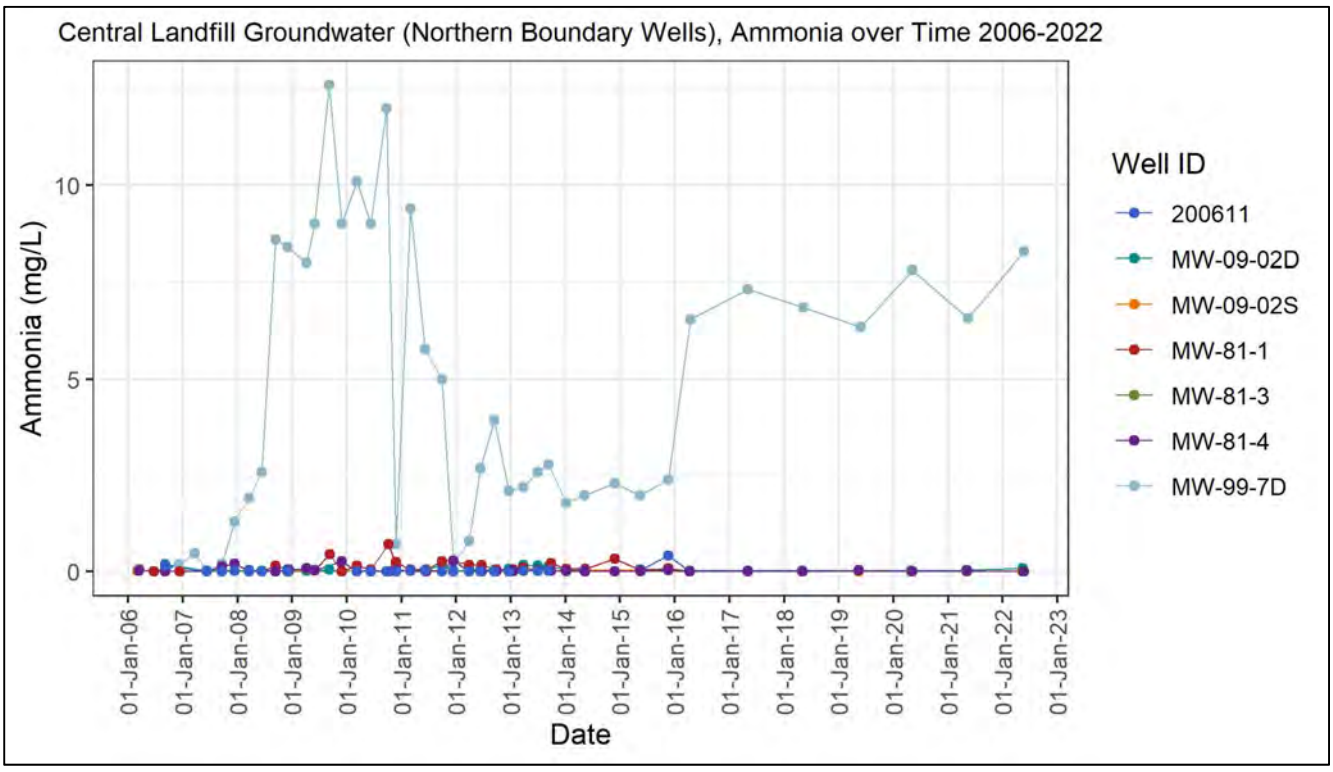


Figure 16

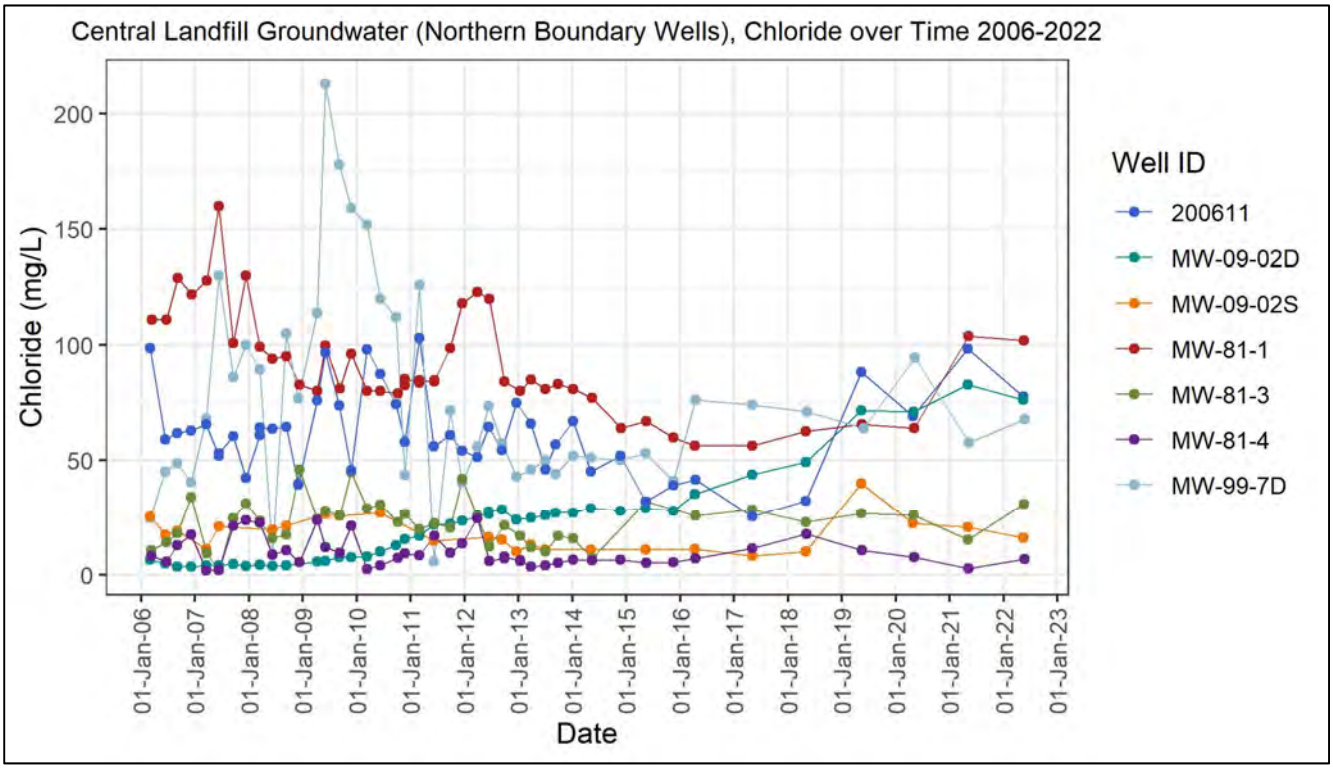


Figure 17

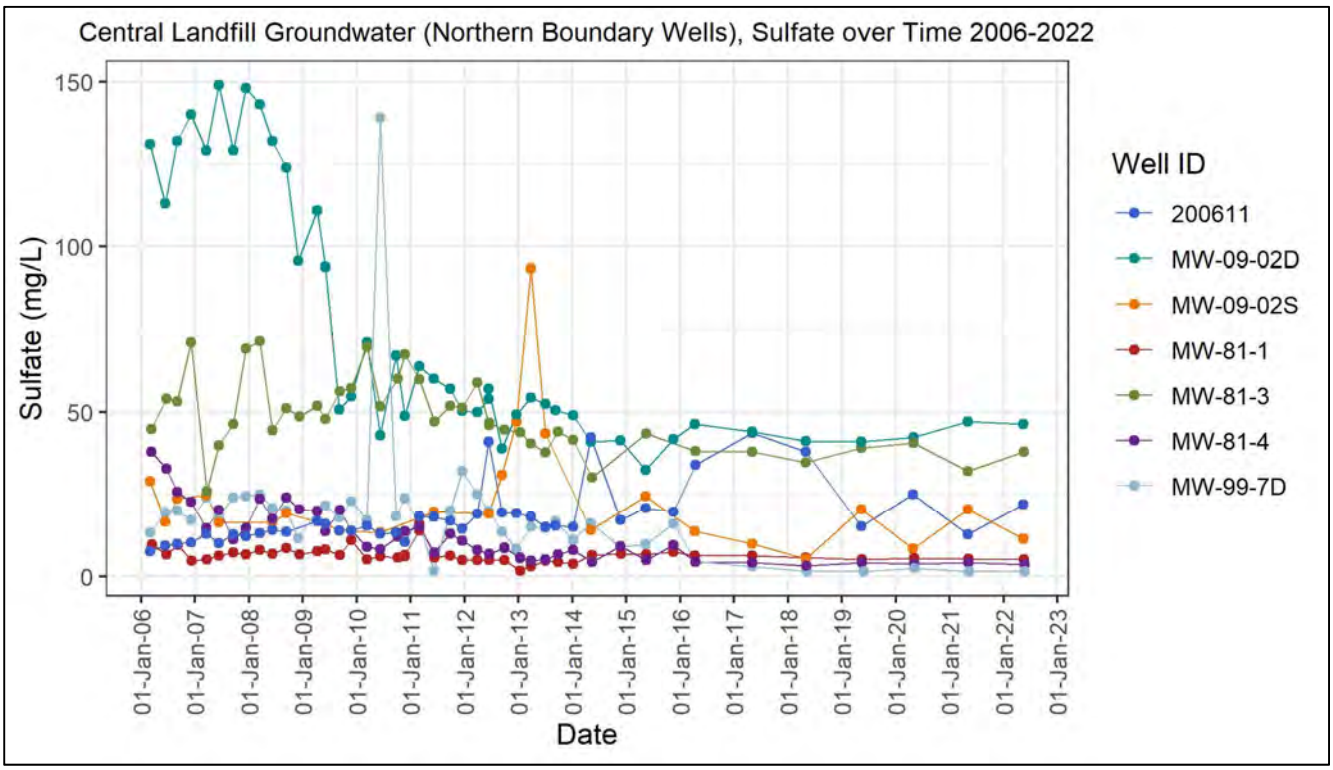


Figure 18

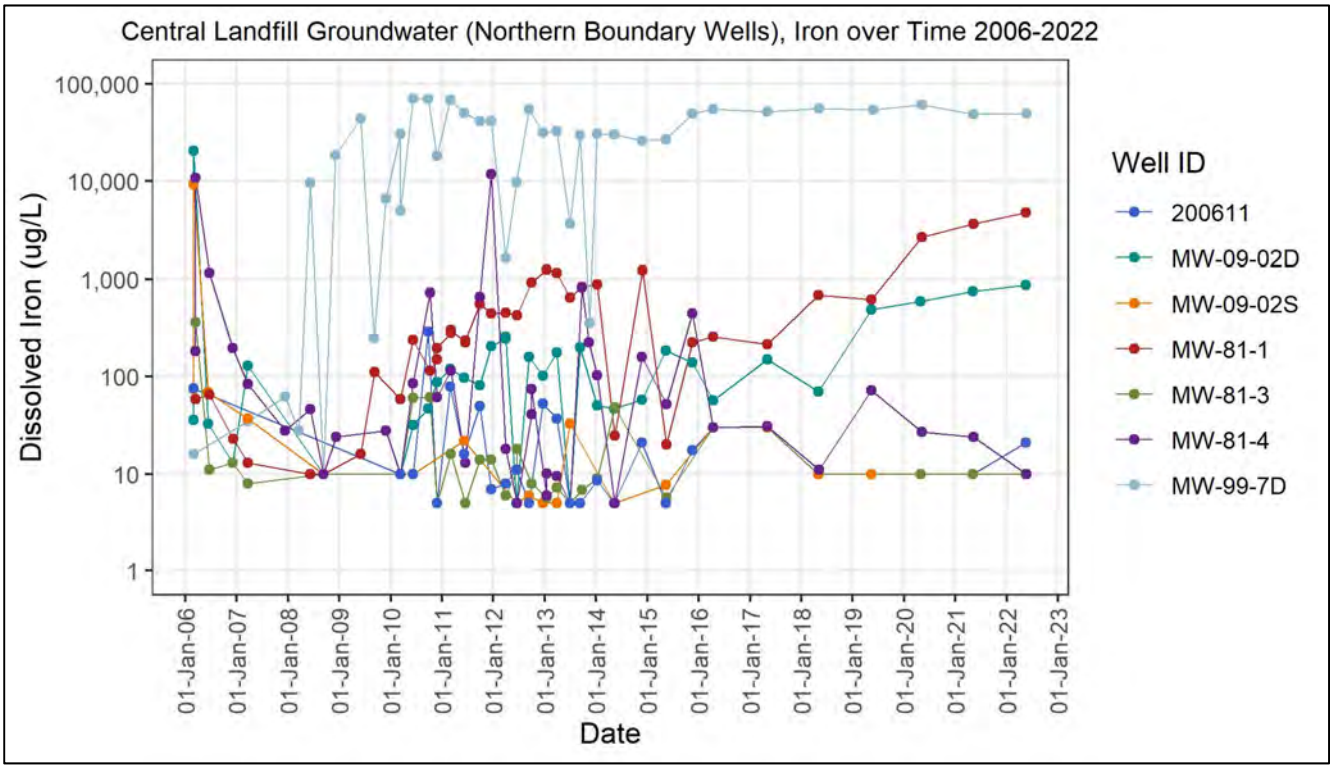


Figure 19

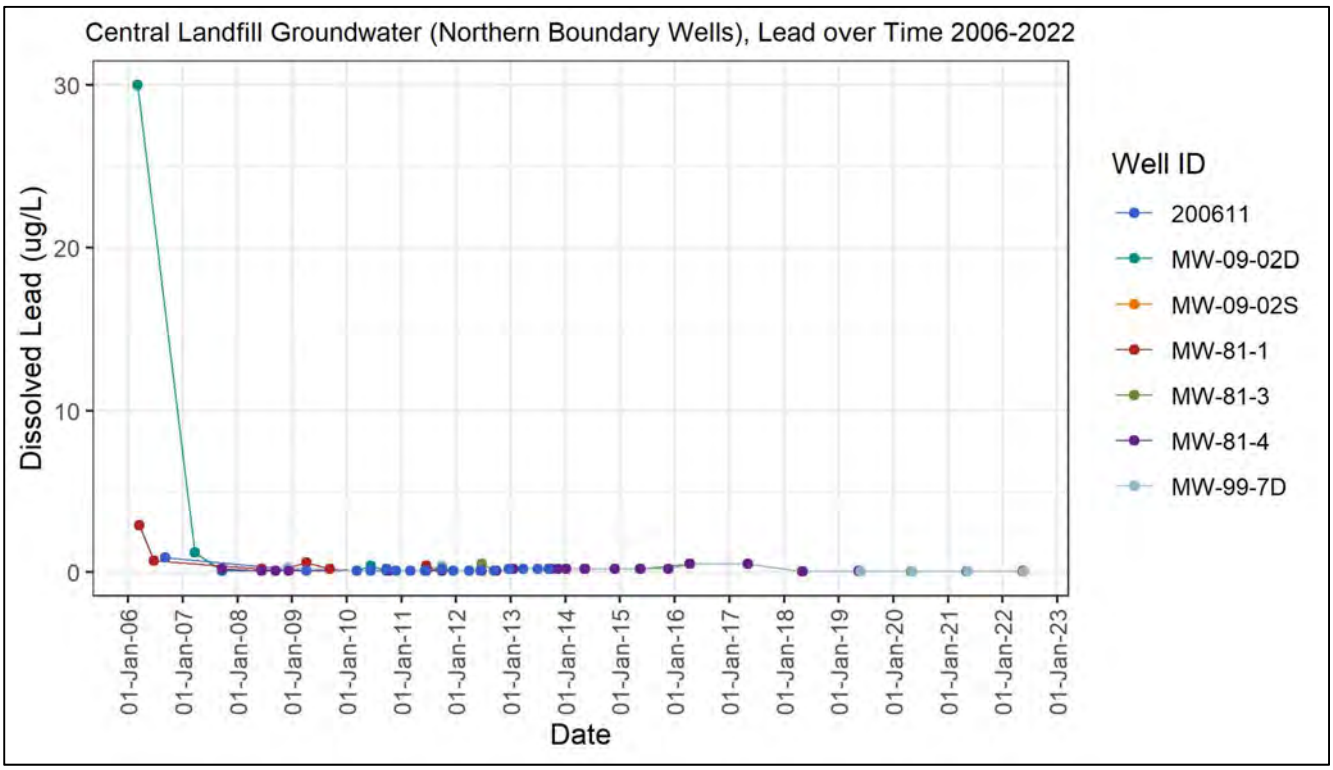


Figure 20

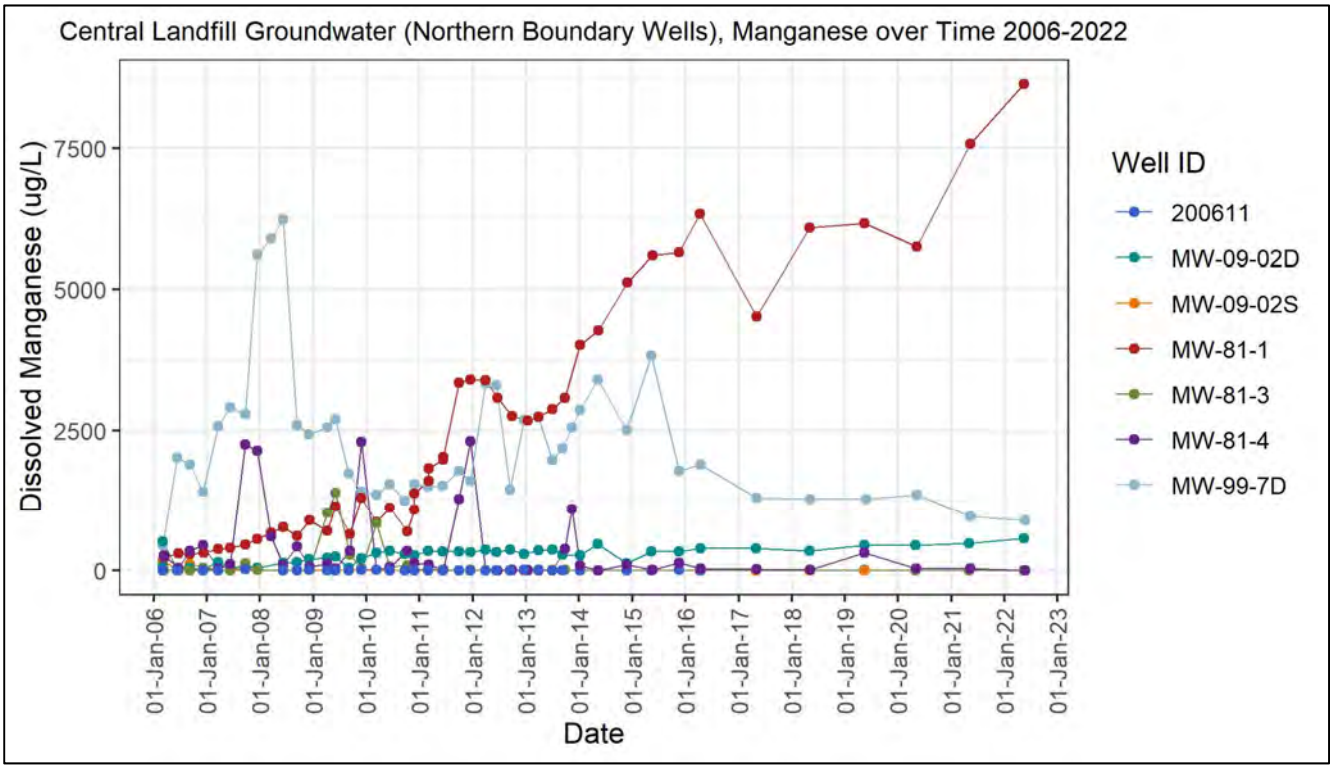


Figure 21

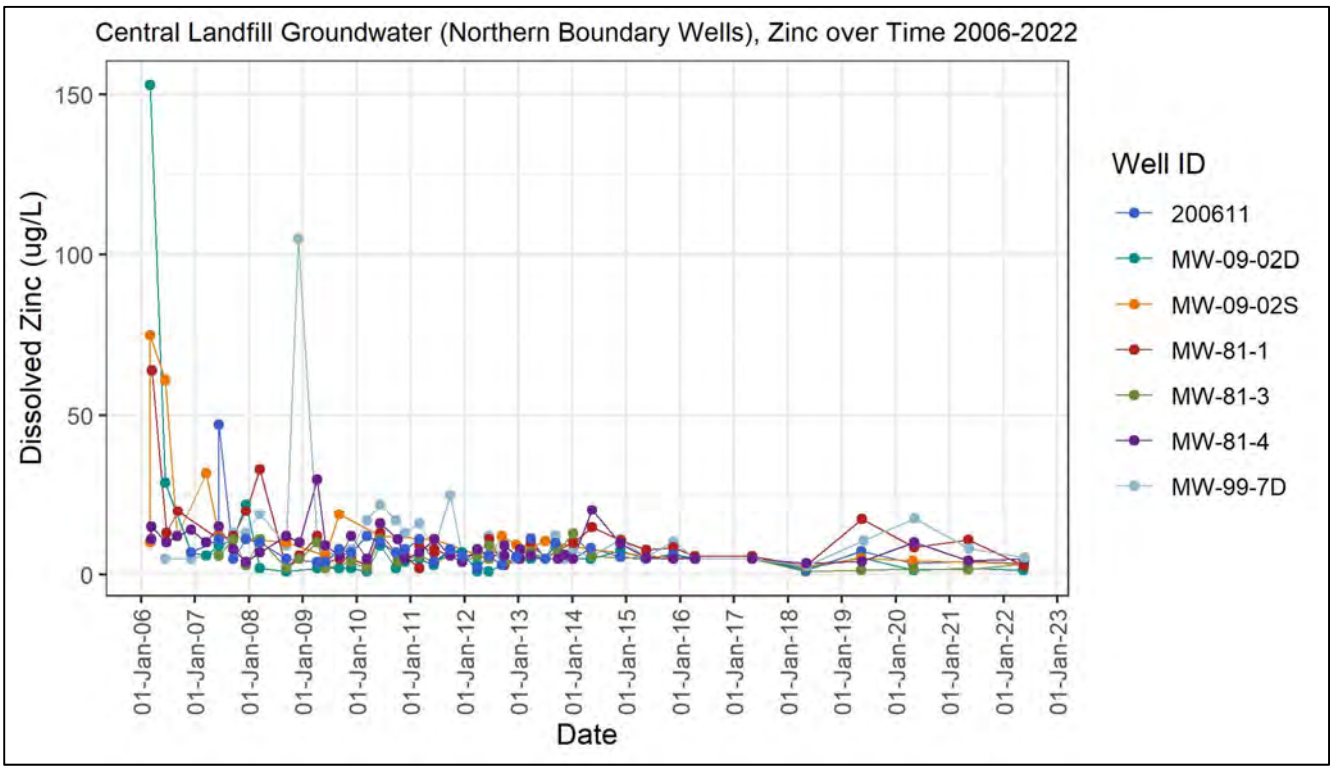


Figure 22

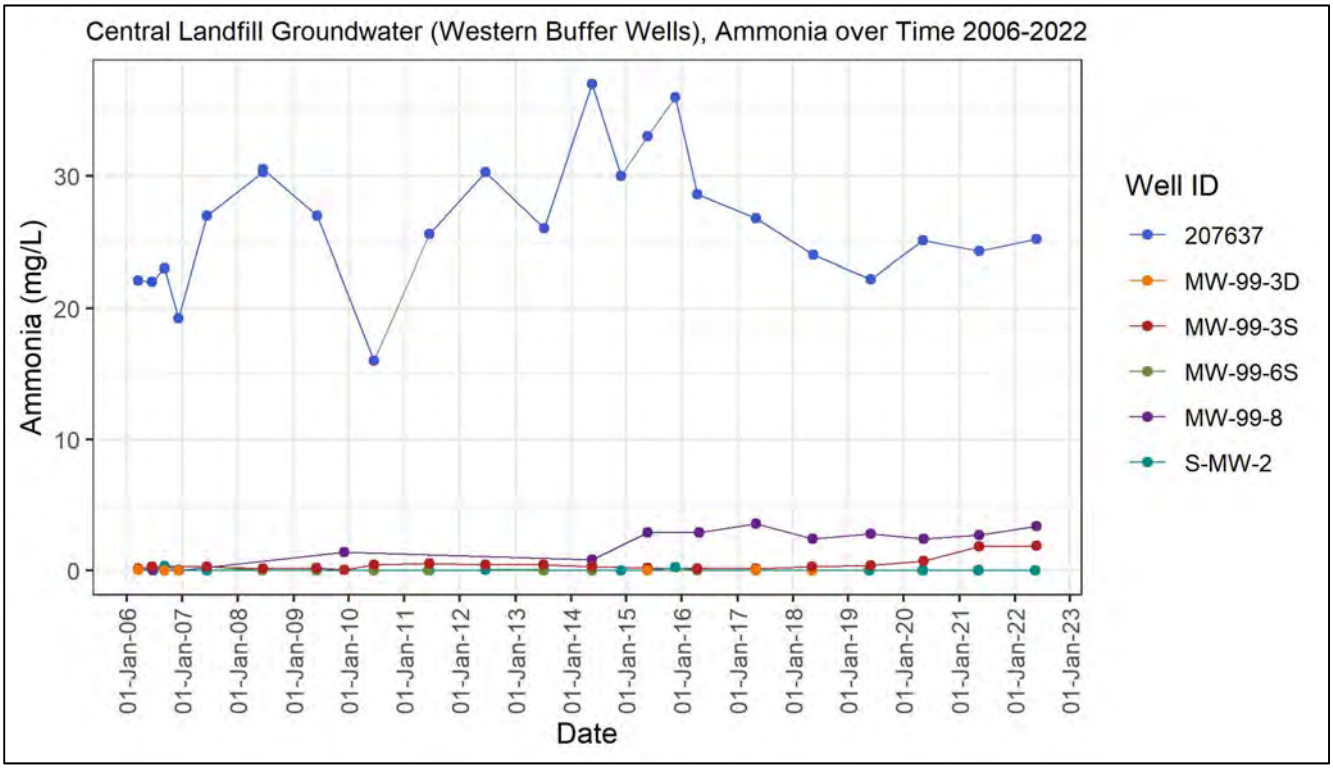


Figure 23

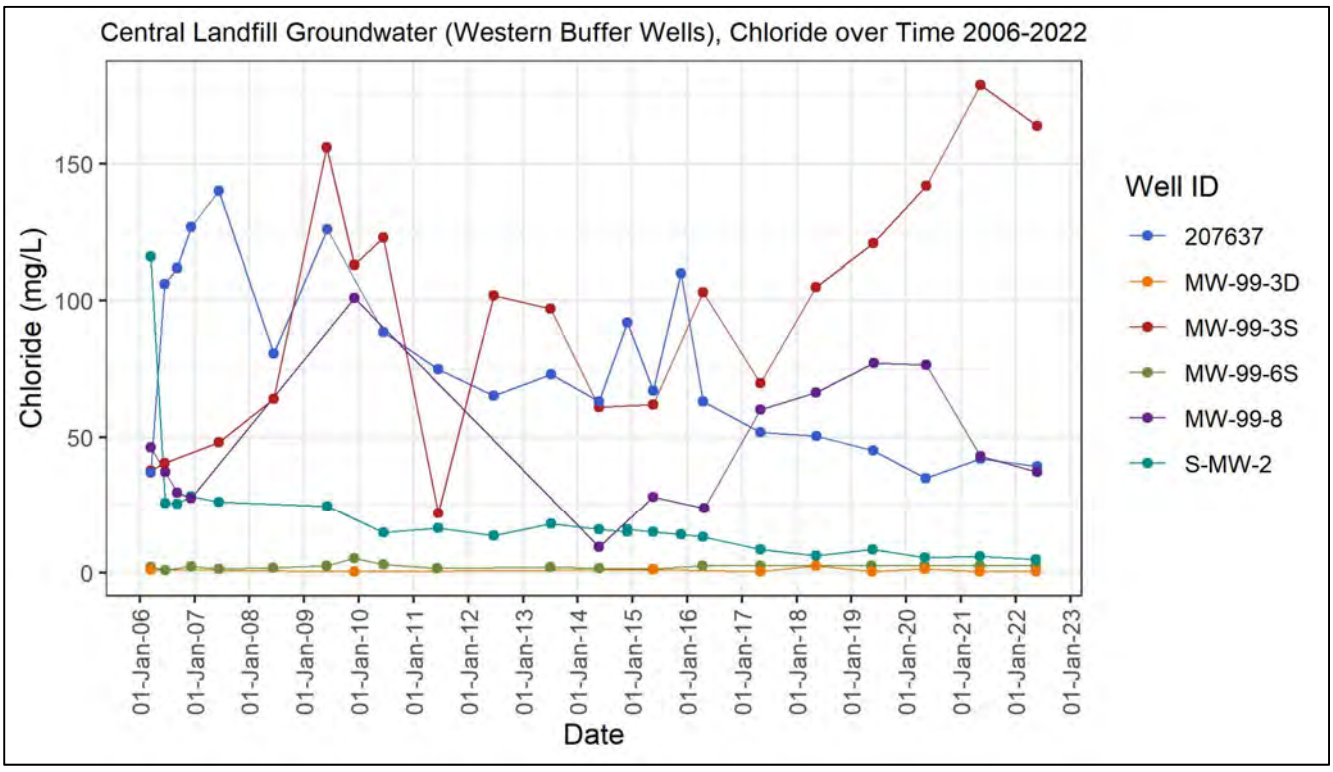


Figure 24

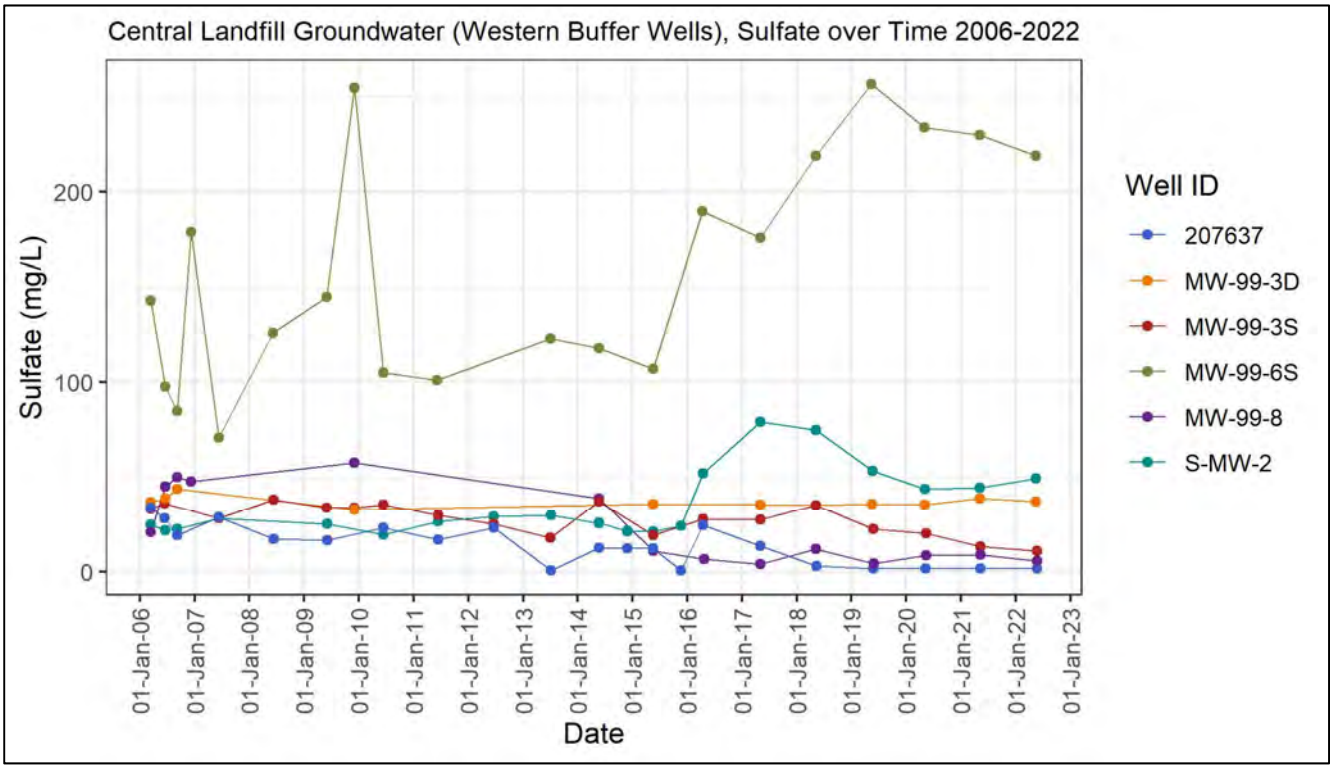


Figure 25

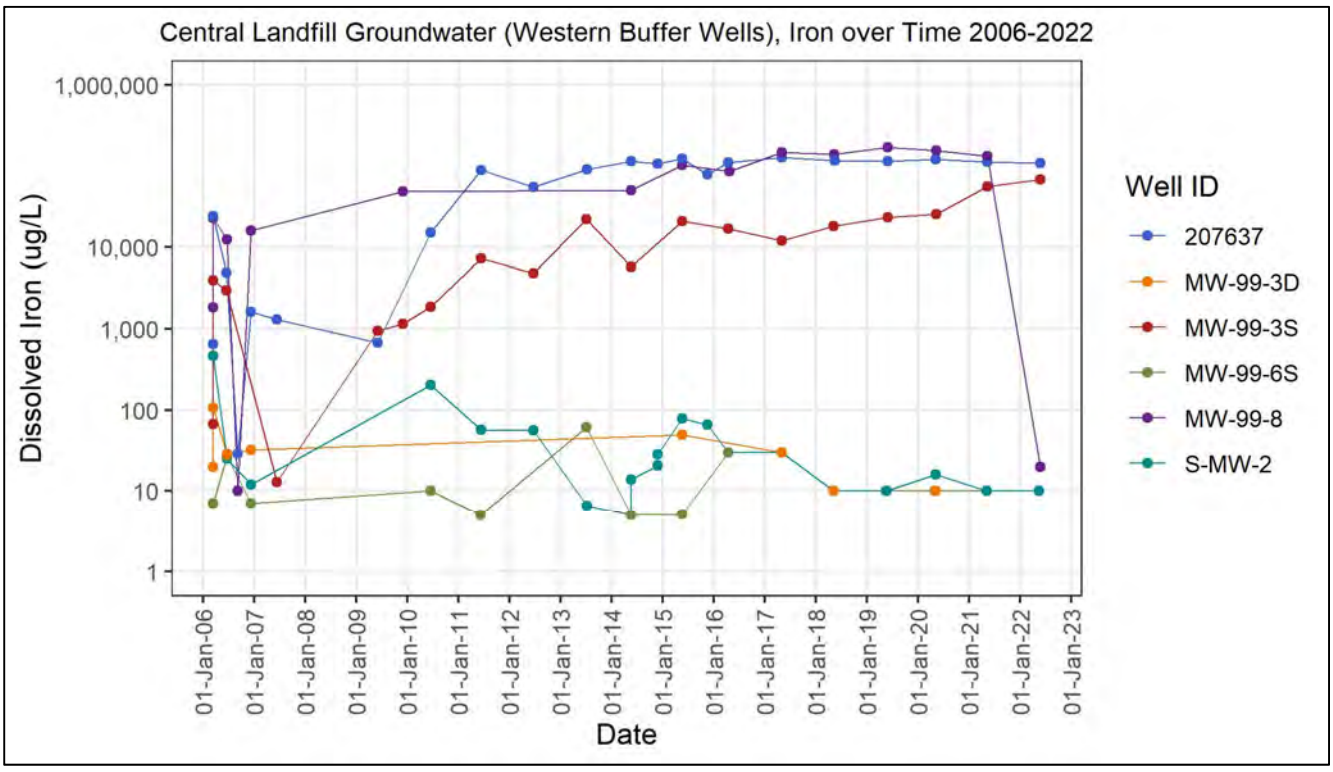


Figure 26

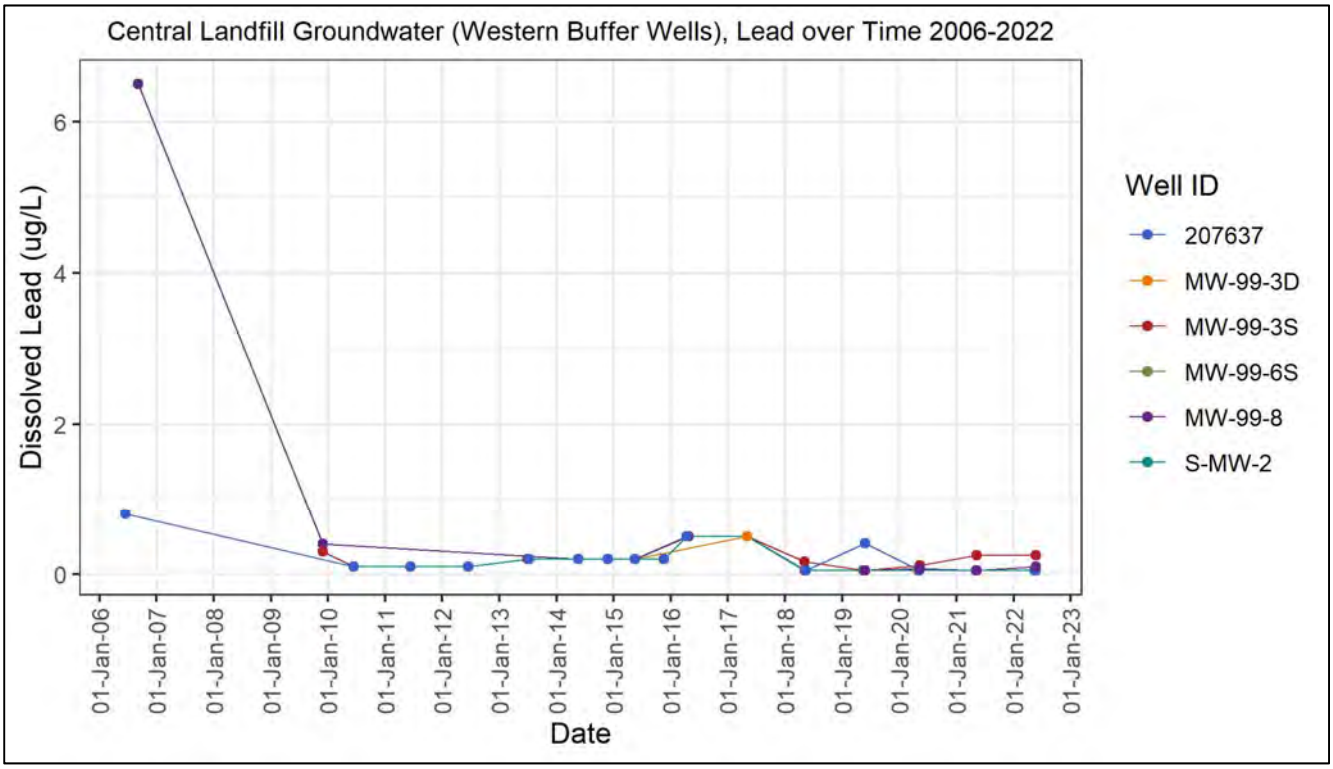


Figure 27

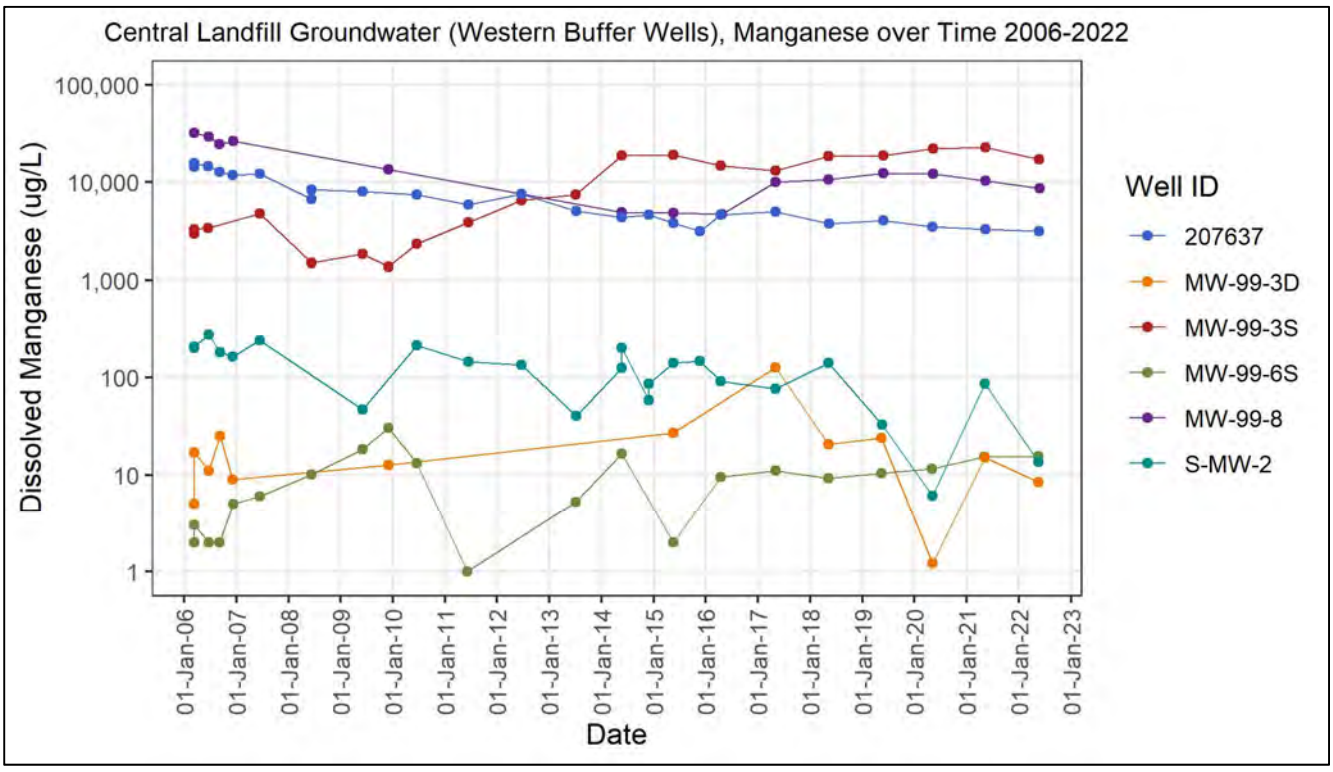


Figure 28

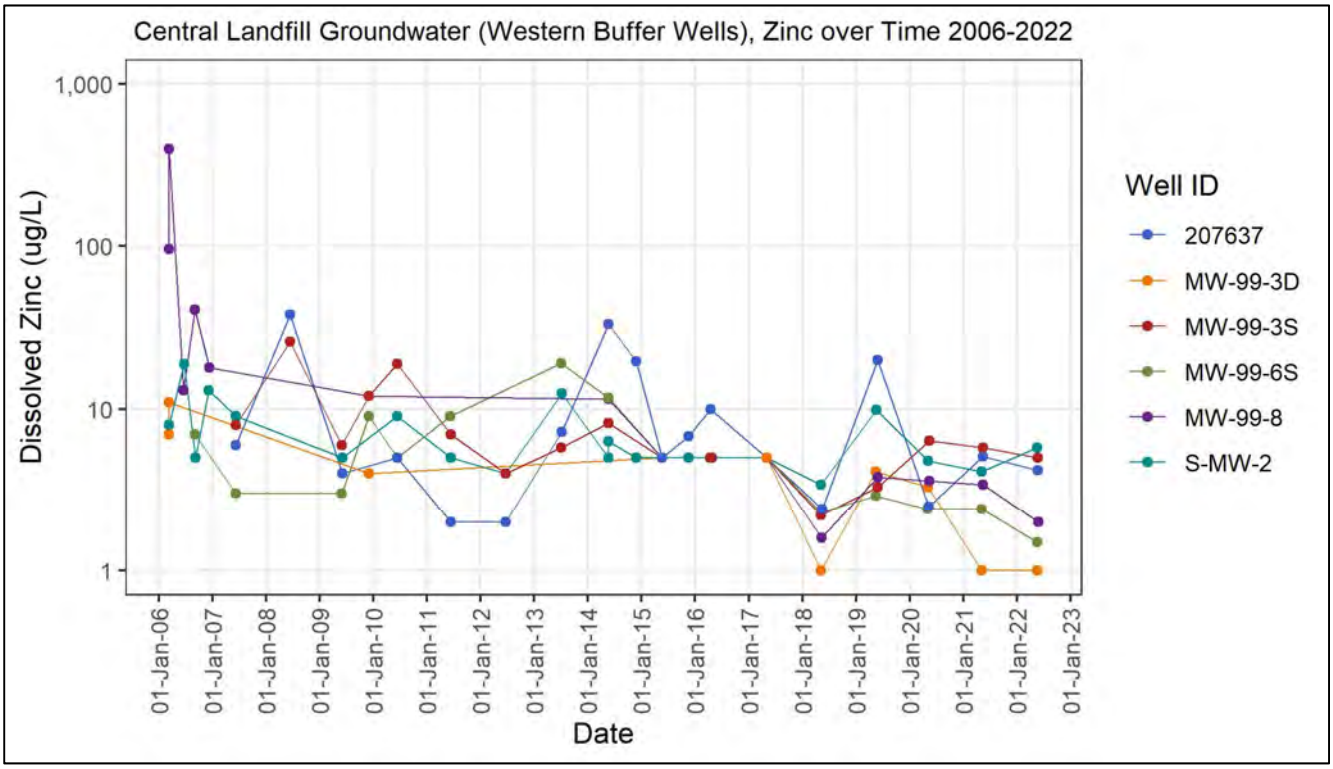


Figure 29

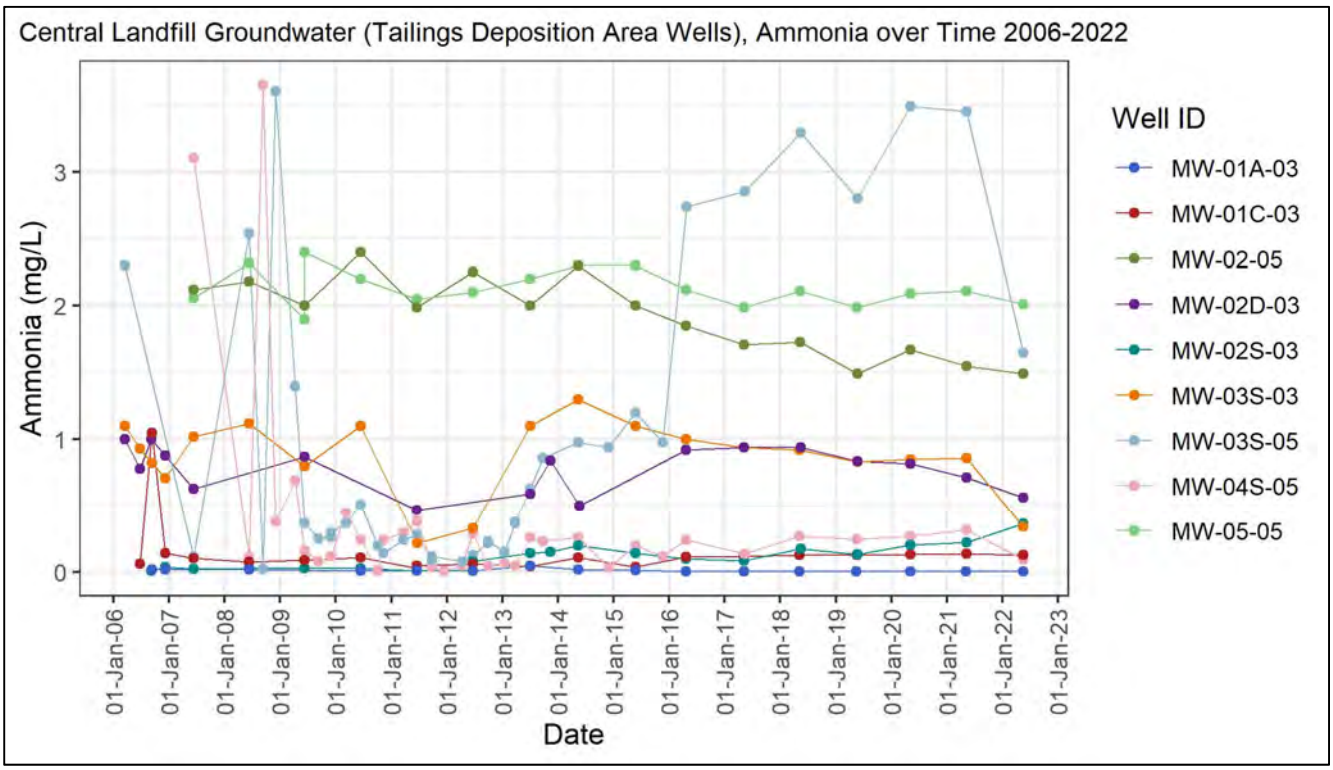


Figure 30

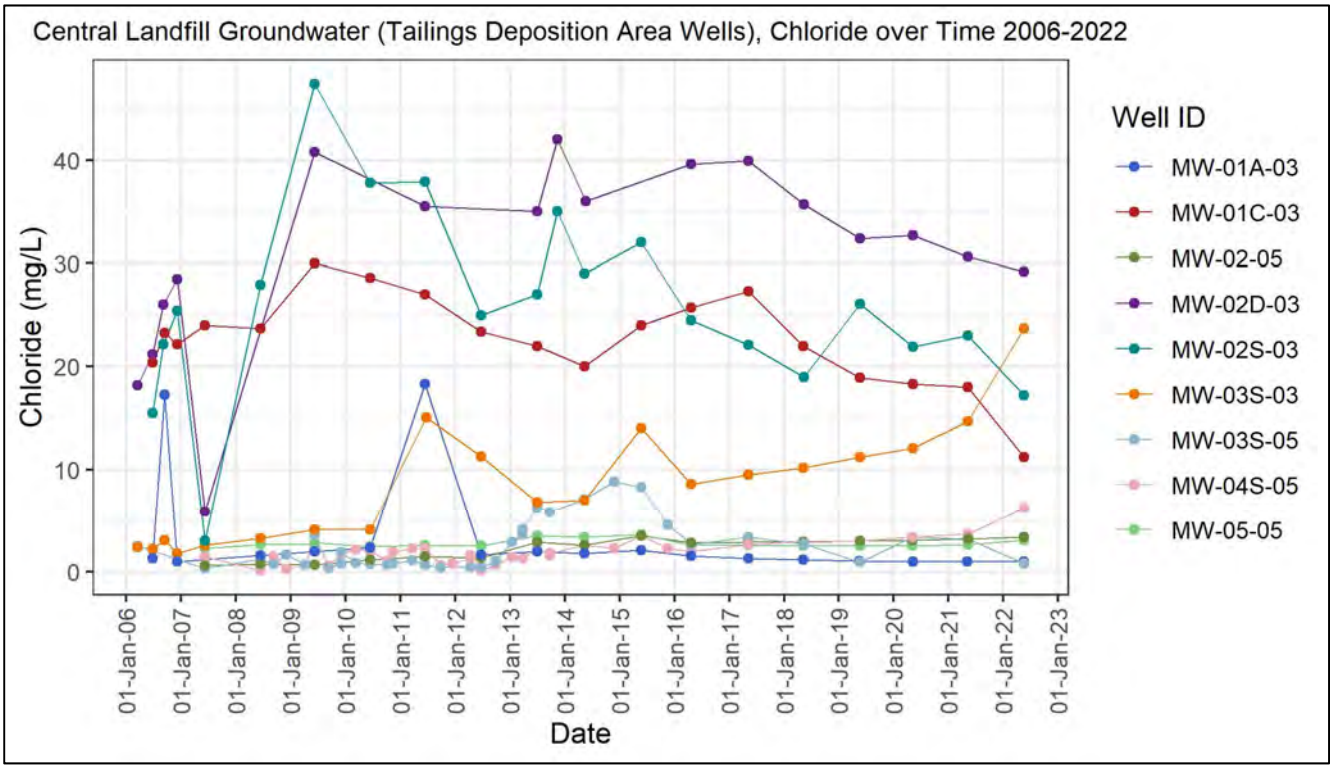


Figure 31

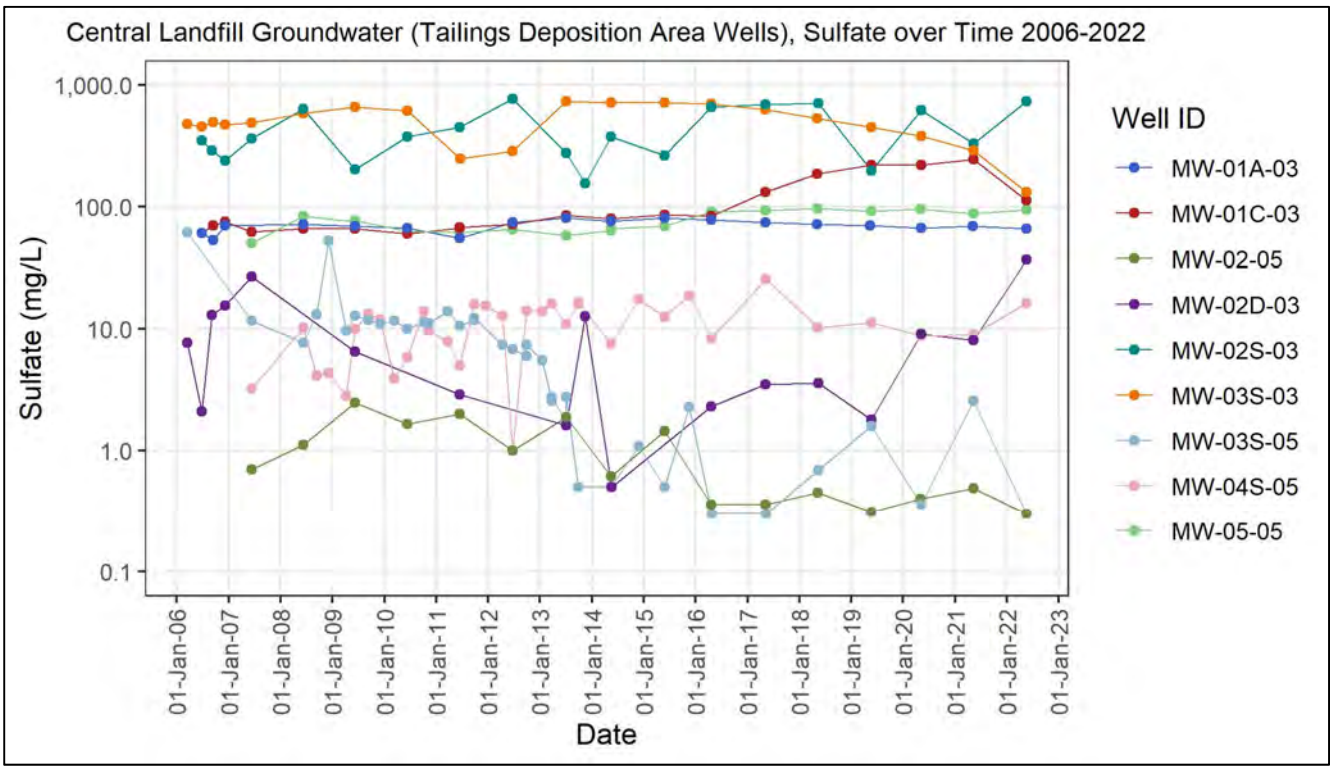


Figure 32

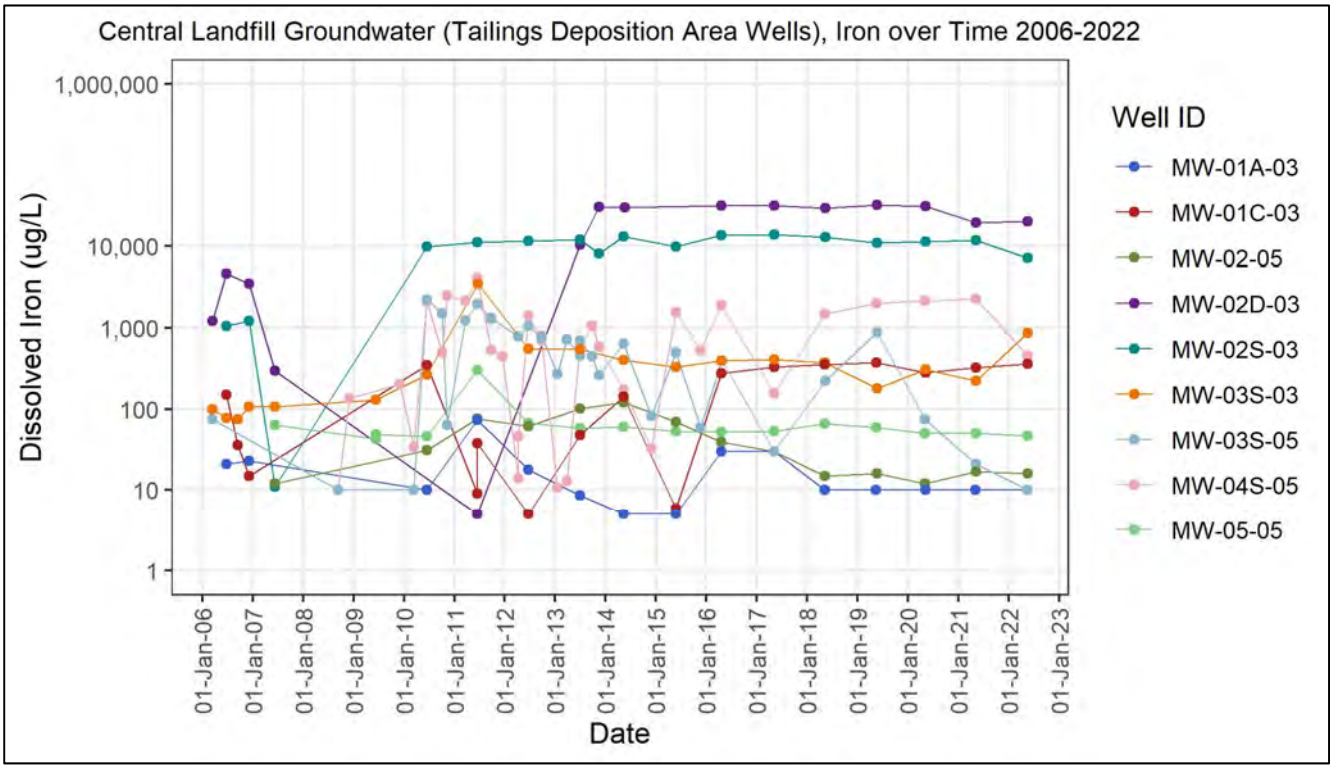


Figure 33

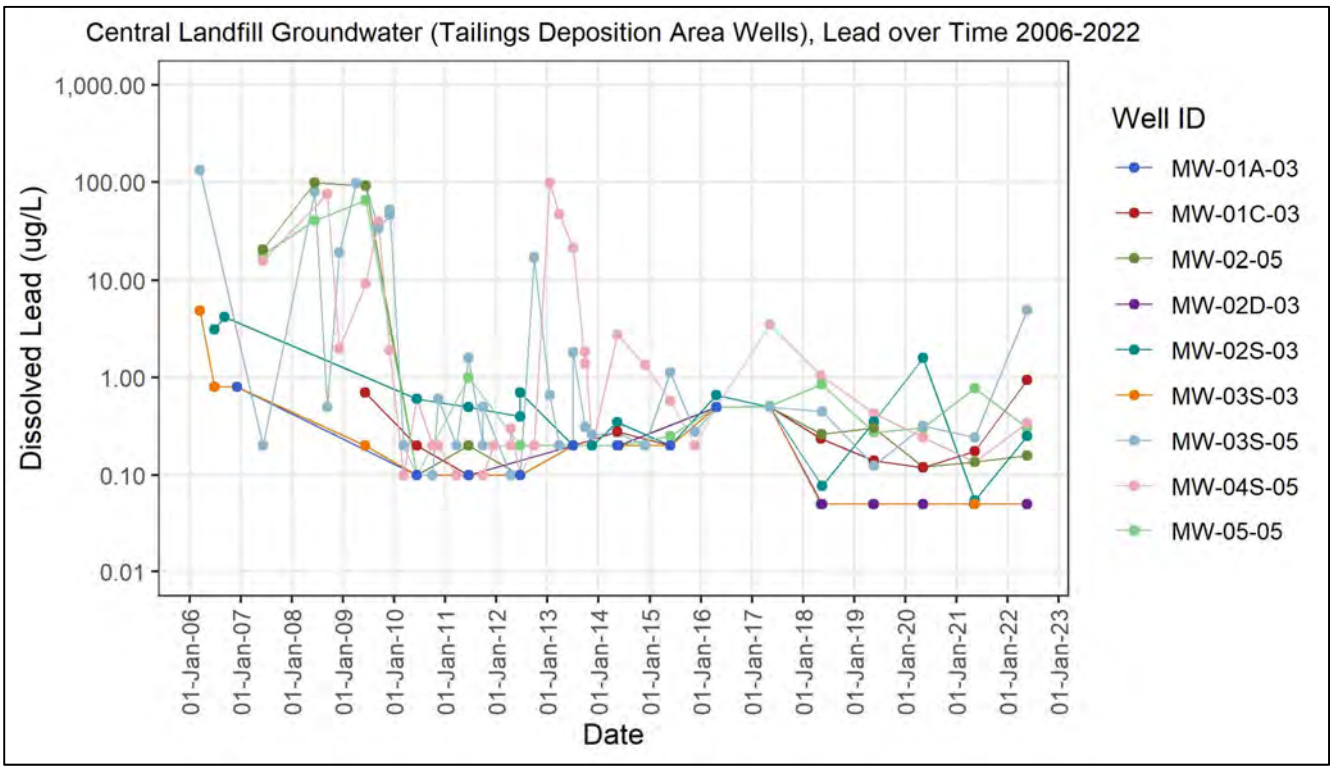


Figure 34

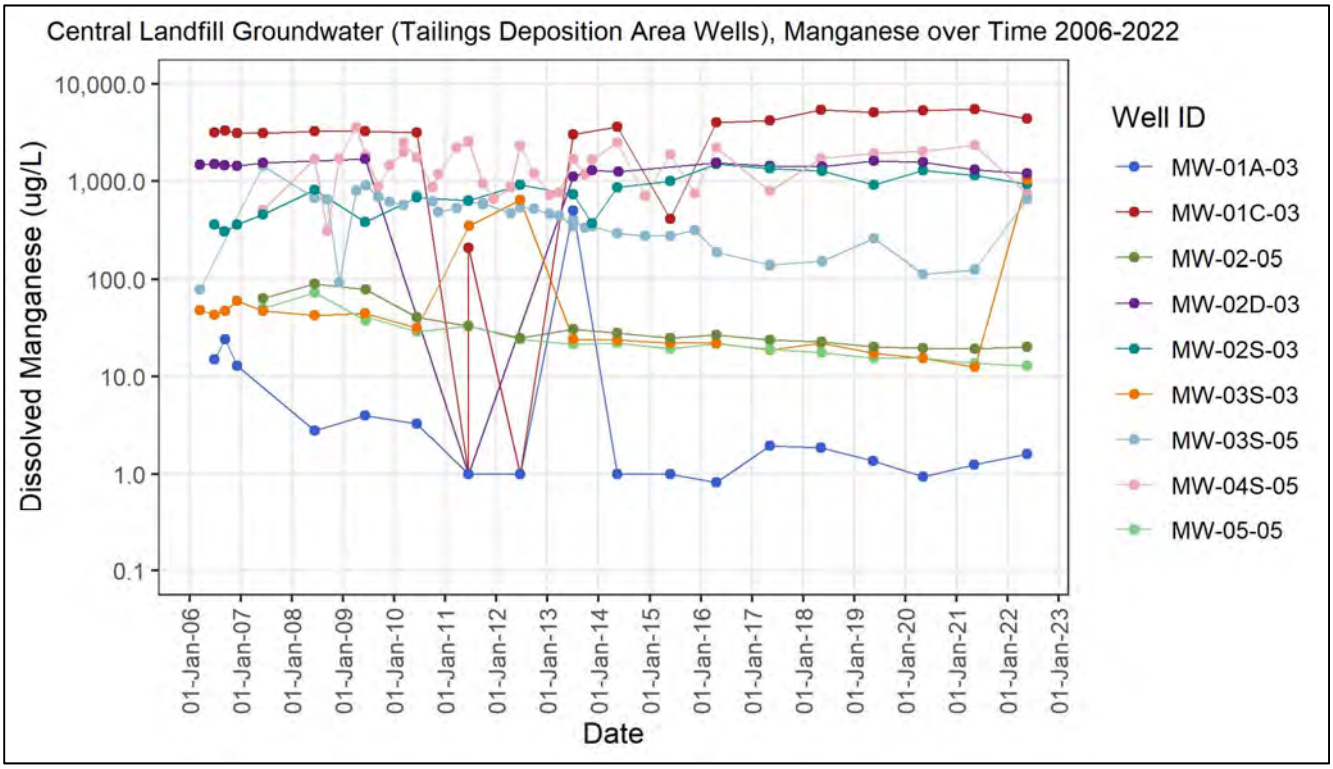
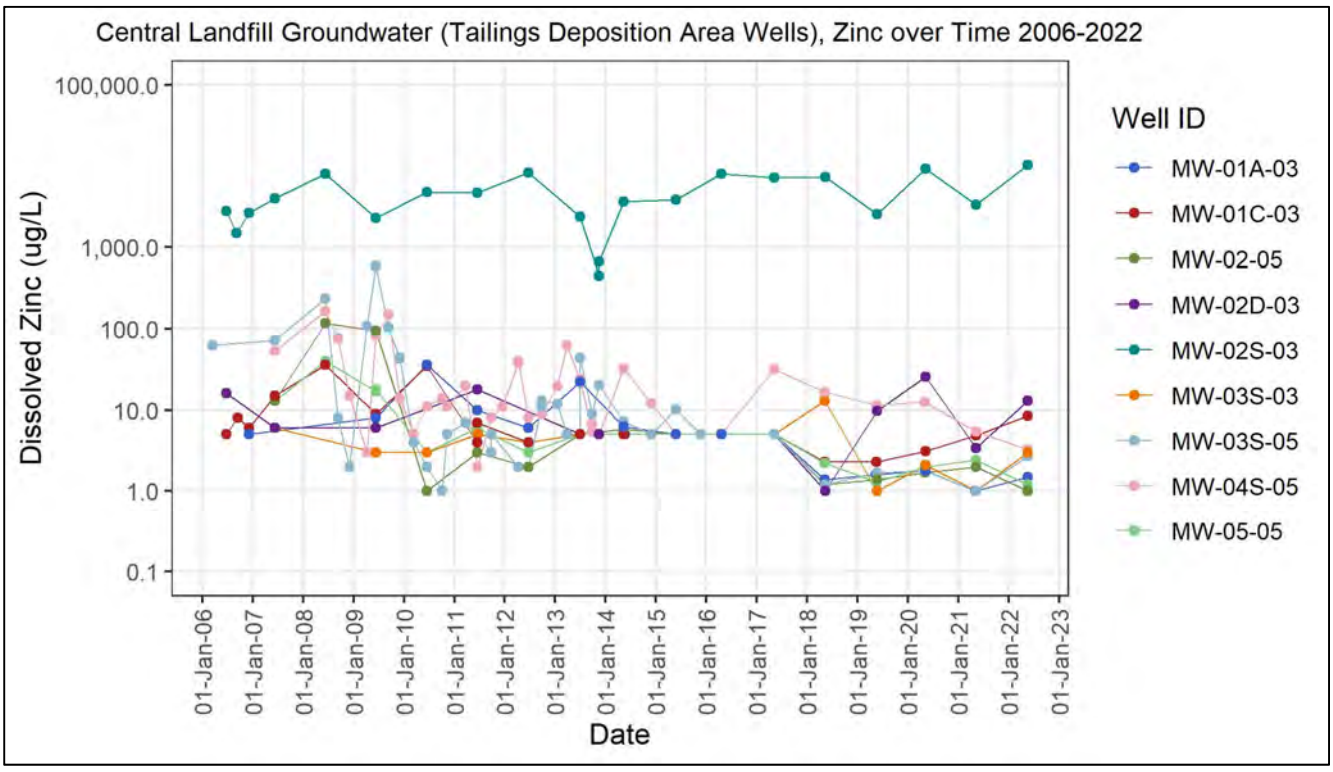


Figure 35


Central Landfill Groundwater (Tailings Deposition Area Wells), Zinc over Time 2006-2022
Dissolved Zinc (ug/L)
100,000.0
1,000.0
100.0
10.0
1.0
0.1
01-Jan-06
01-Jan-07
01-Jan-08
01-Jan-09
01-Jan-10
01-Jan-11
01-Jan-12
01-Jan-13
01-Jan-14
01-Jan-15
01-Jan-16
01-Jan-17
01-Jan-18
01-Jan-19
01-Jan-20
01-Jan-21
01-Jan-22
01-Jan-23
Date
Well ID
MW-01A-03
MW-01C-03
MW-02-05
MW-02D-03
MW-02S-03
MW-03S-03
MW-03S-05
MW-04S-05
MW-05-05

Seep and Surface Water Figures:

Figure 36

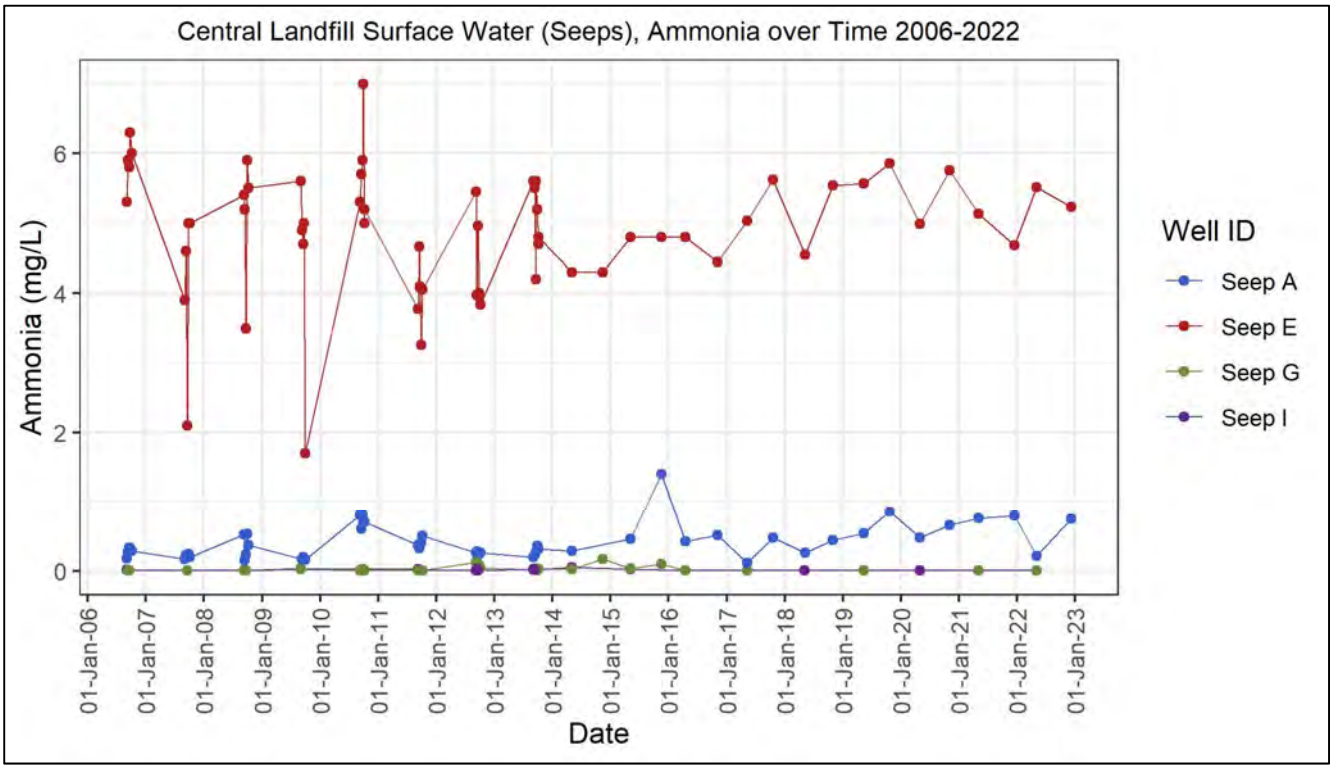


Figure 37

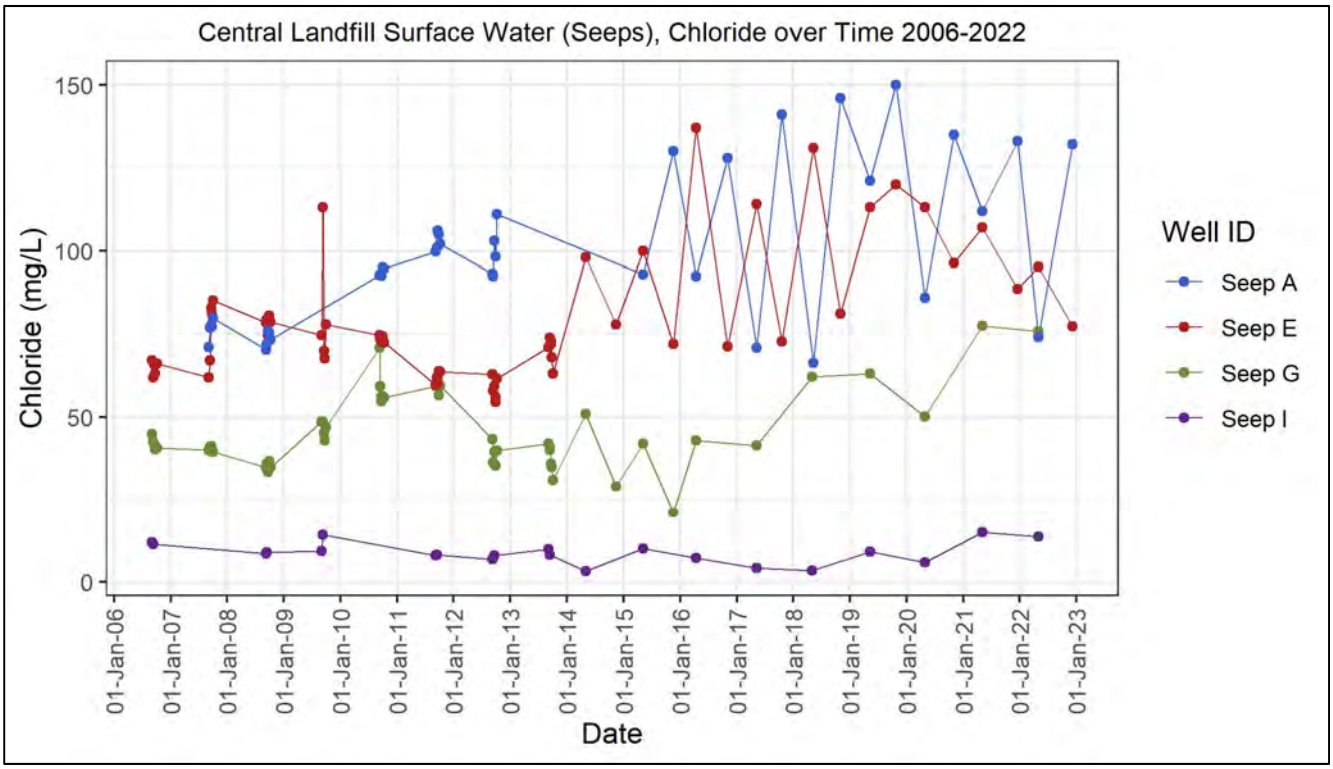


Figure 38

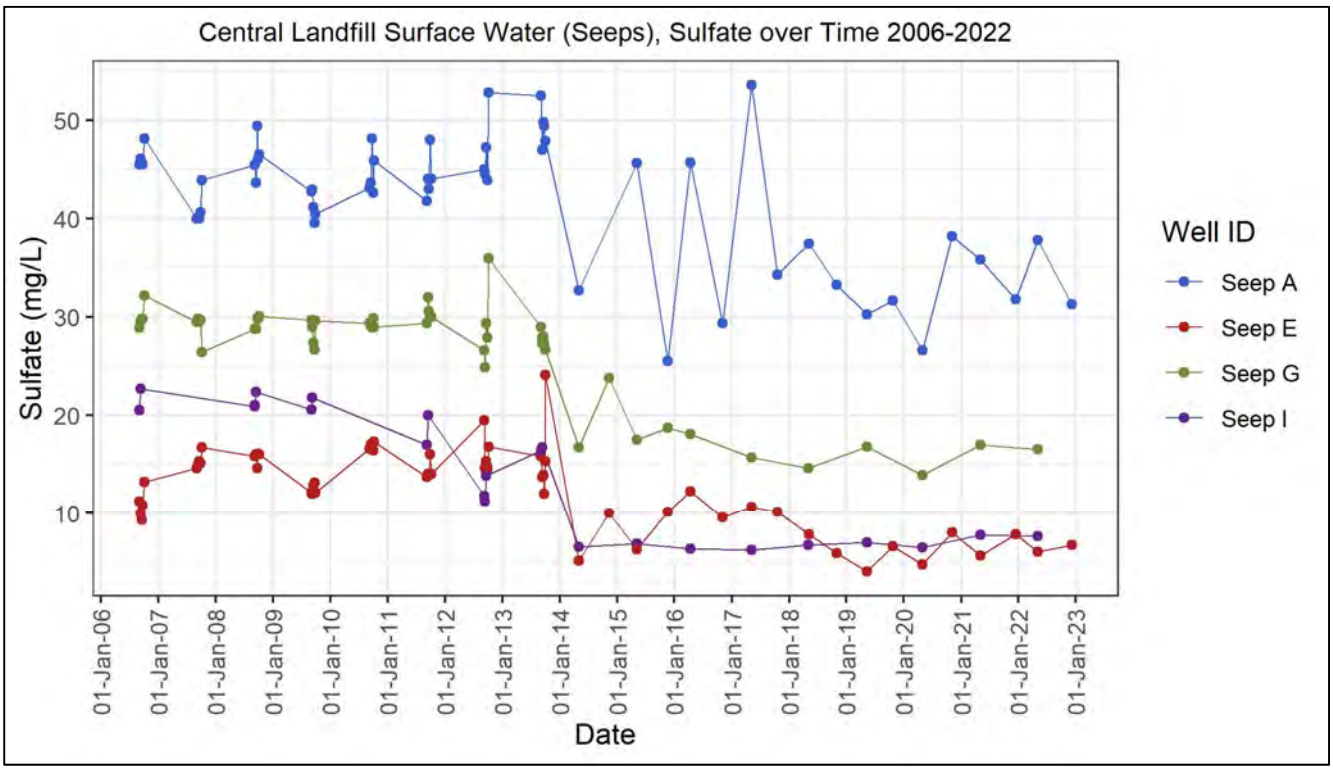


Figure 39

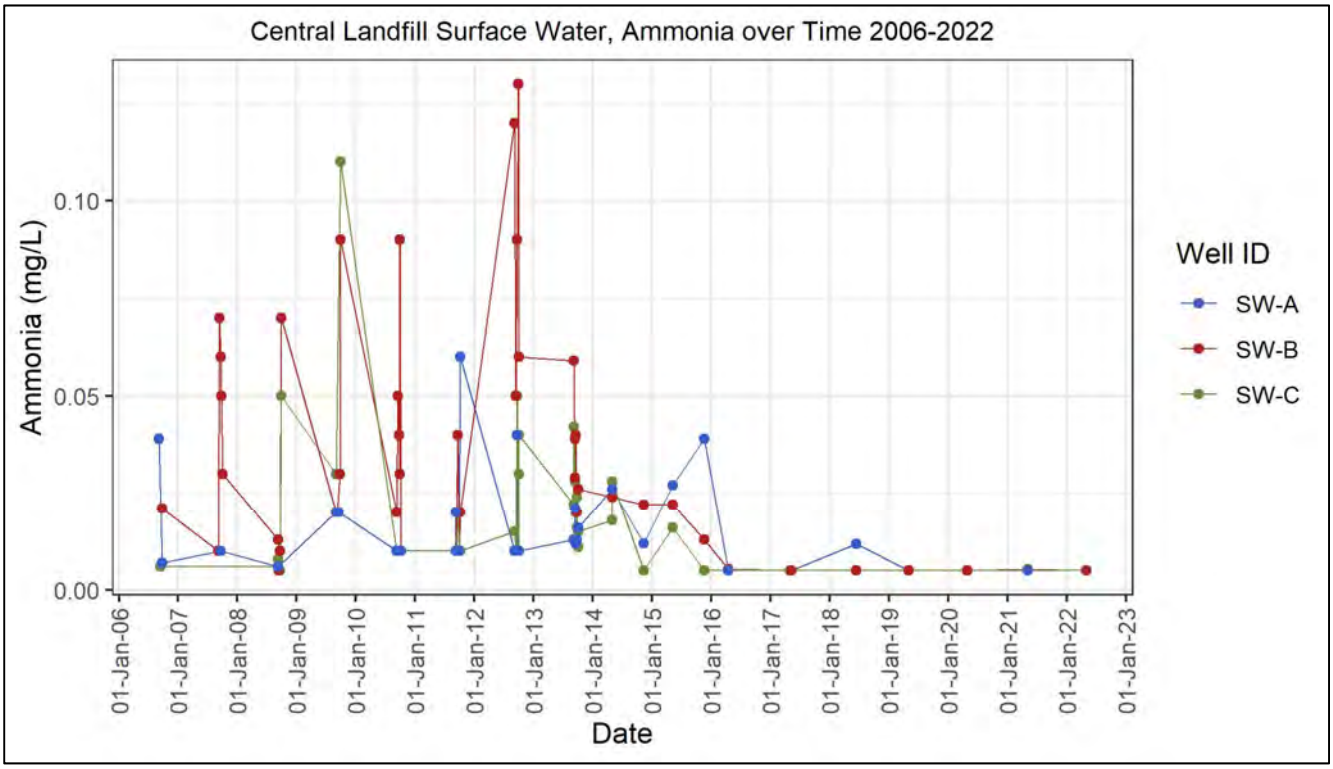


Figure 40

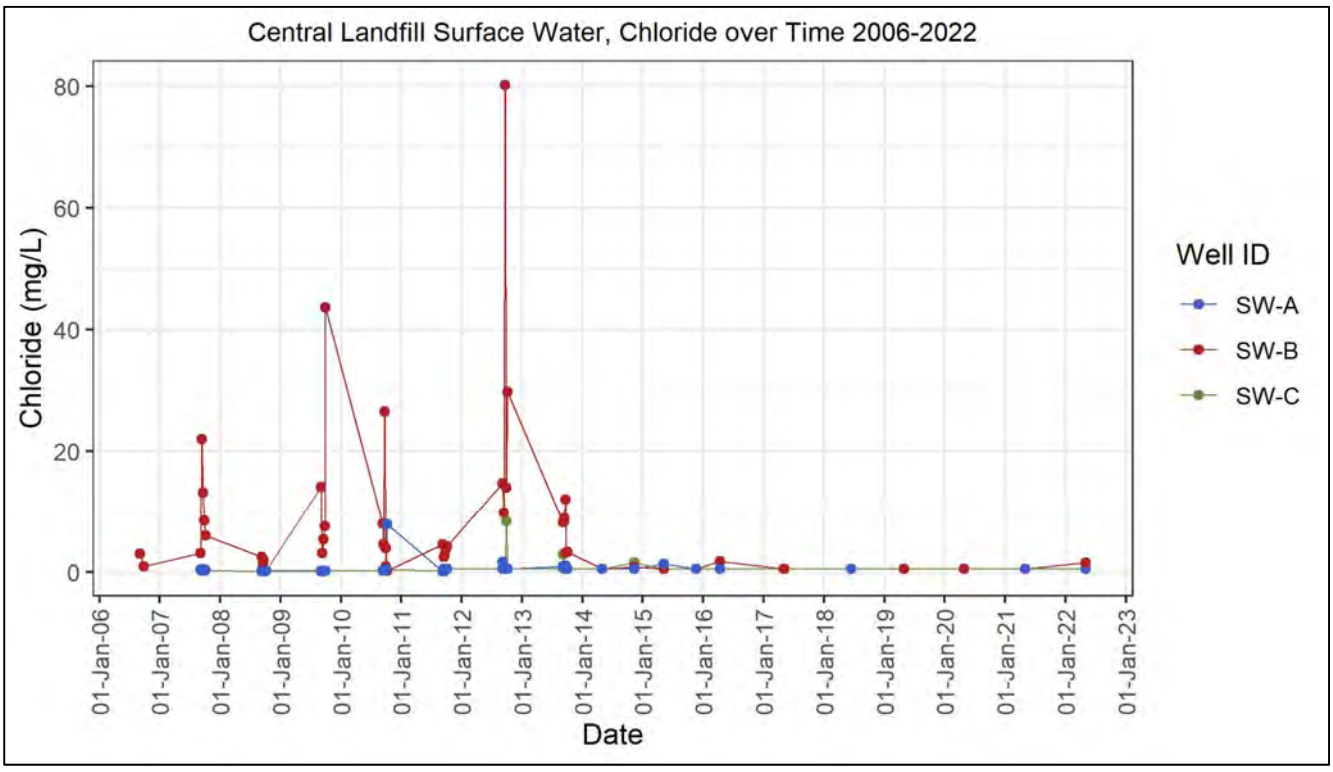
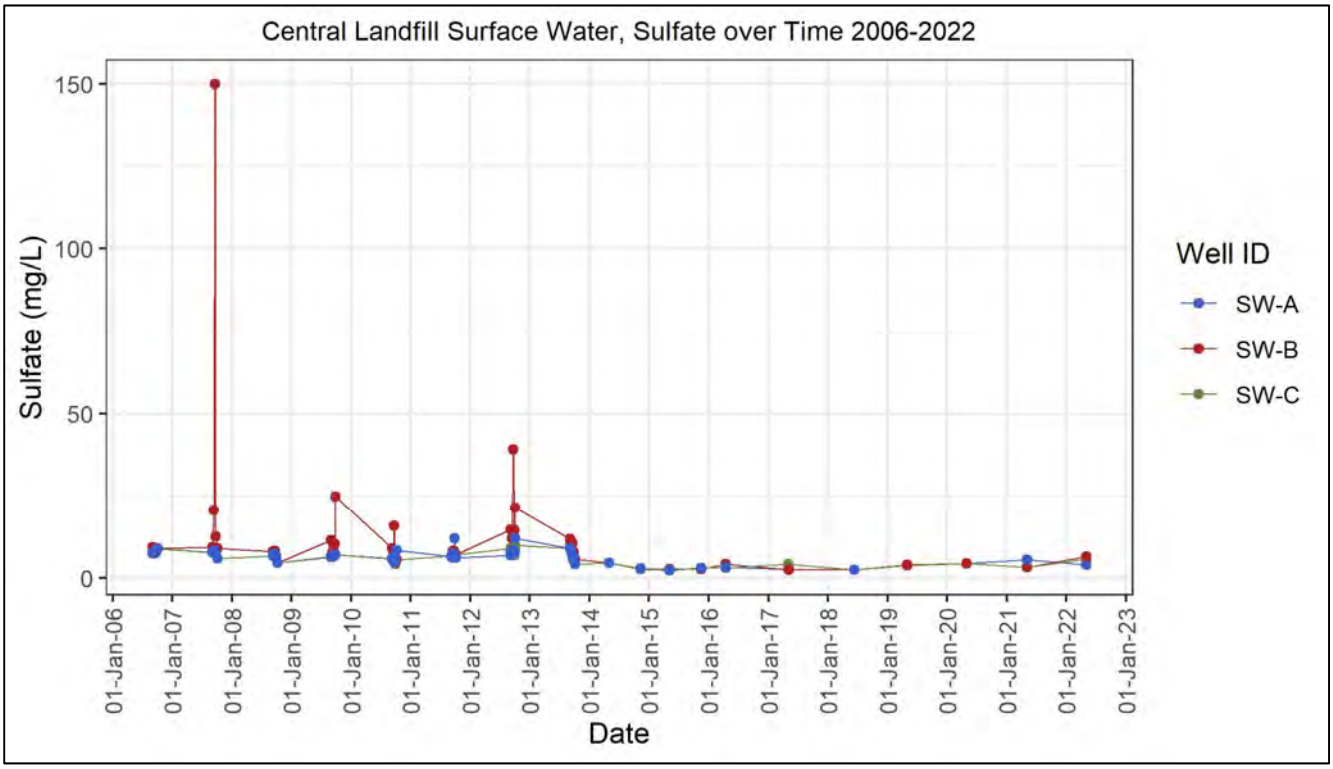


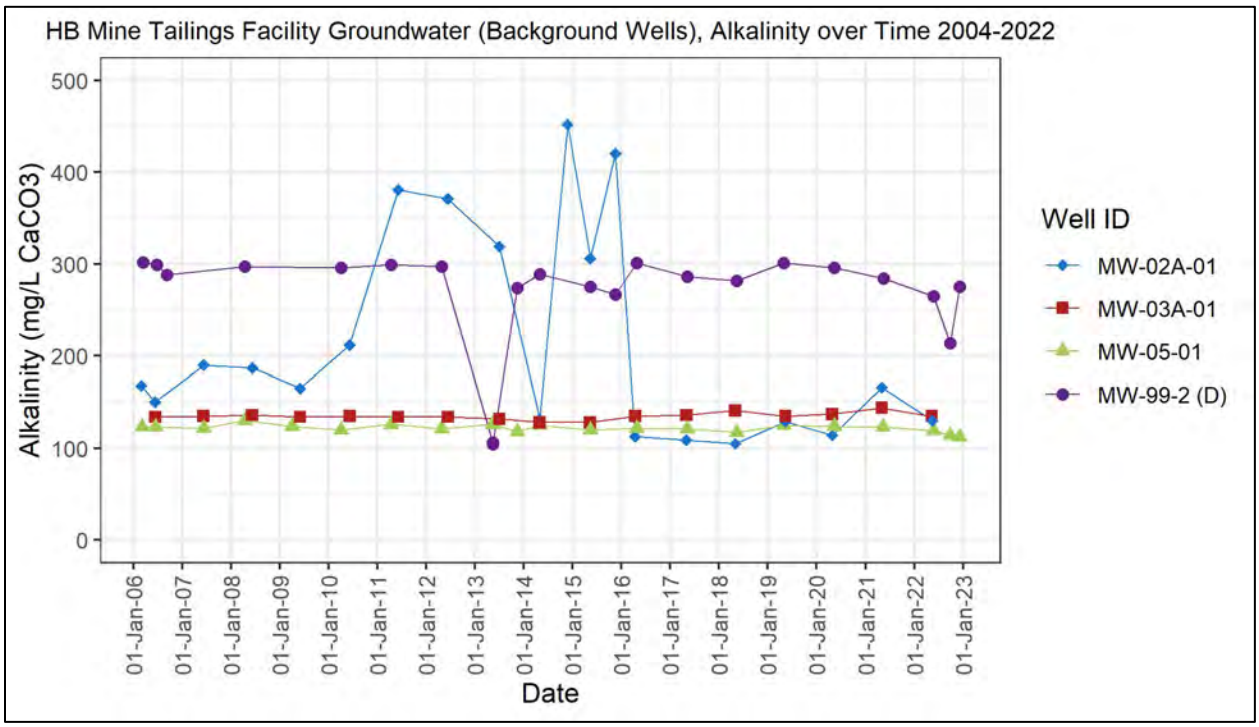
Figure 41



Appendix H2

TSF Historical Concentration Versus Time Plots (2004-2022) (RDCK, 2023b)

Figure 4



Note: The carbonate and bicarbonate data were summed in order to produce the 2010-2012 data presented.

Figure 5

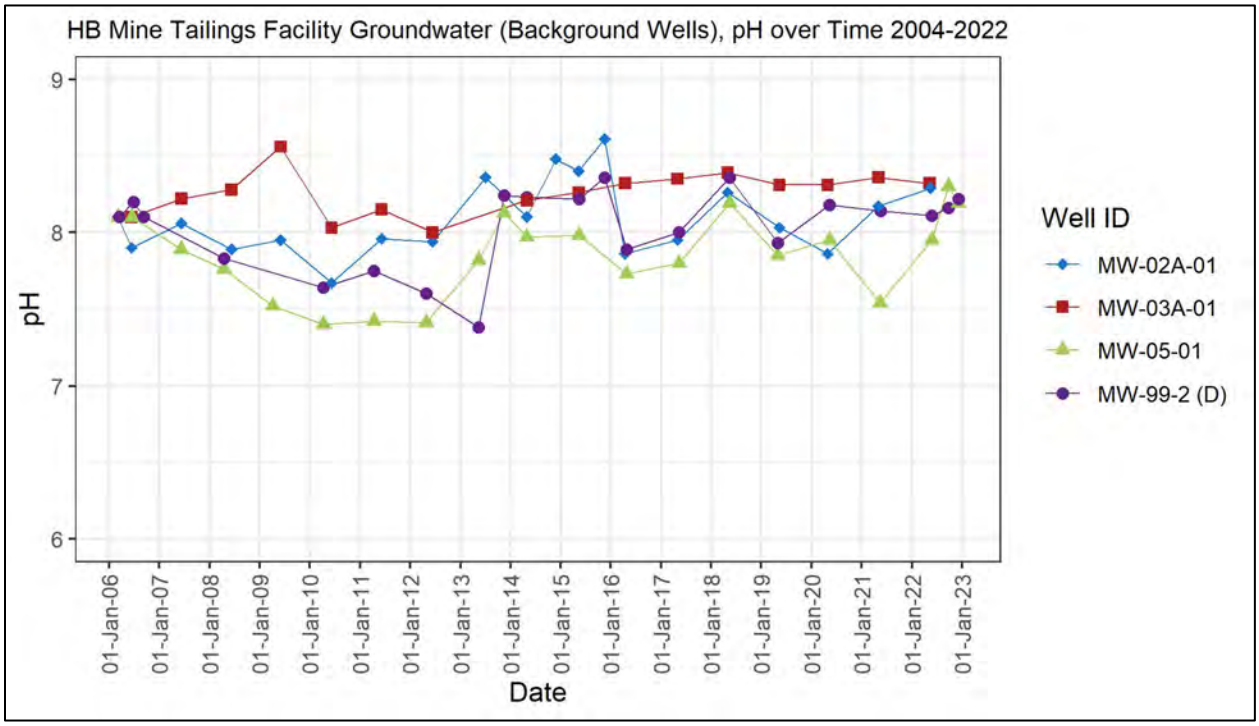


Figure 6

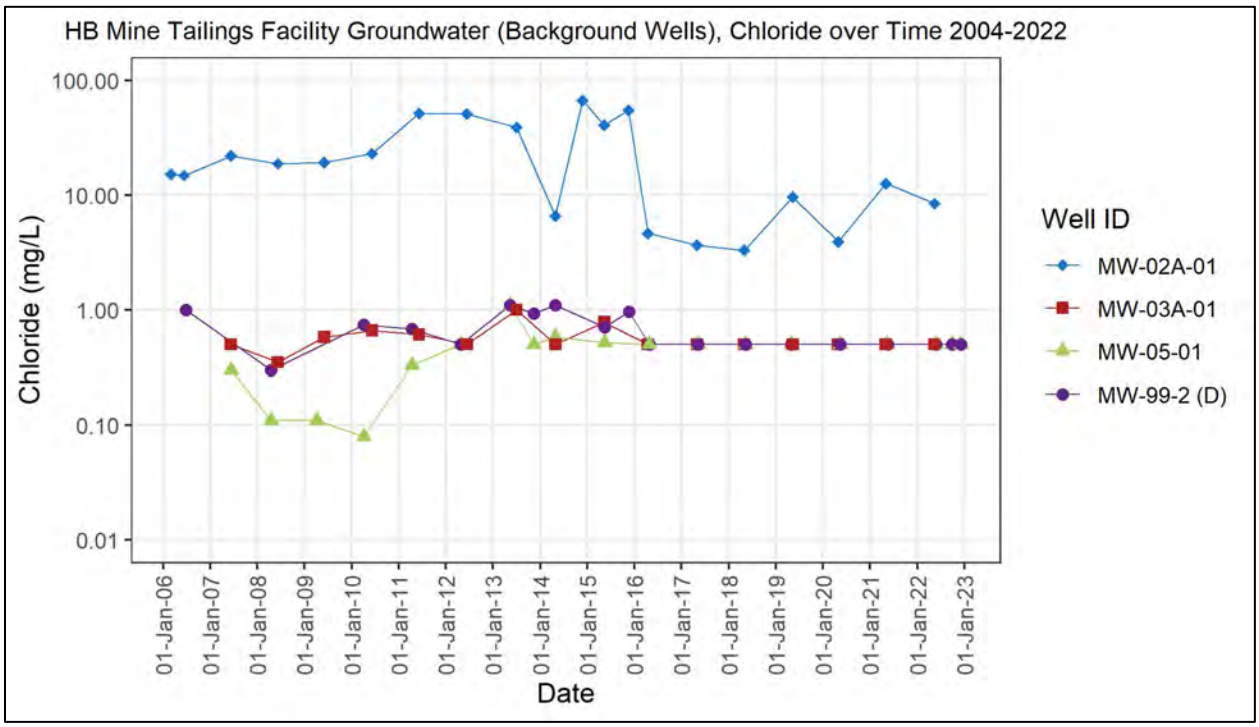


Figure 7

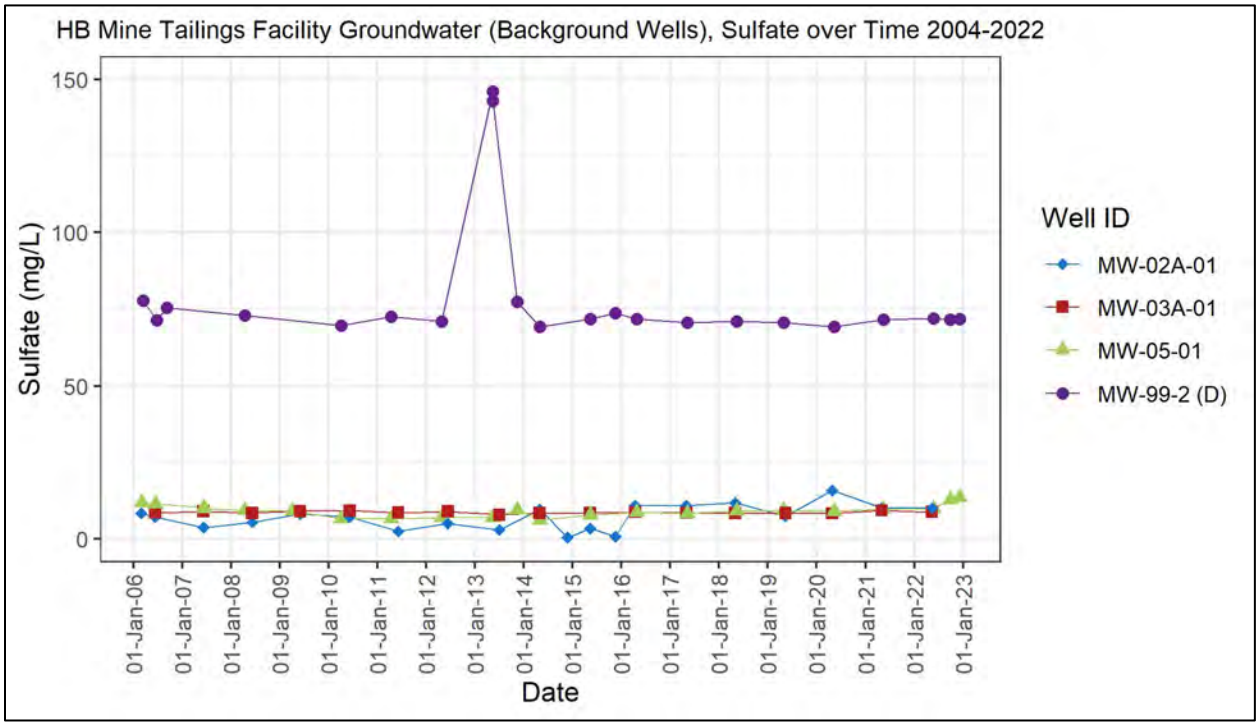


Figure 8

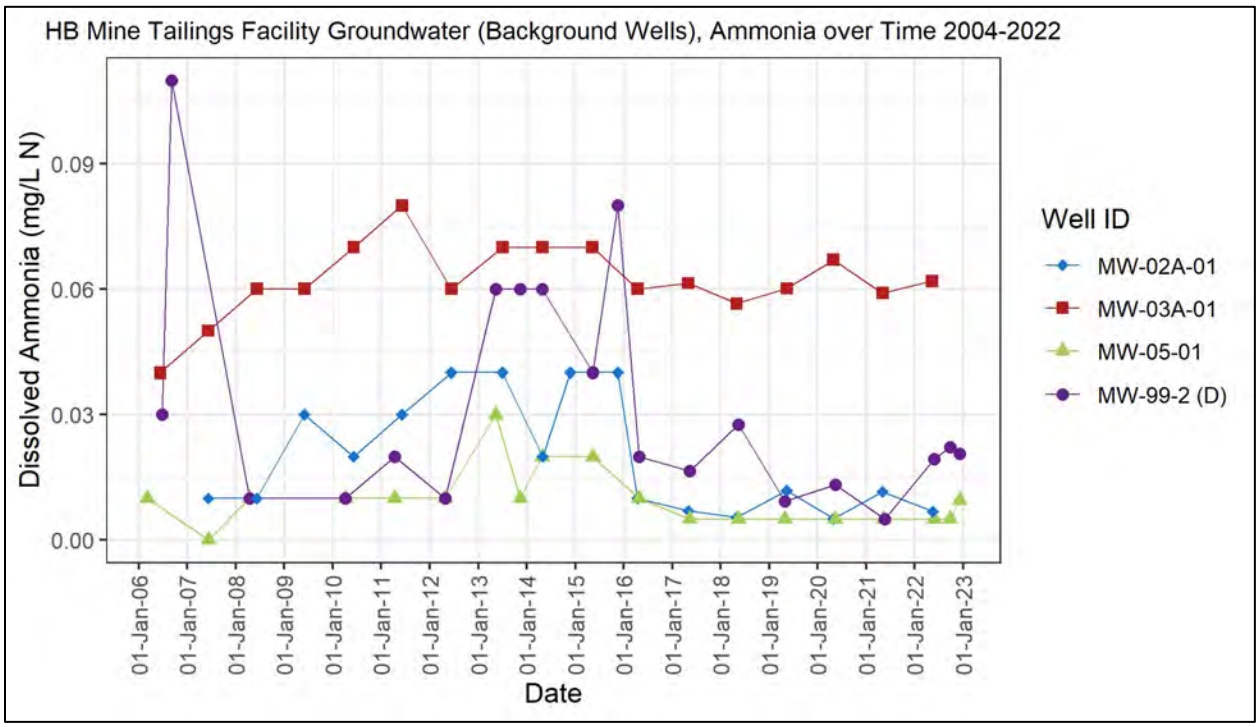


Figure 9

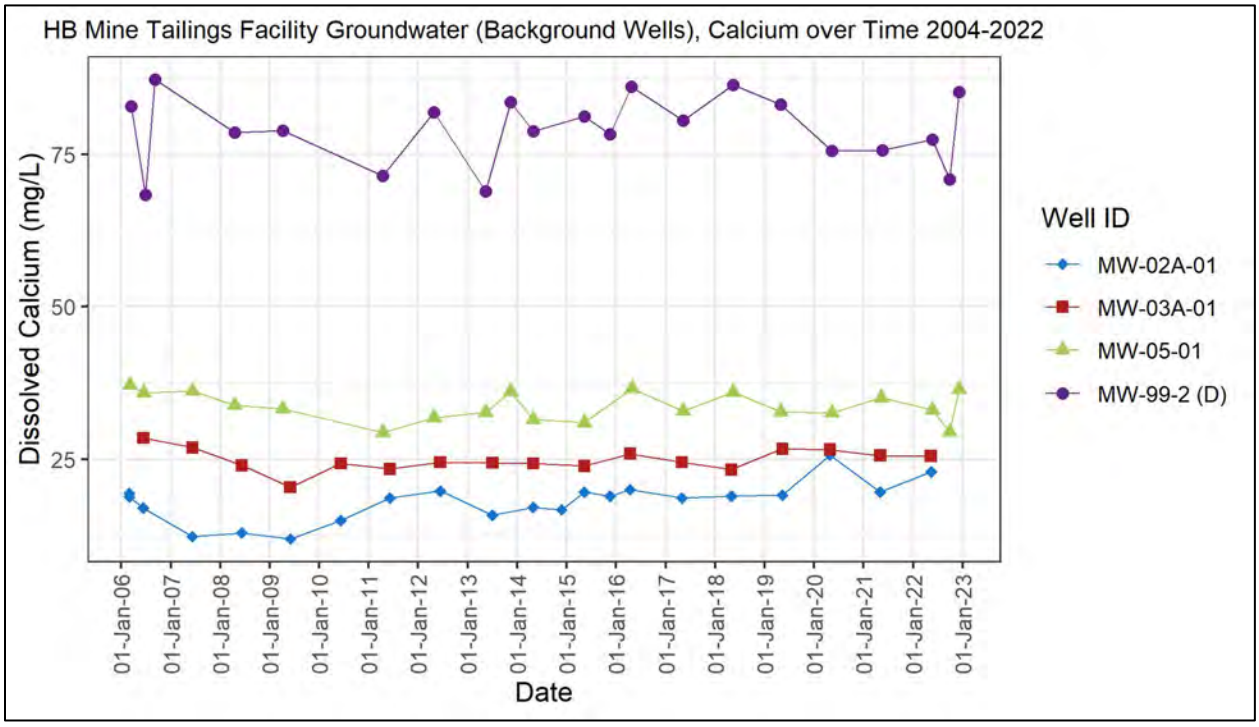


Figure 10

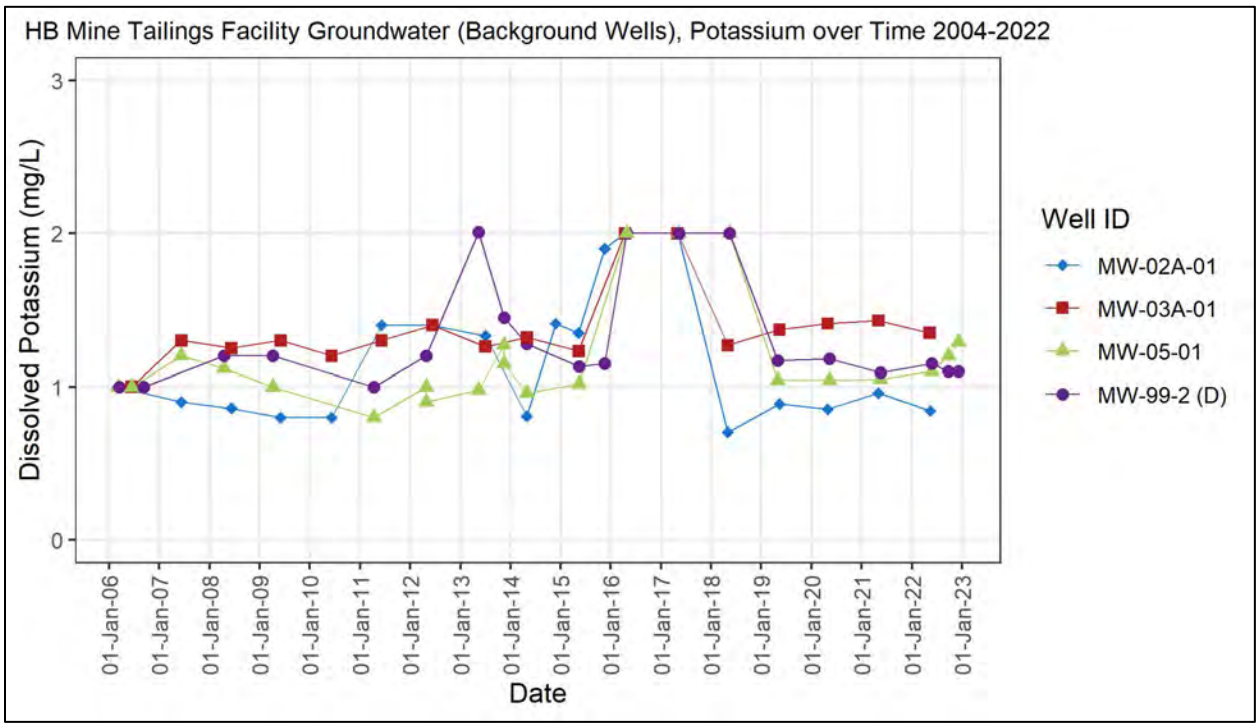


Figure 11

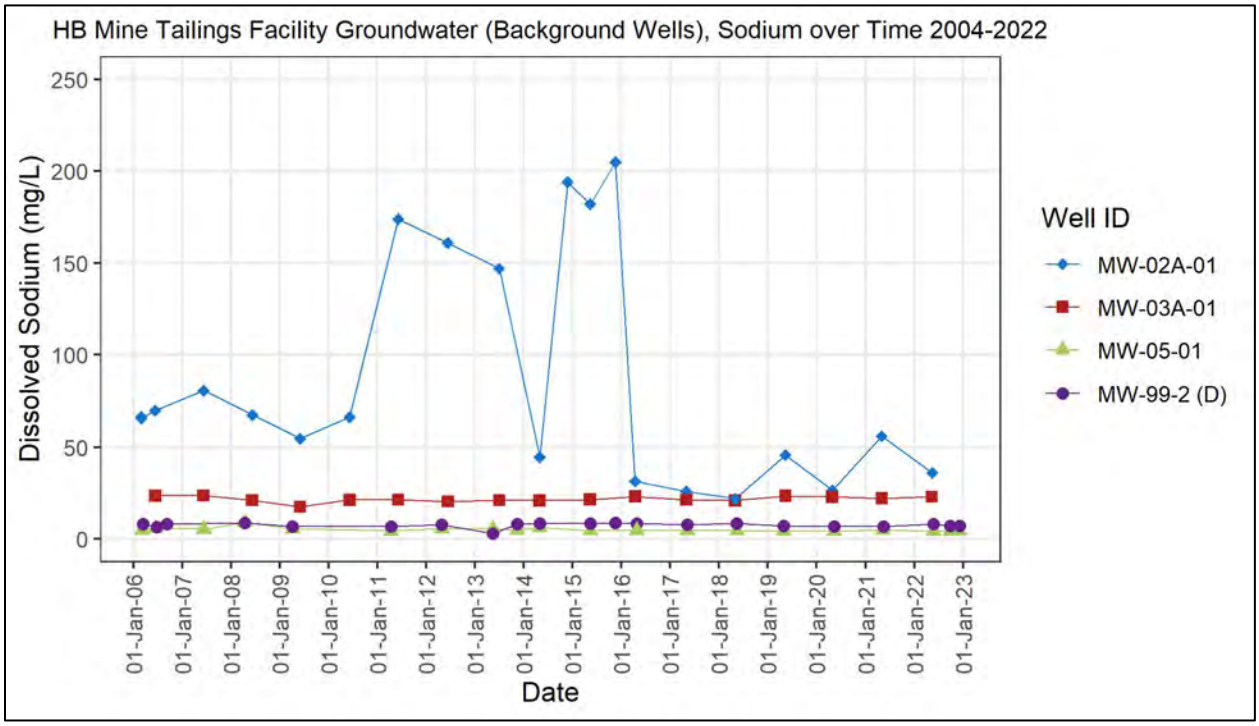


Figure 12

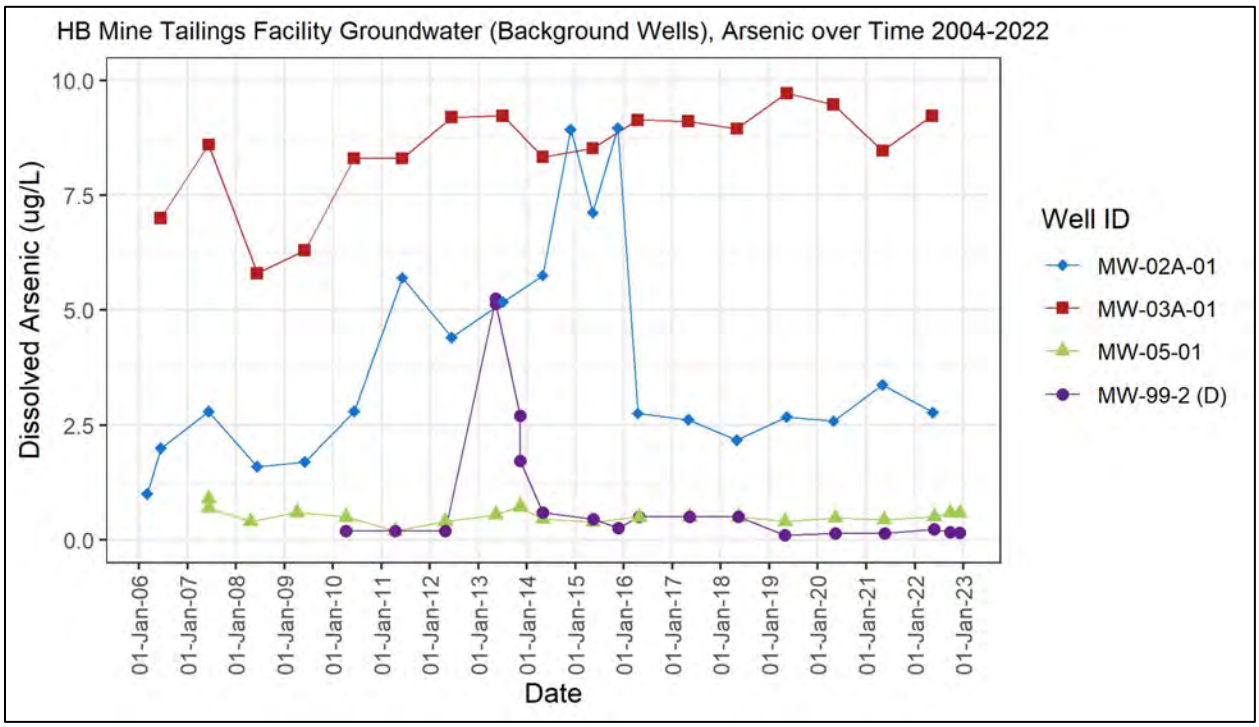


Figure 13

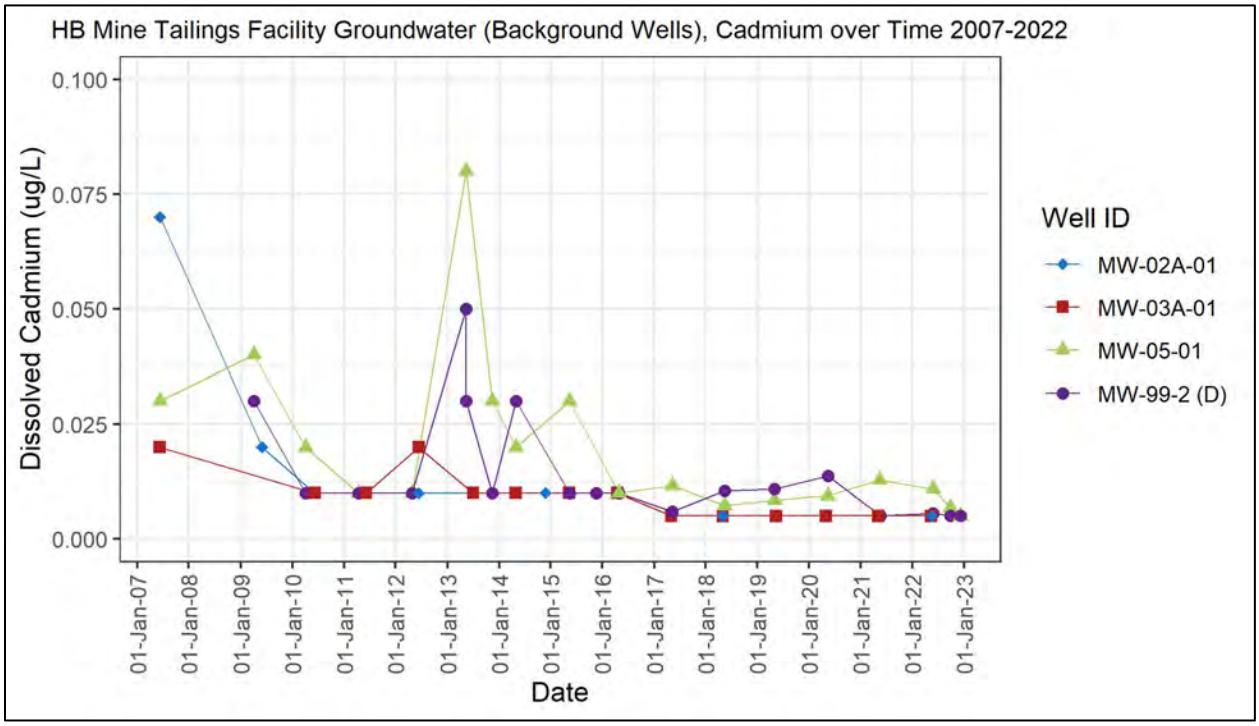


Figure 14

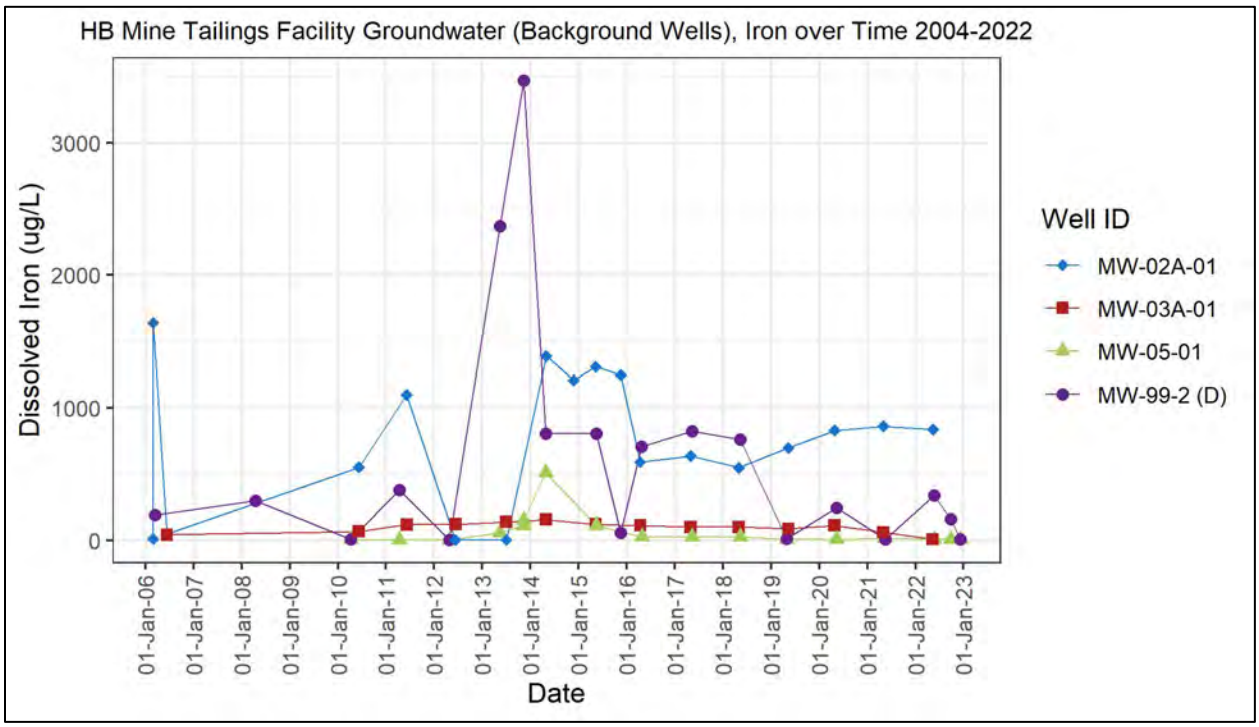
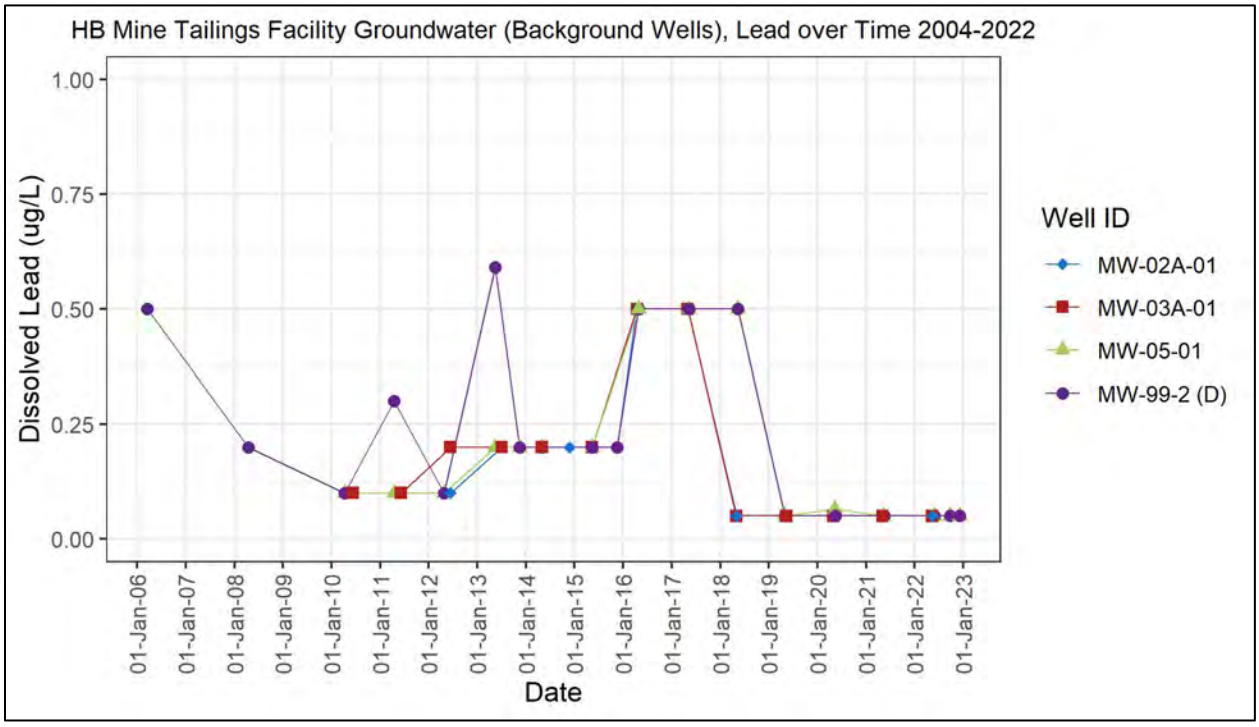


Figure 15



NB: The limit of detection was changed in 2016 from 0.25 to 0.5 µg/L.

Figure 16

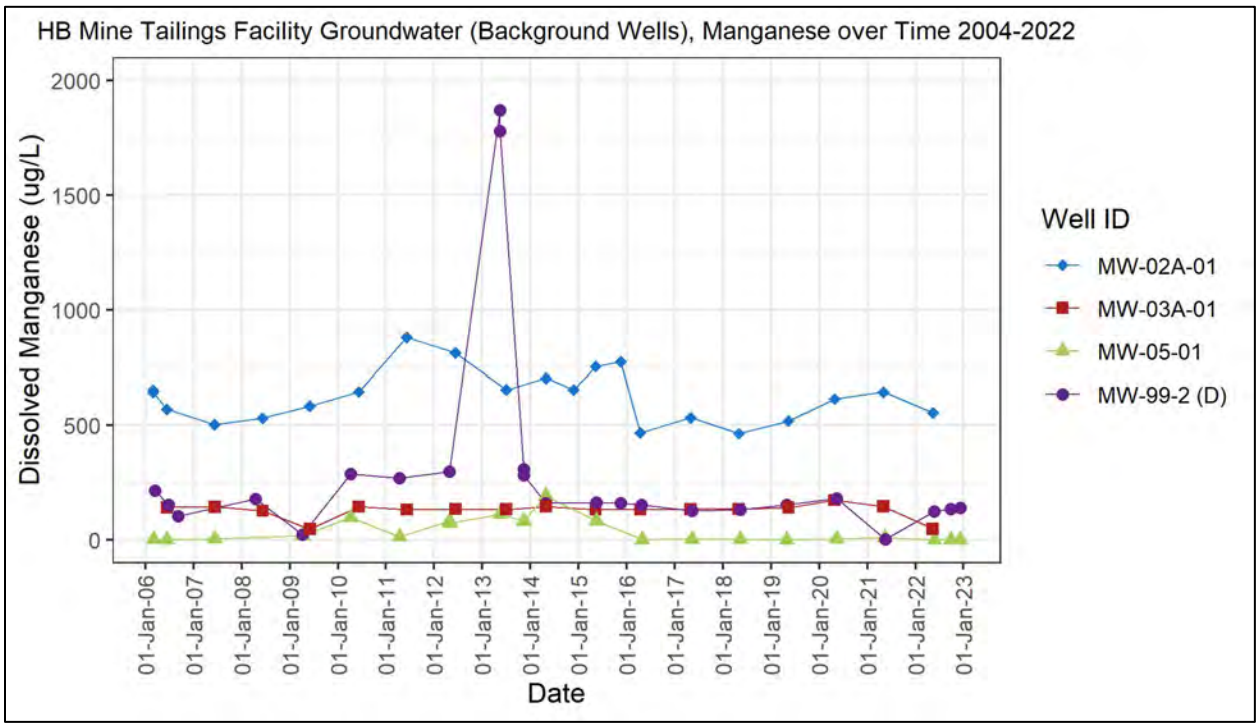


Figure 17

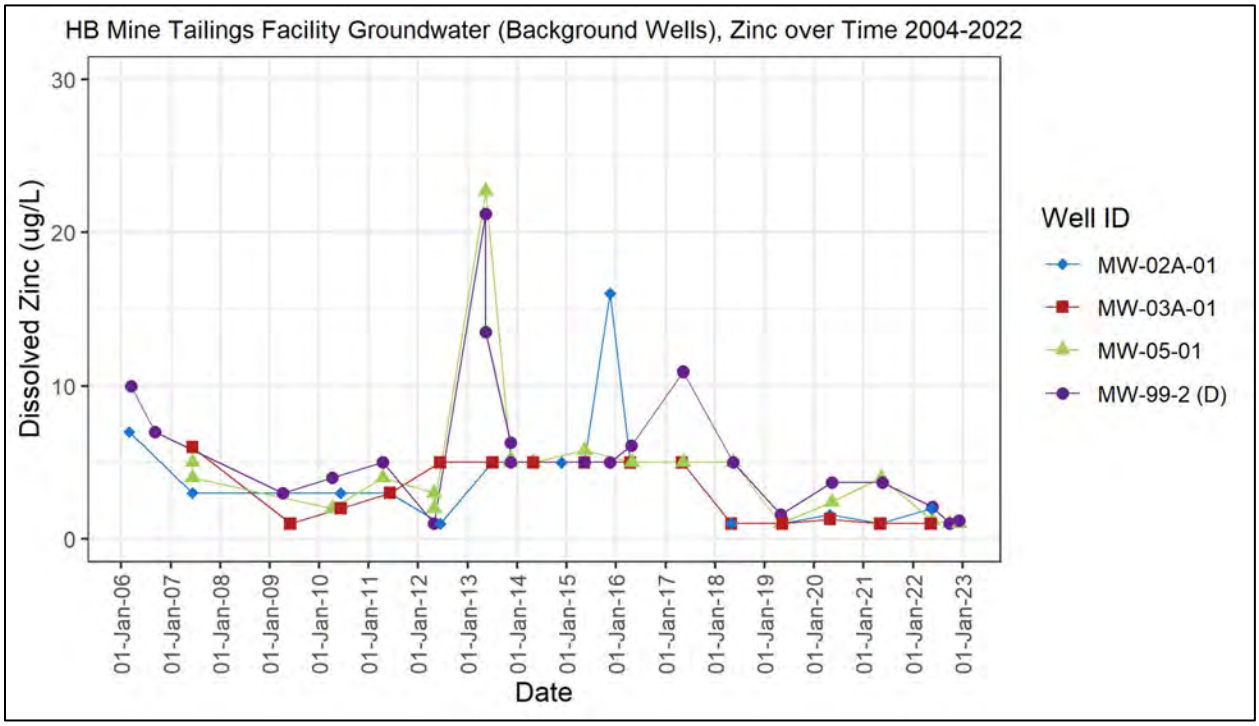


Figure 18

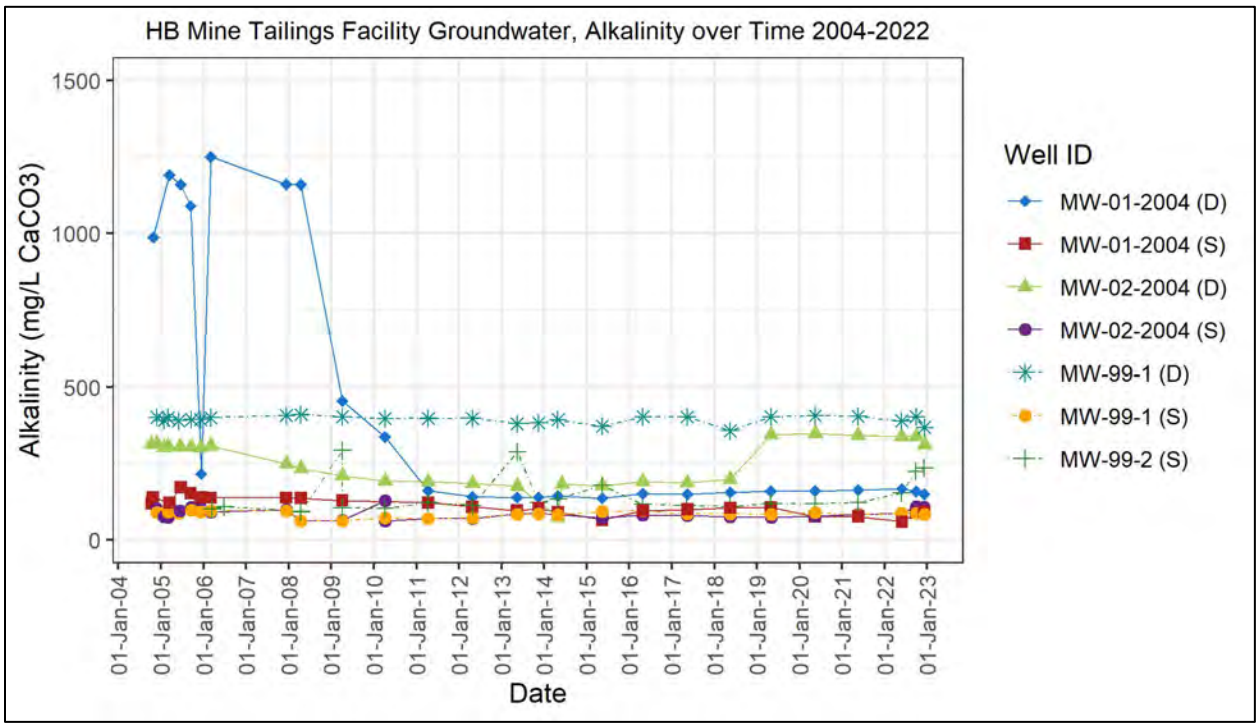


Figure 19

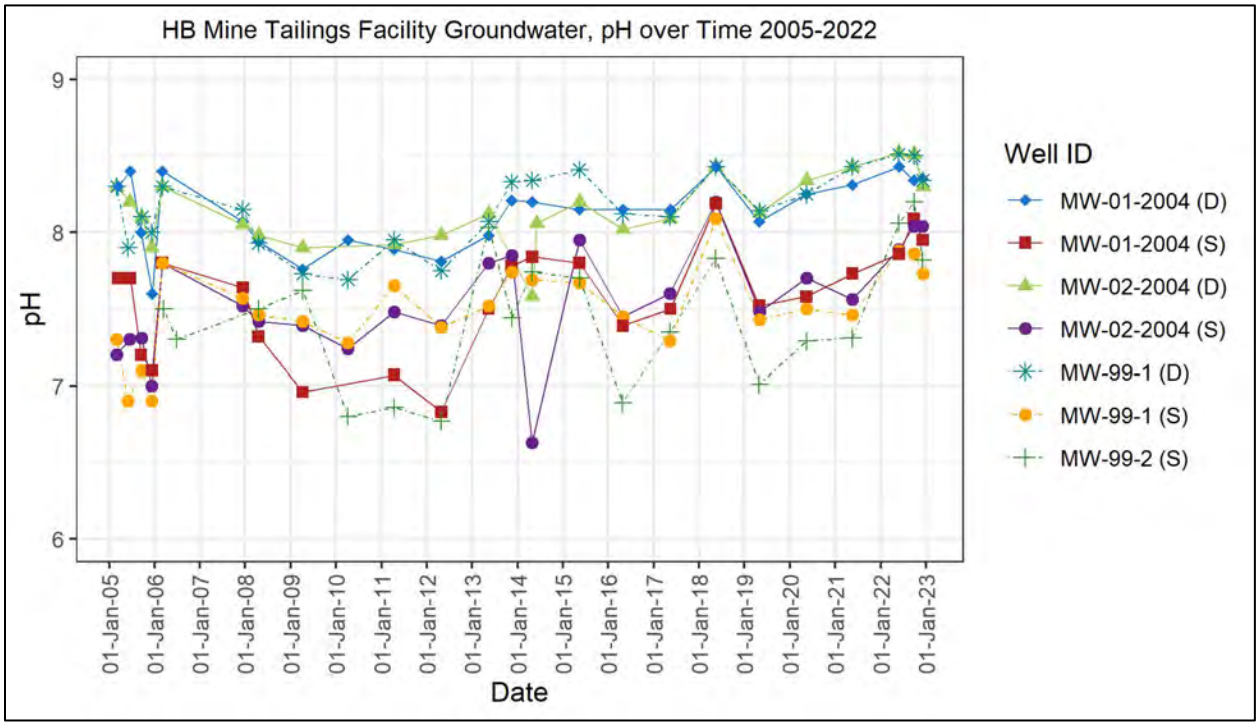


Figure 20

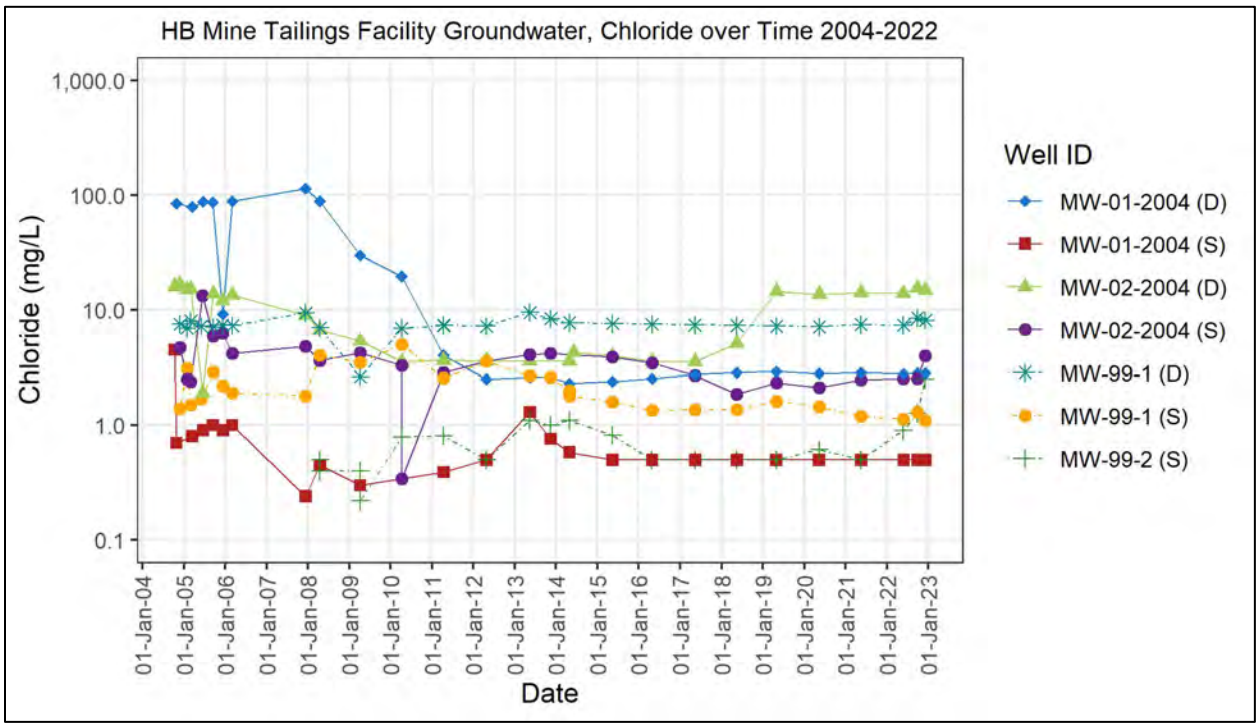


Figure 21

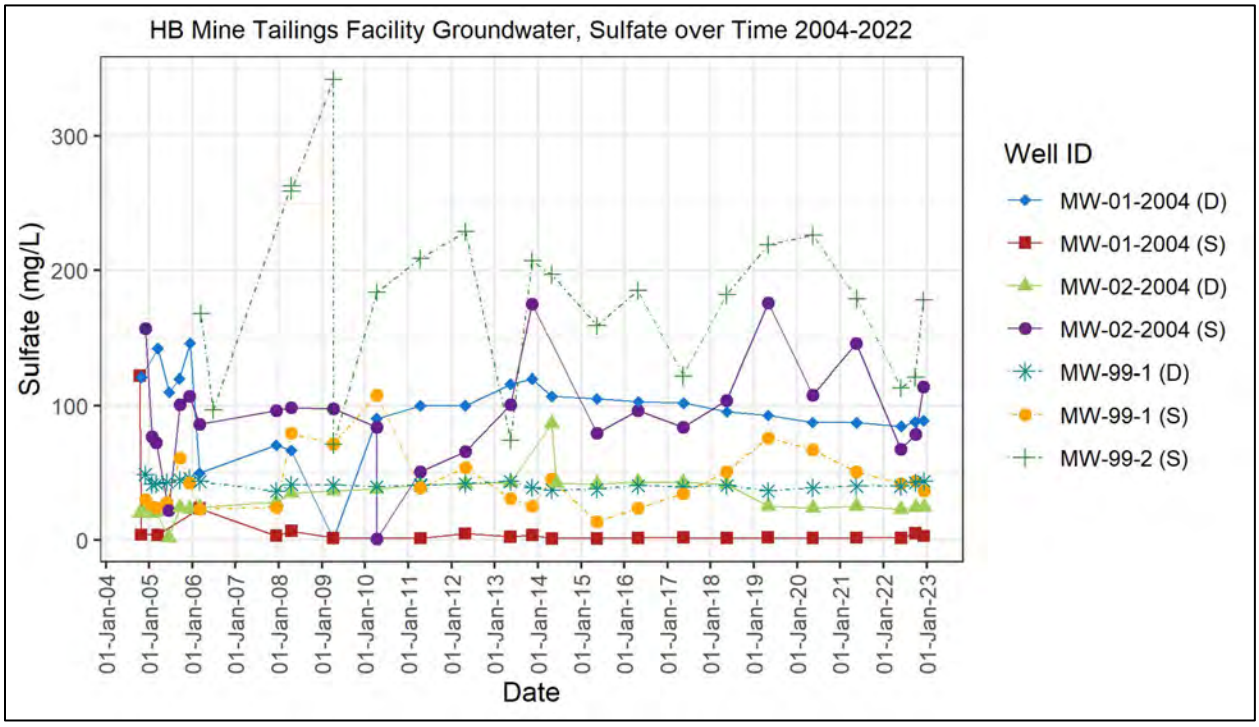


Figure 22

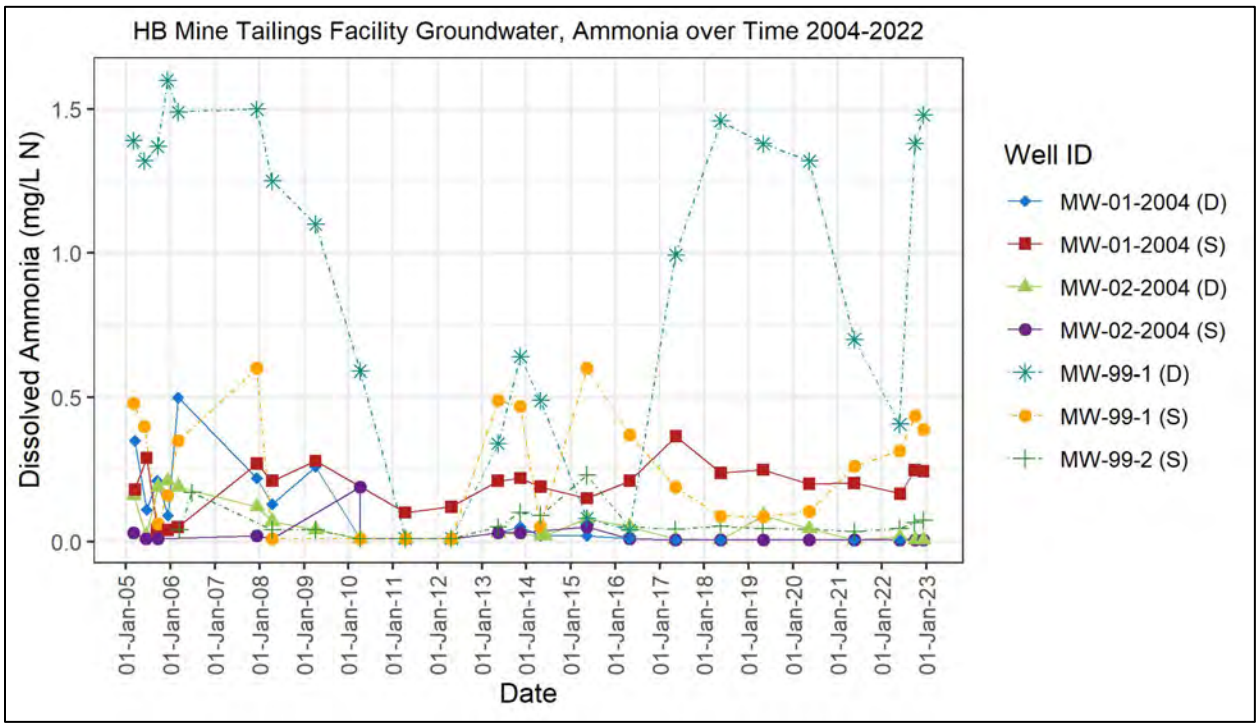


Figure 23

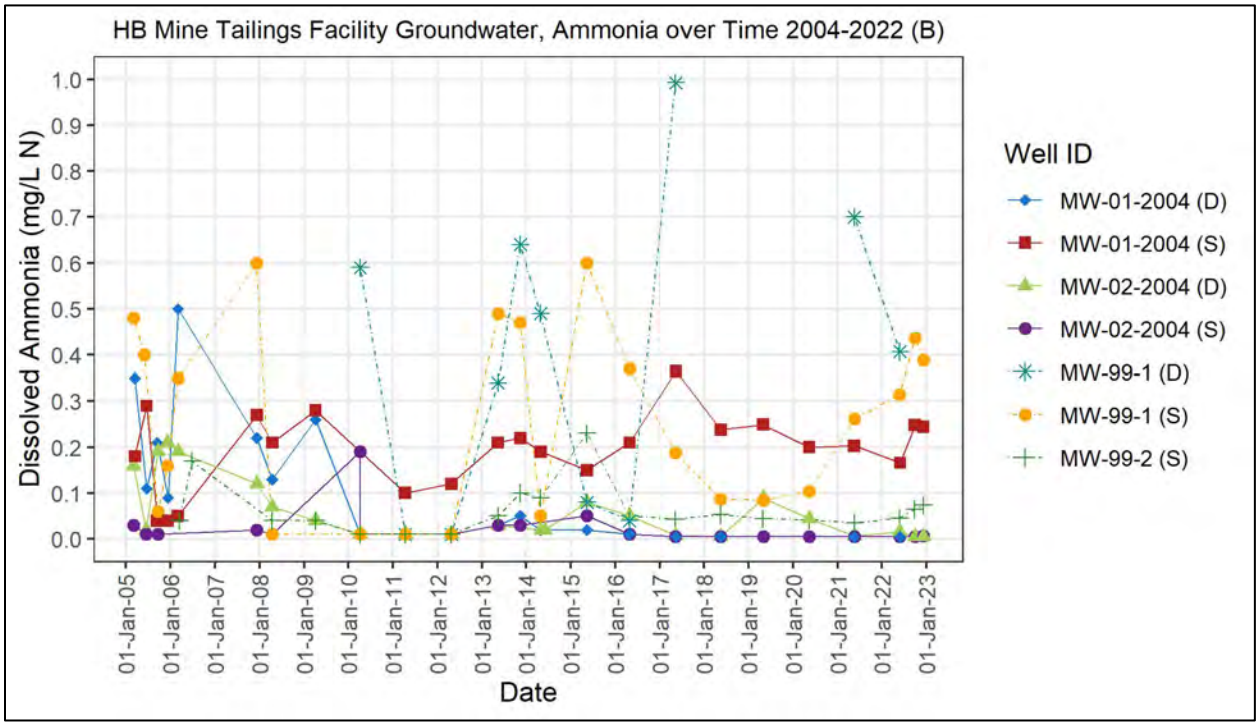


Figure 24

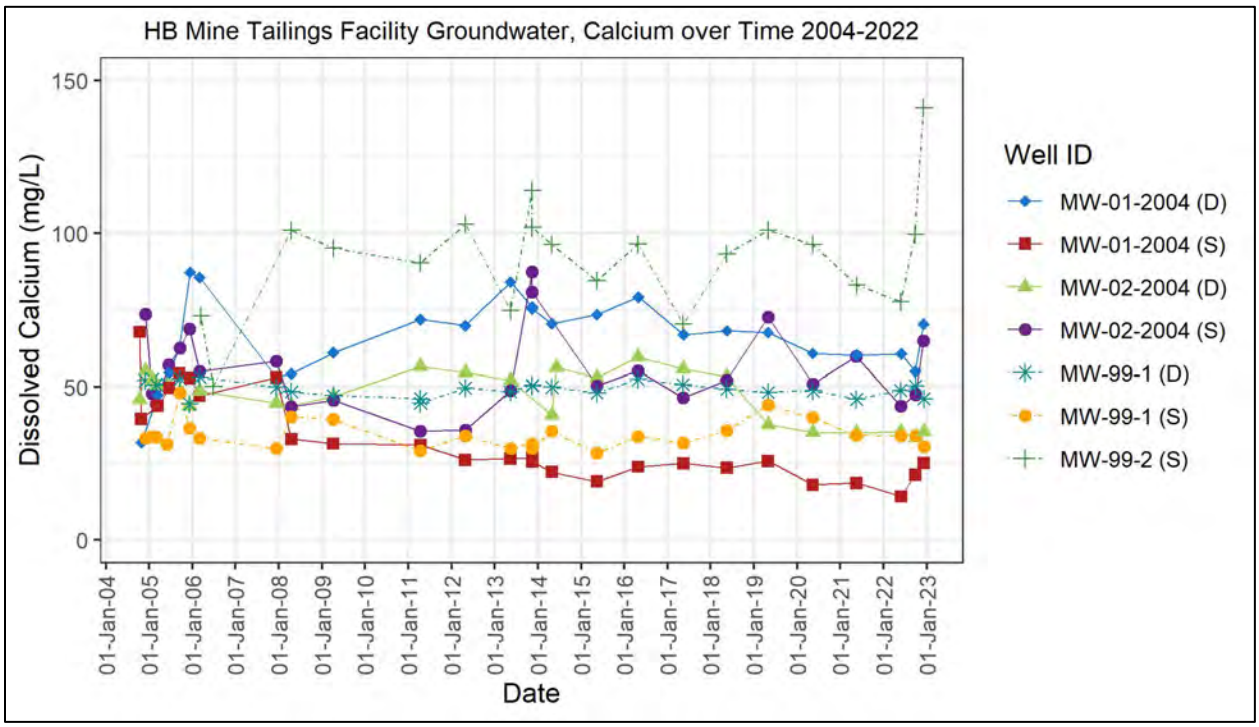


Figure 25

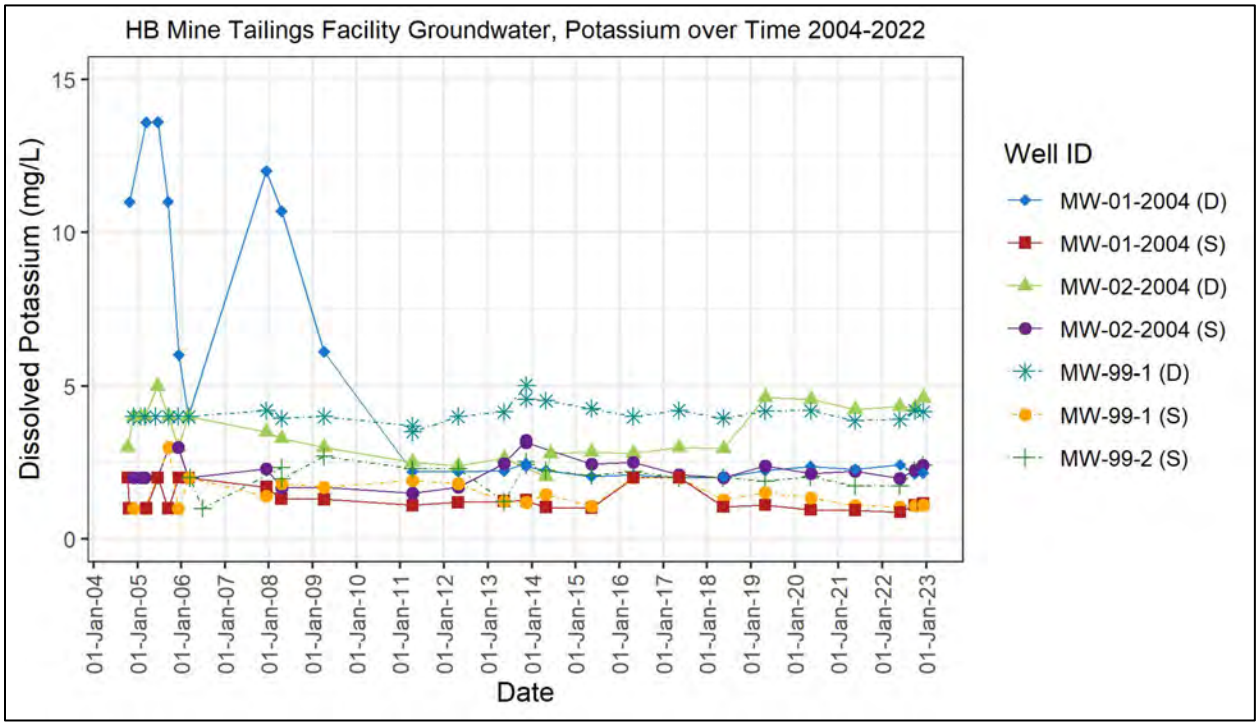


Figure 26

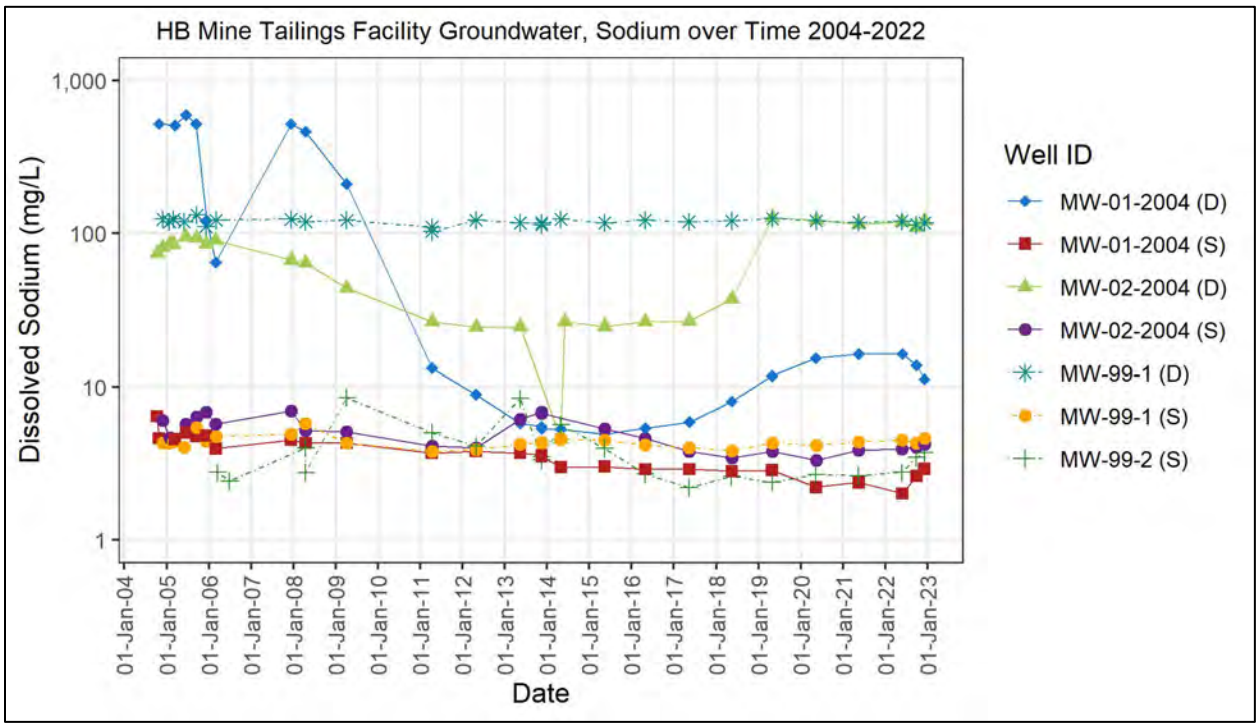


Figure 27

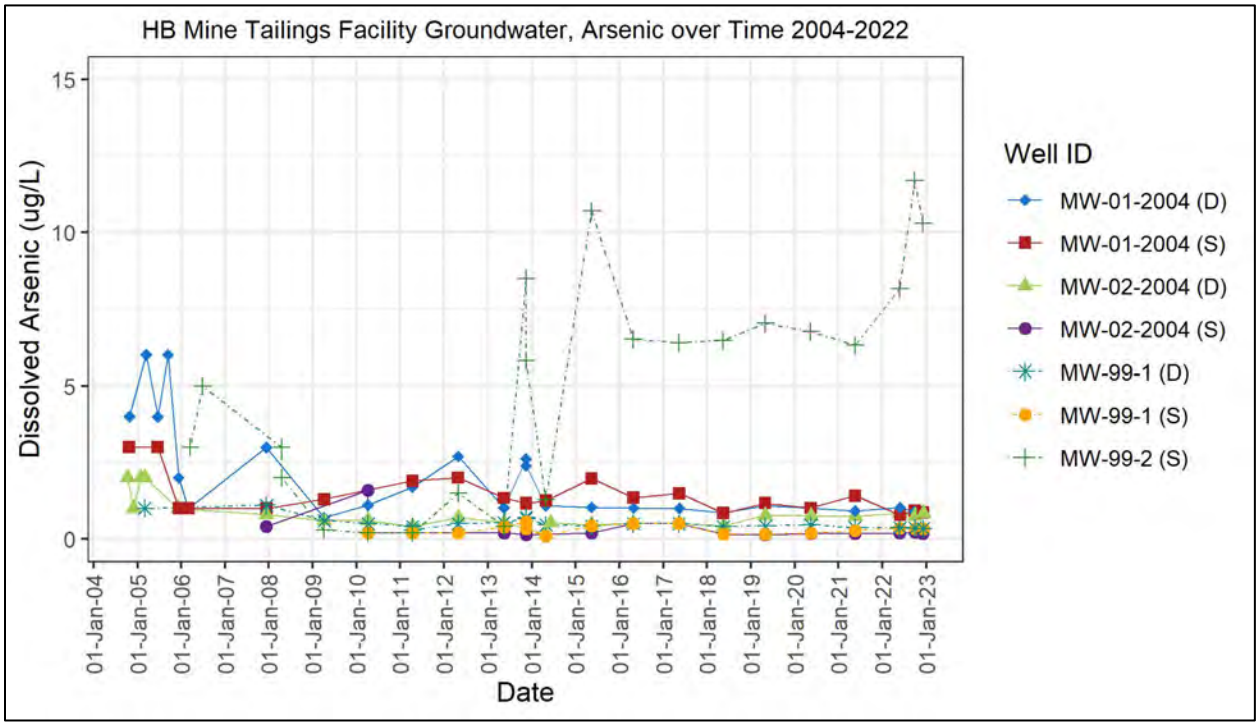


Figure 28

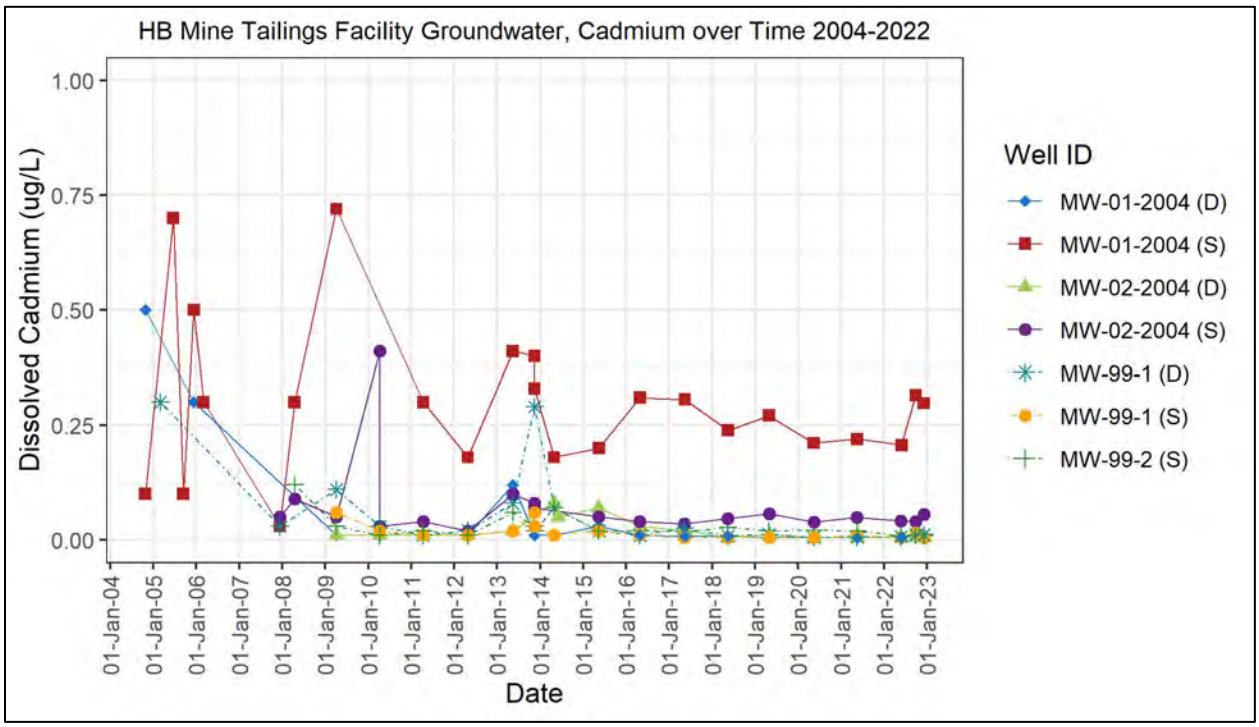


Figure 29

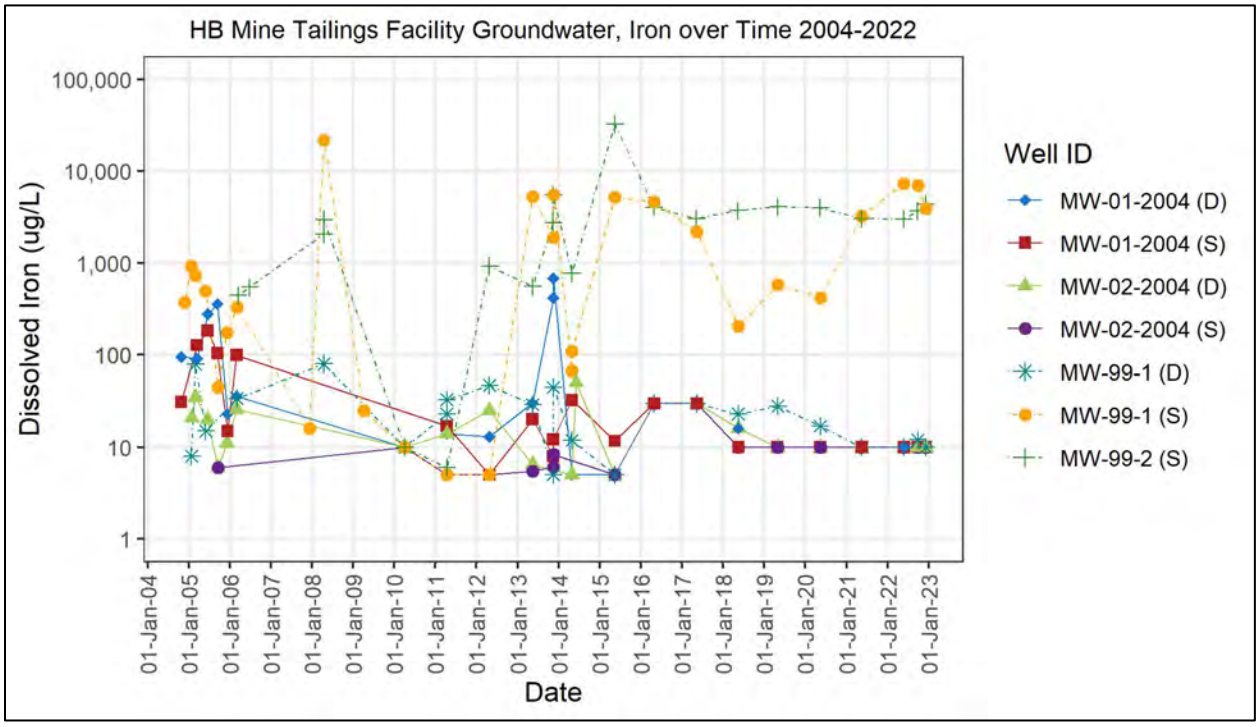


Figure 30

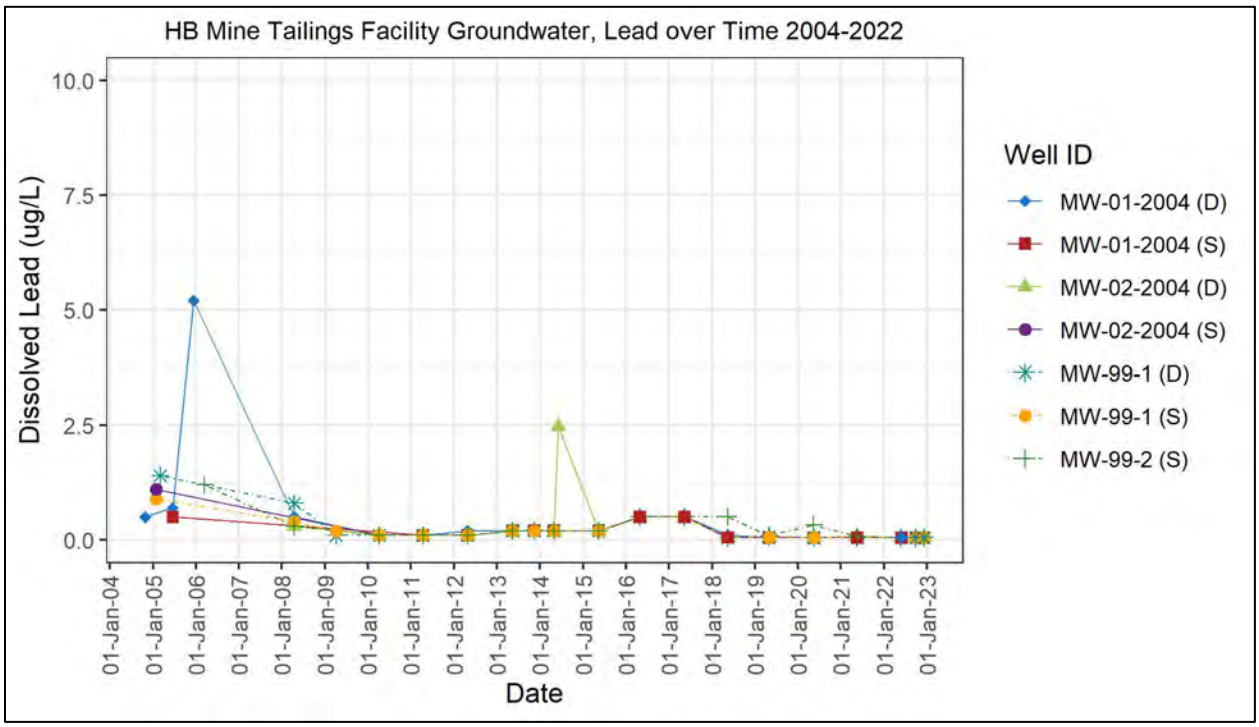


Figure 31

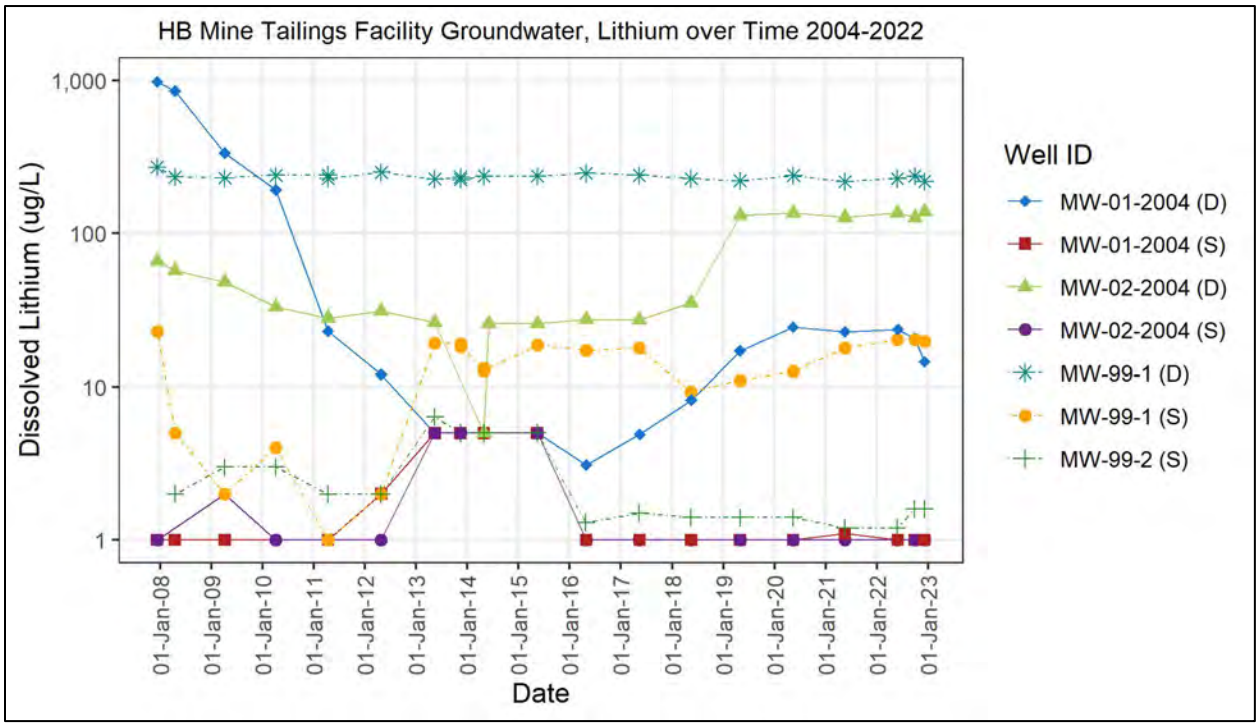


Figure 32

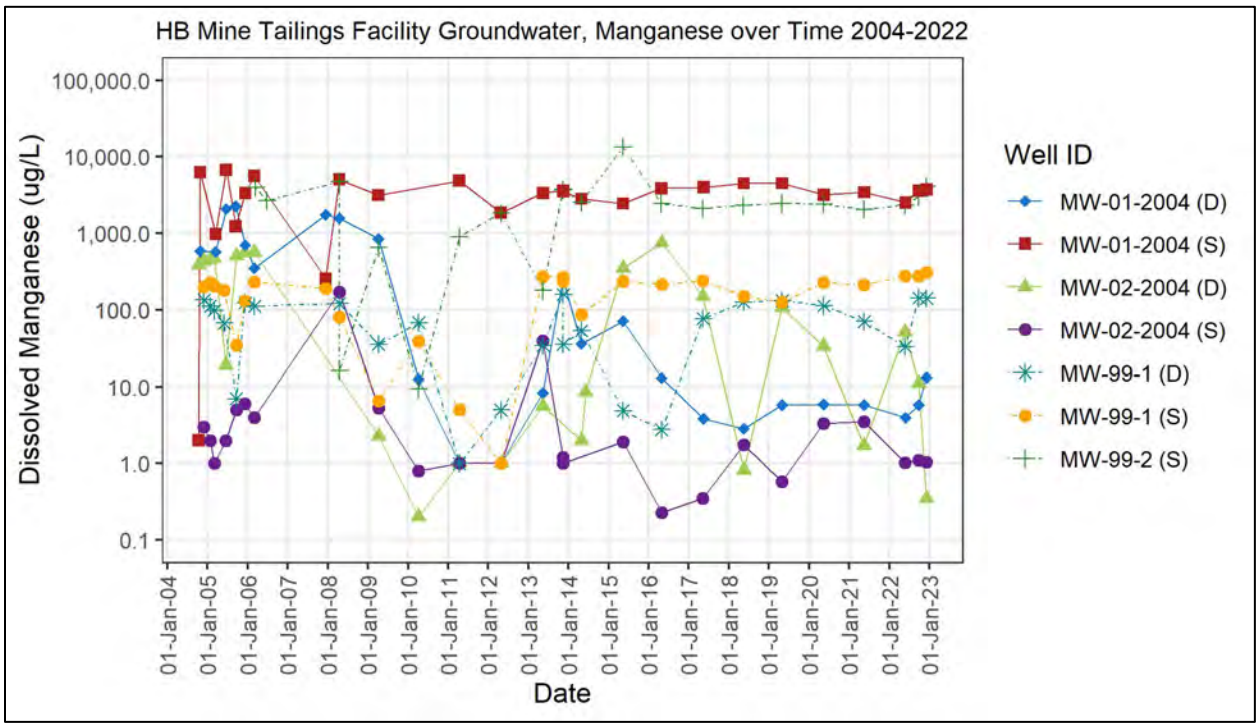


Figure 33

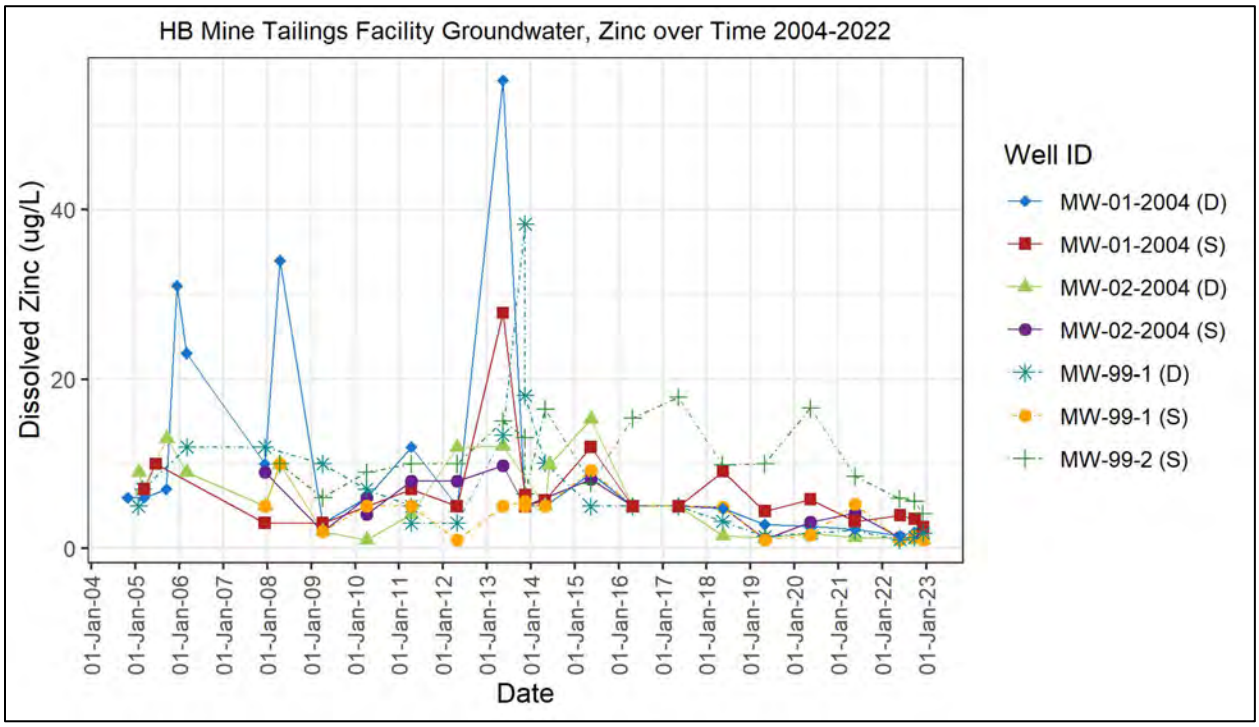
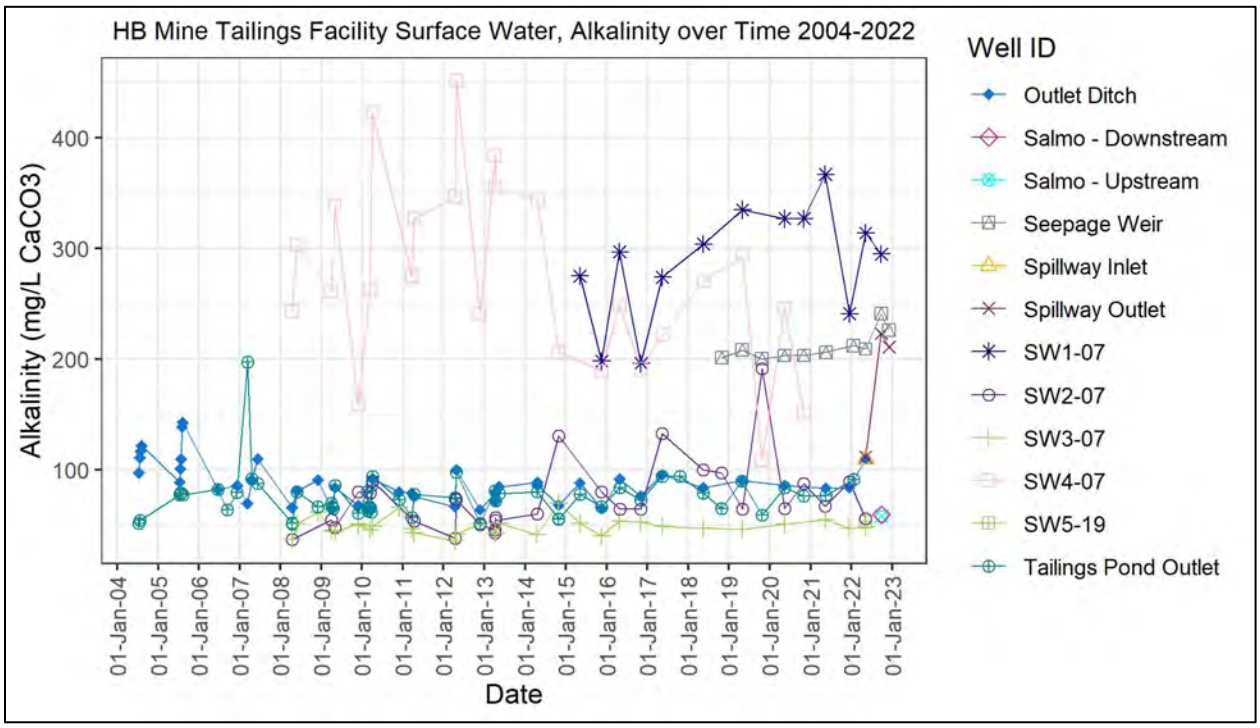


Figure 34



Note: The bicarbonate data was used for the 2010-2012 data presented as this was the major contributor to alkalinity.

Figure 35

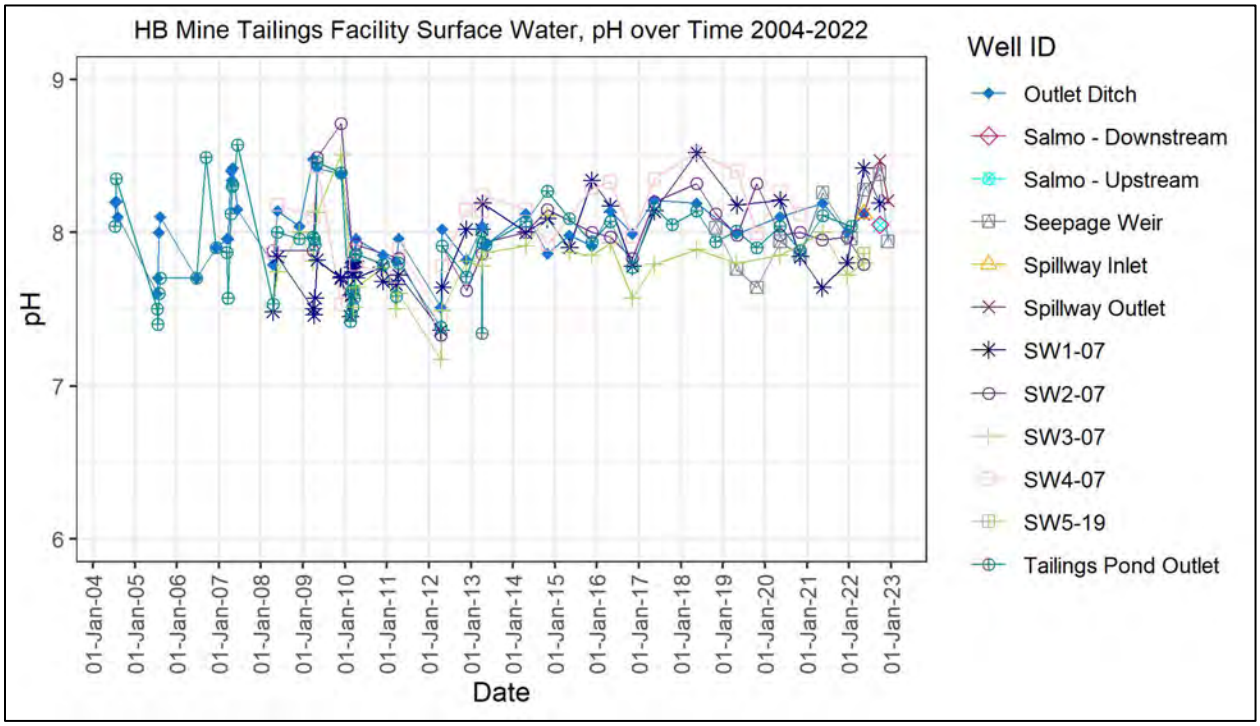
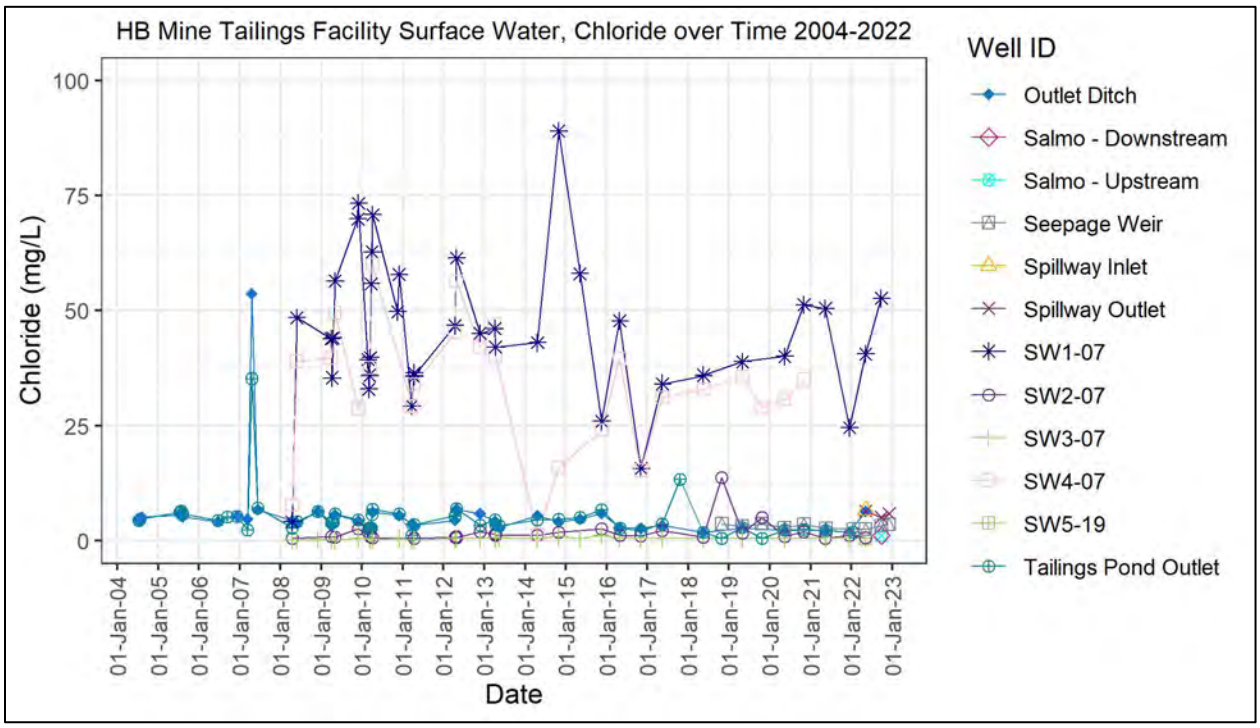


Figure 36



Note: In their hydrological review, AMEC determined that the April 2007 chloride value for TPO had to be an error (should be 35.2 mg/L). (AMEC 2014).

Figure 37

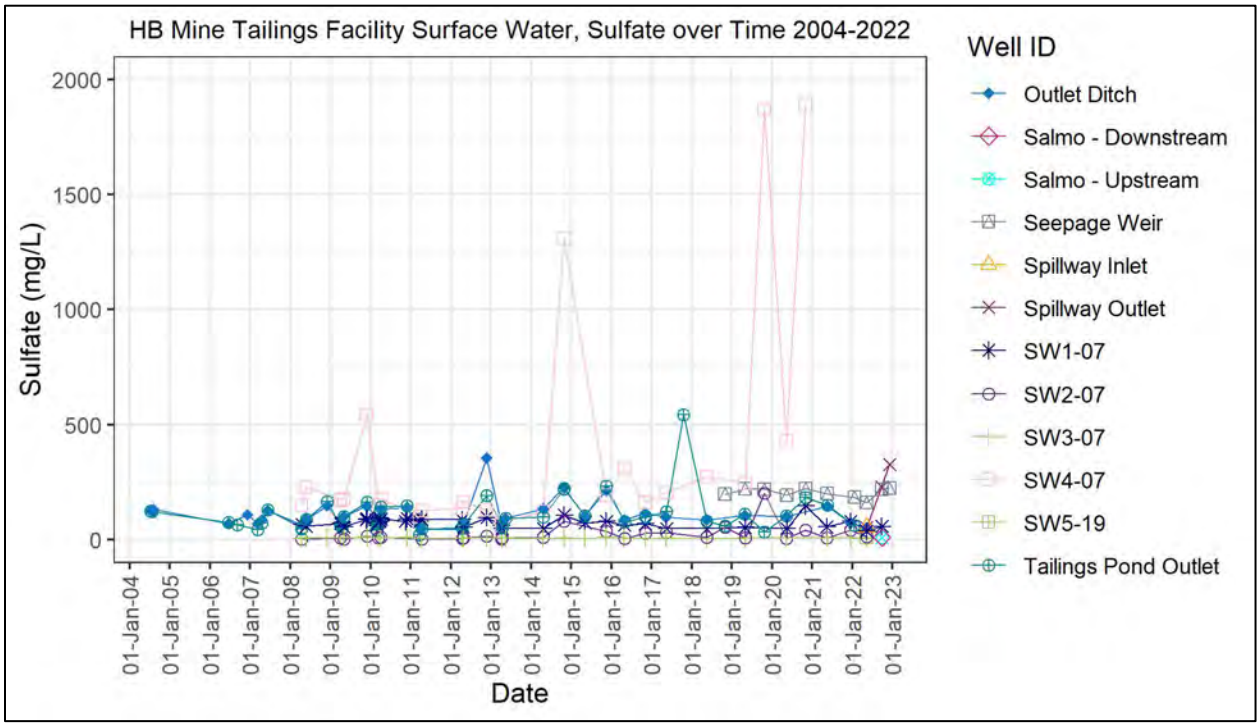


Figure 38

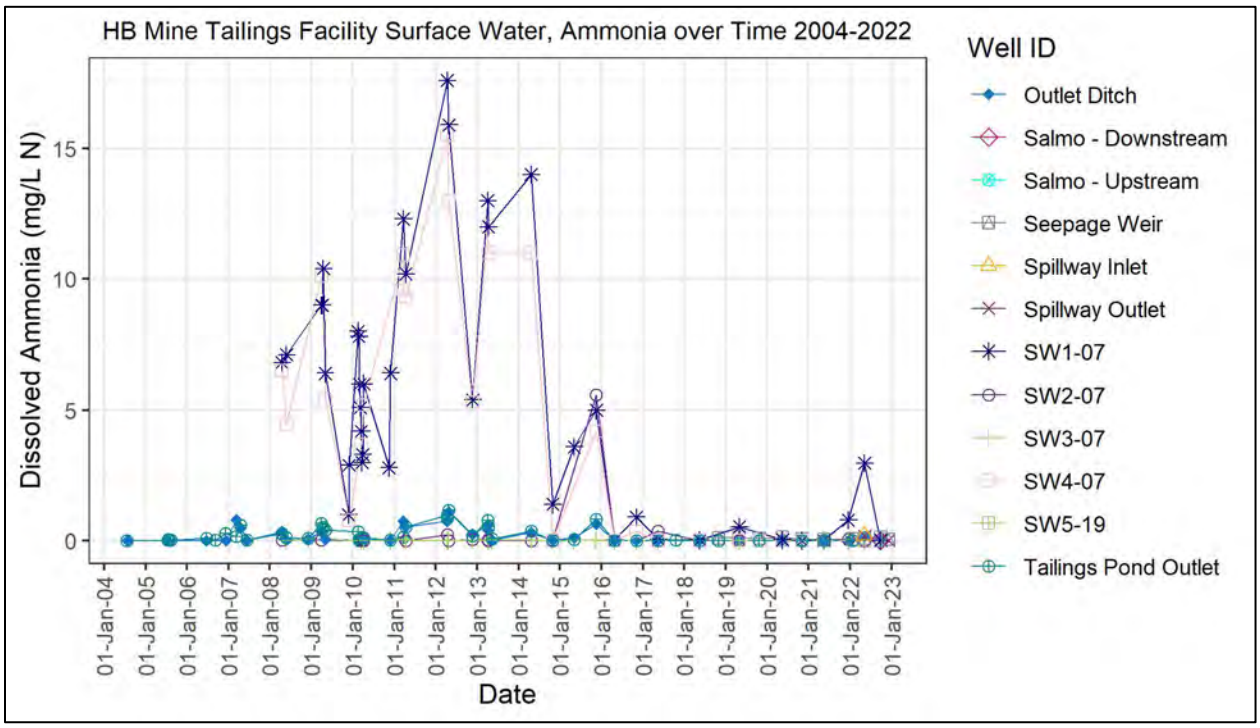


Figure 39

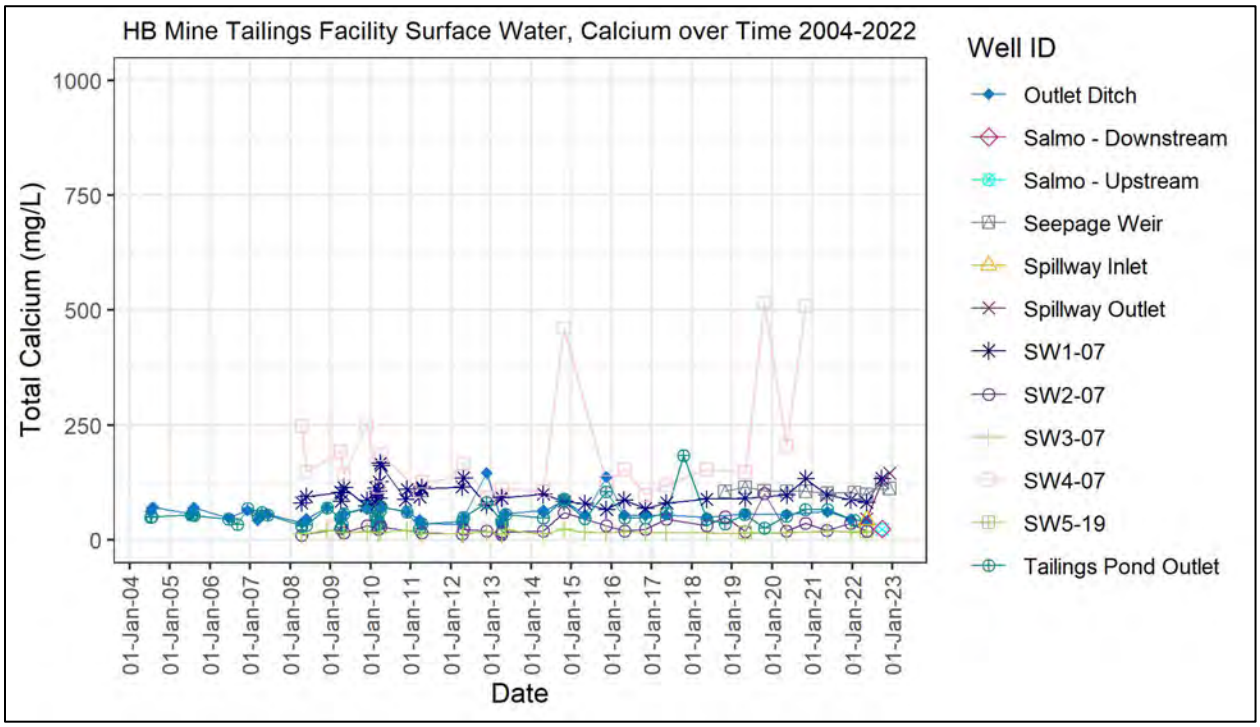


Figure 40

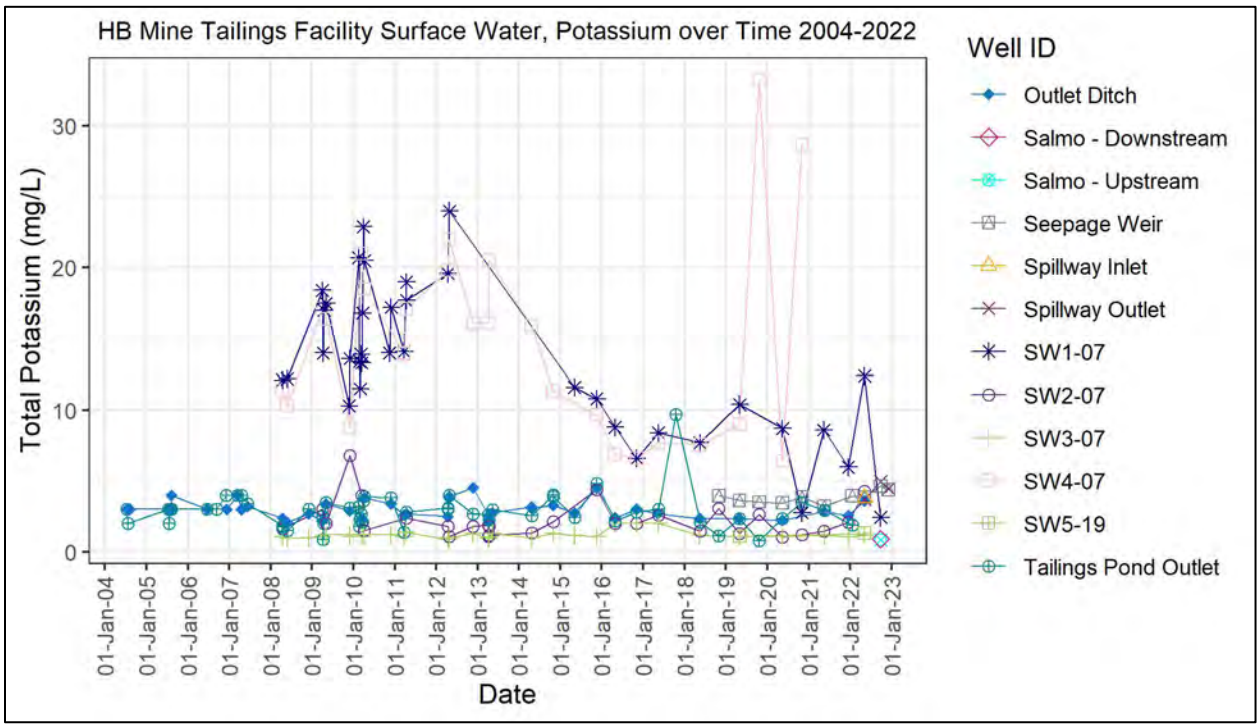


Figure 41

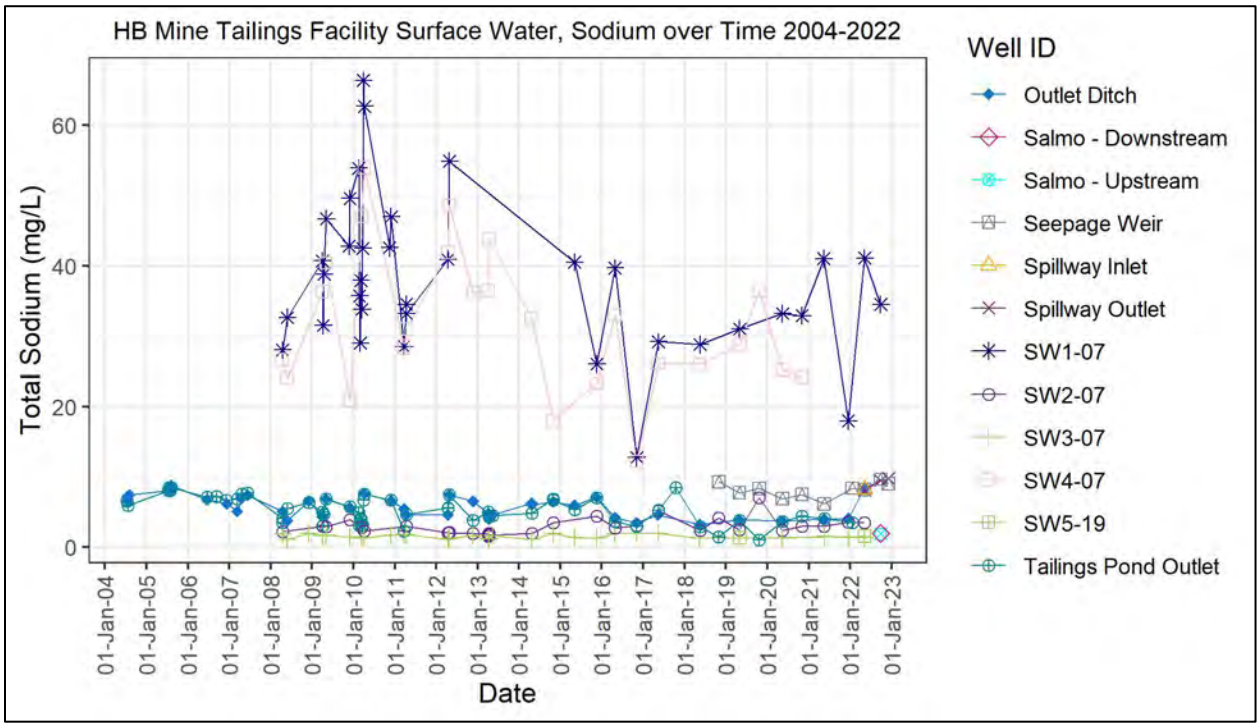


Figure 42

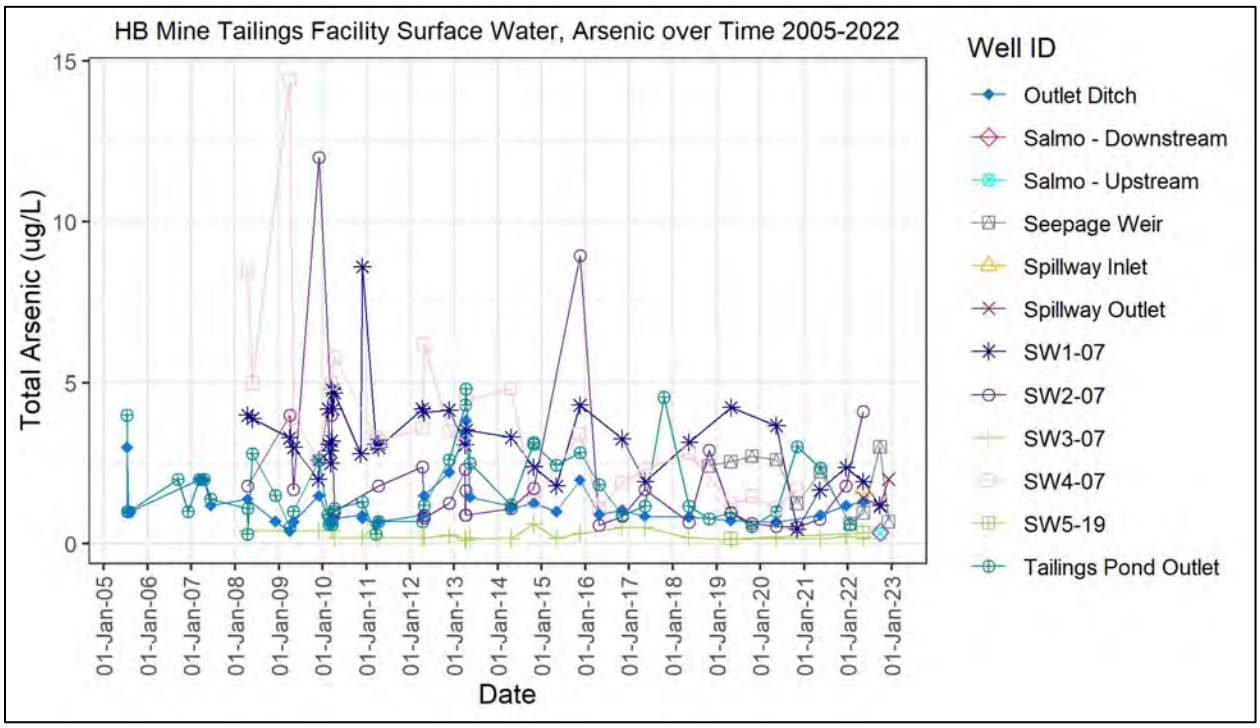


Figure 43

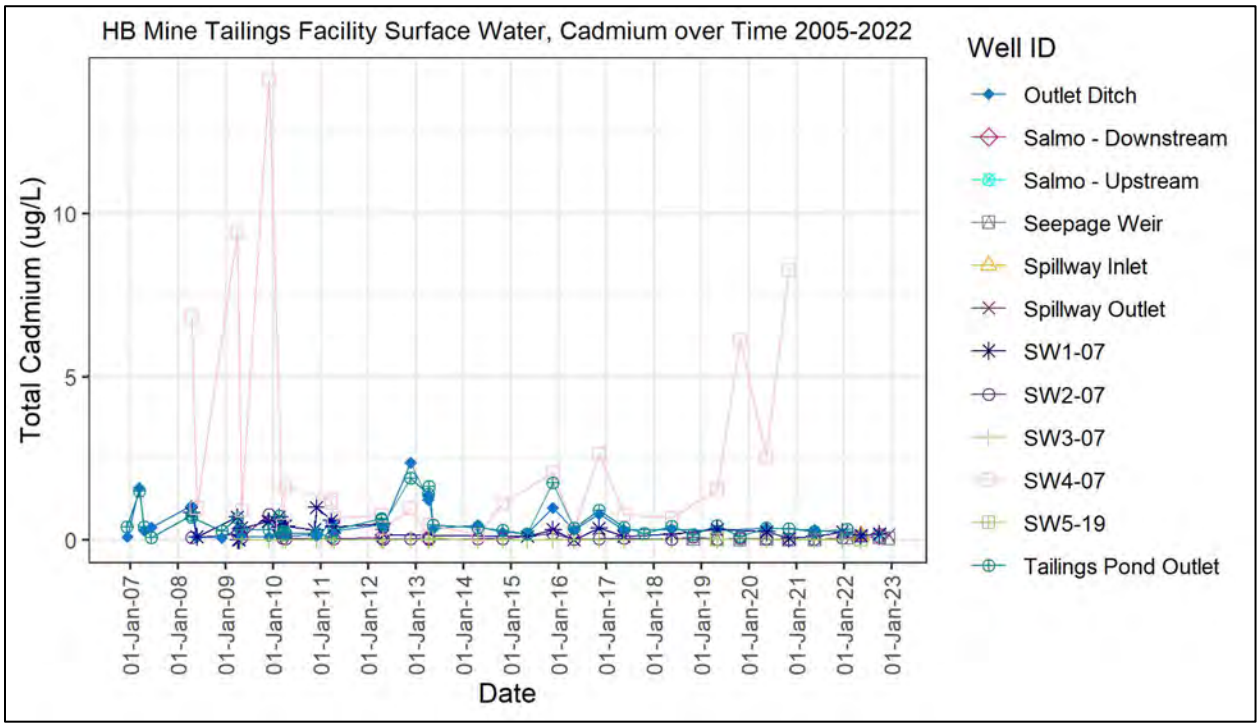


Figure 44

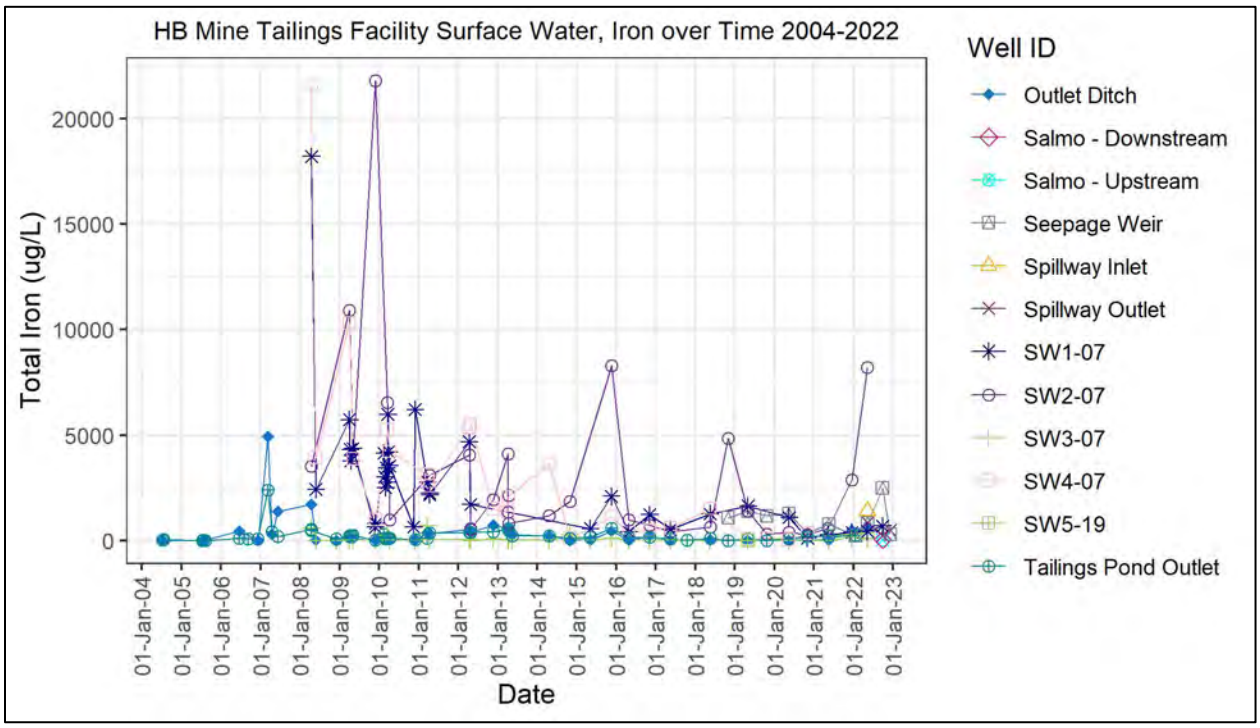


Figure 45

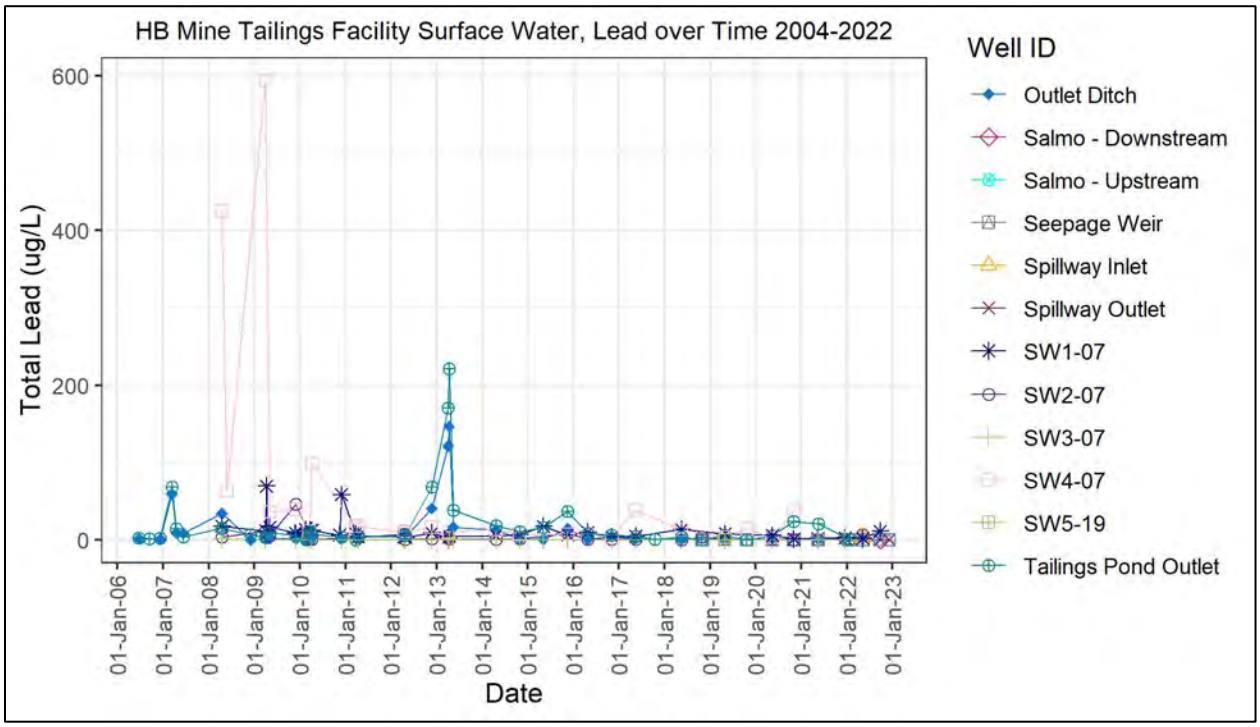


Figure 46

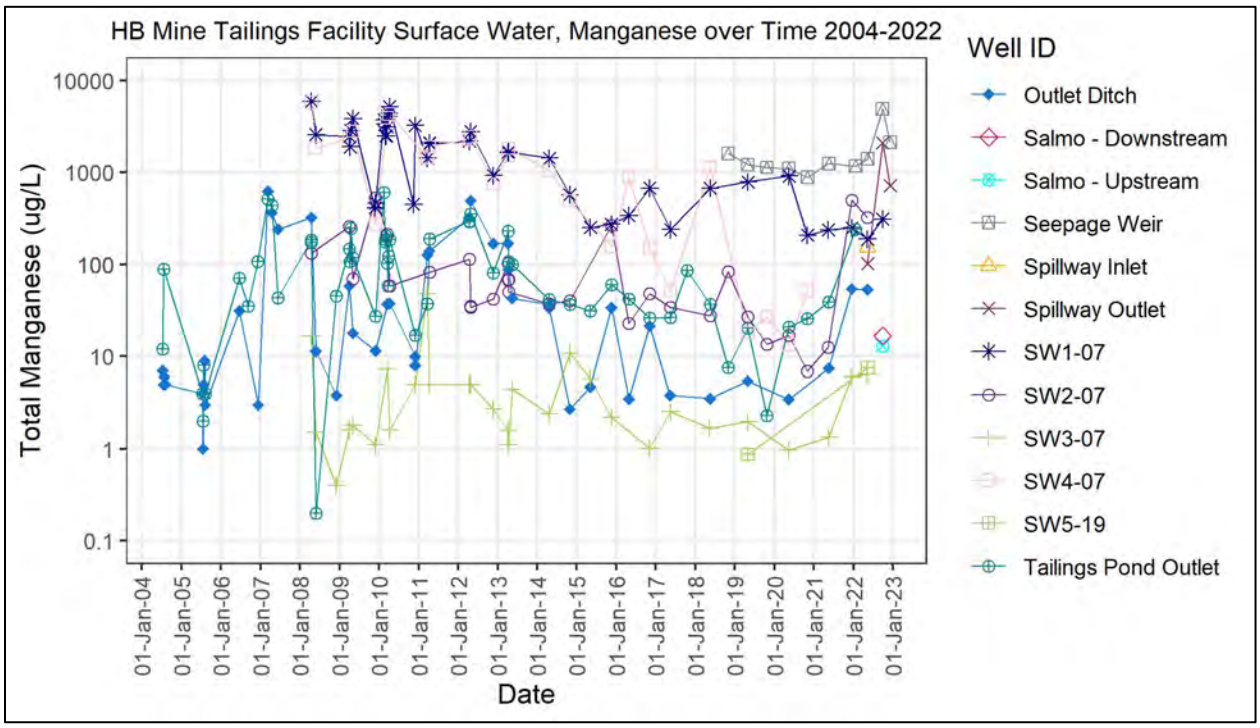
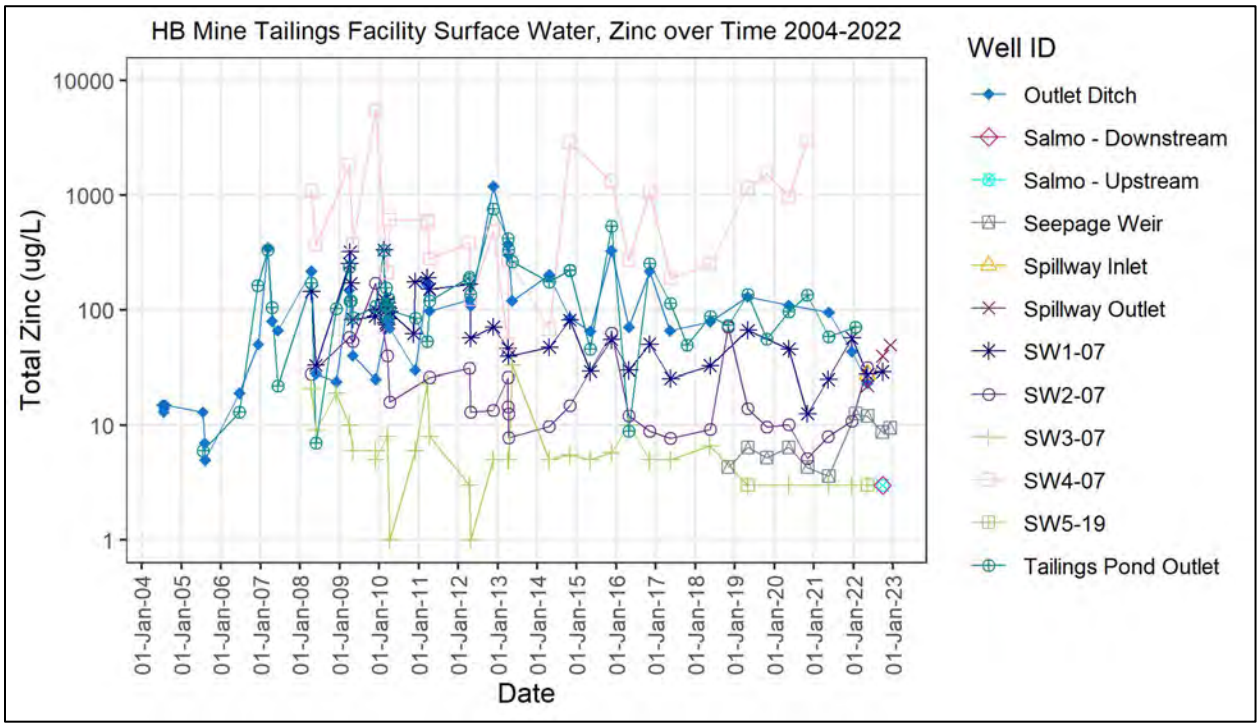


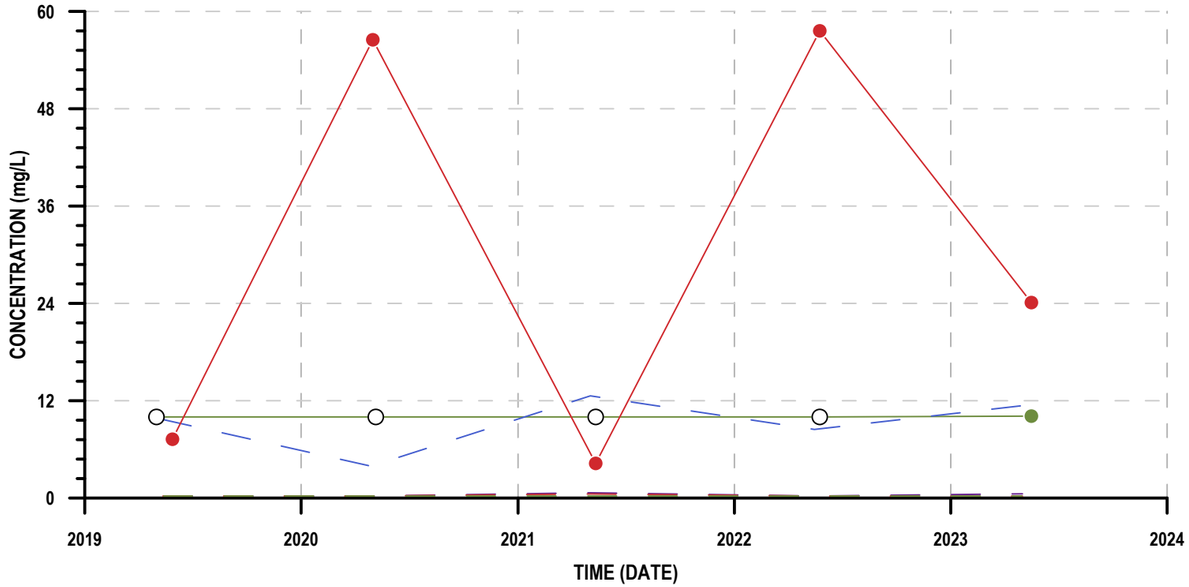
Figure 47



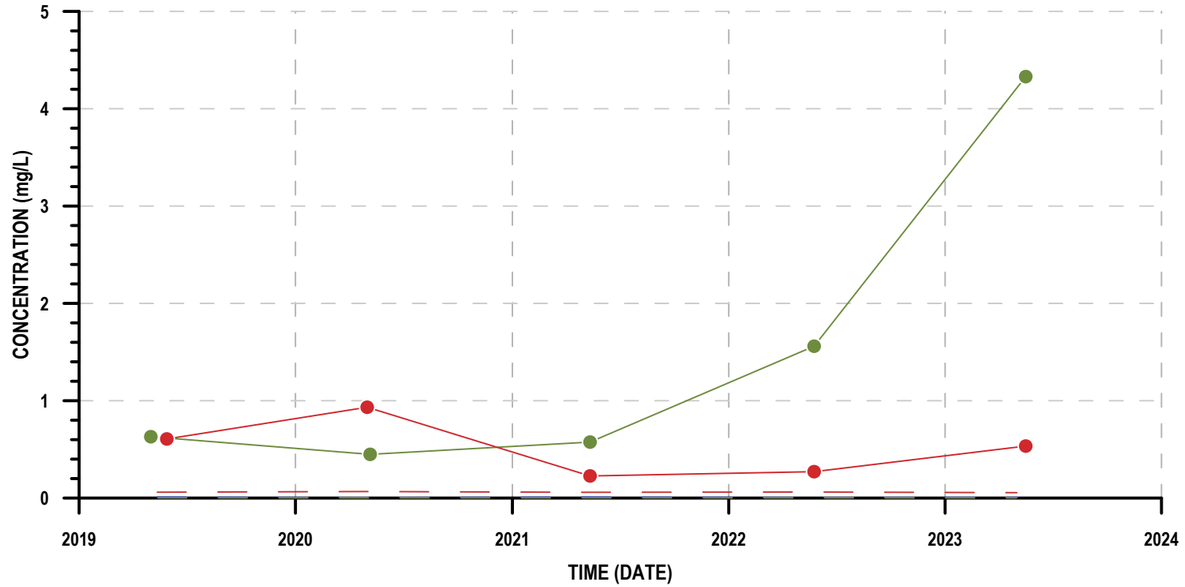
Appendix I

Concentration Versus Time Plots (2019-2023)

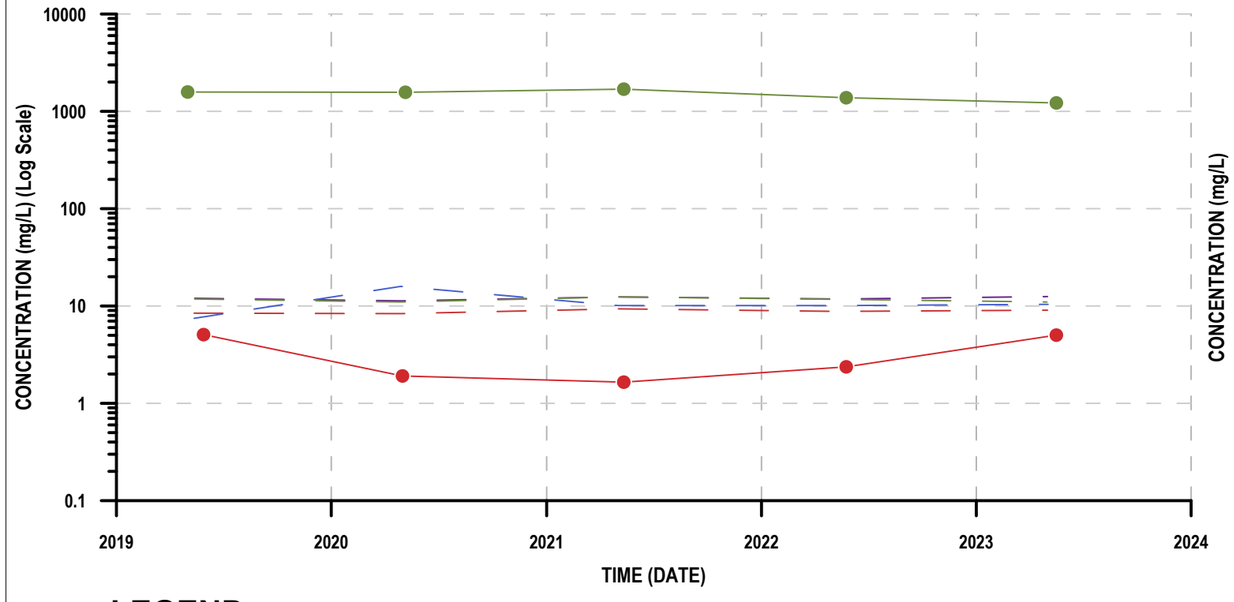
CHLORIDE



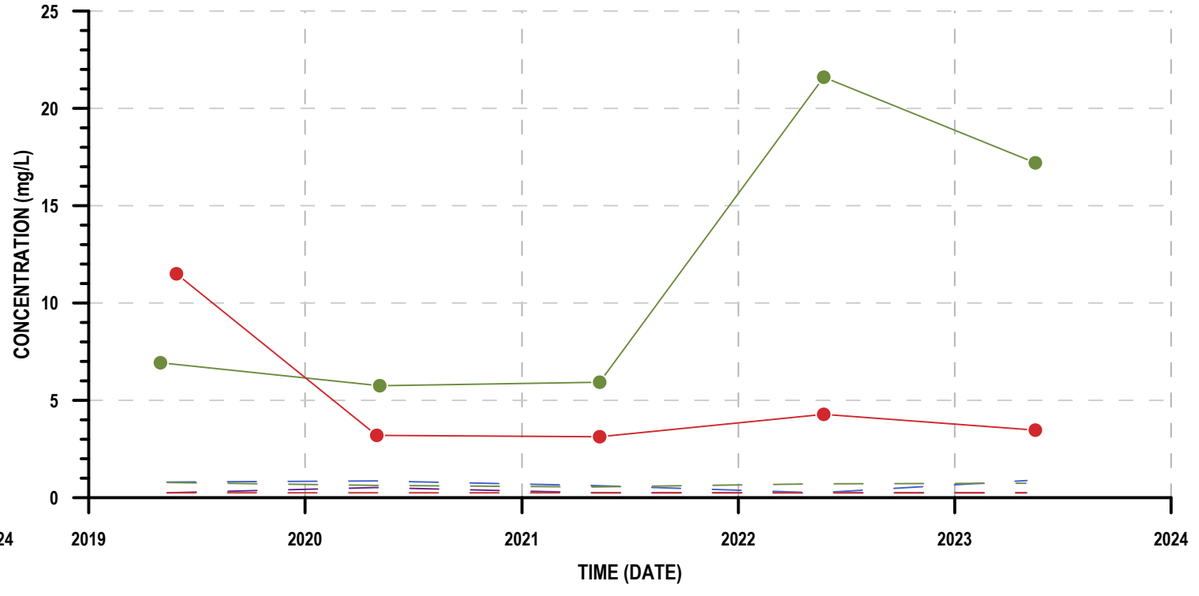
AMMONIA (as N)



SULFATE



TOC



LEGEND

LW-03-01 — MW-02A-01* — MW-07-01*

MW-06-01 — MW-03A-01* ○○○ Non-Detect

S-MW-1*

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

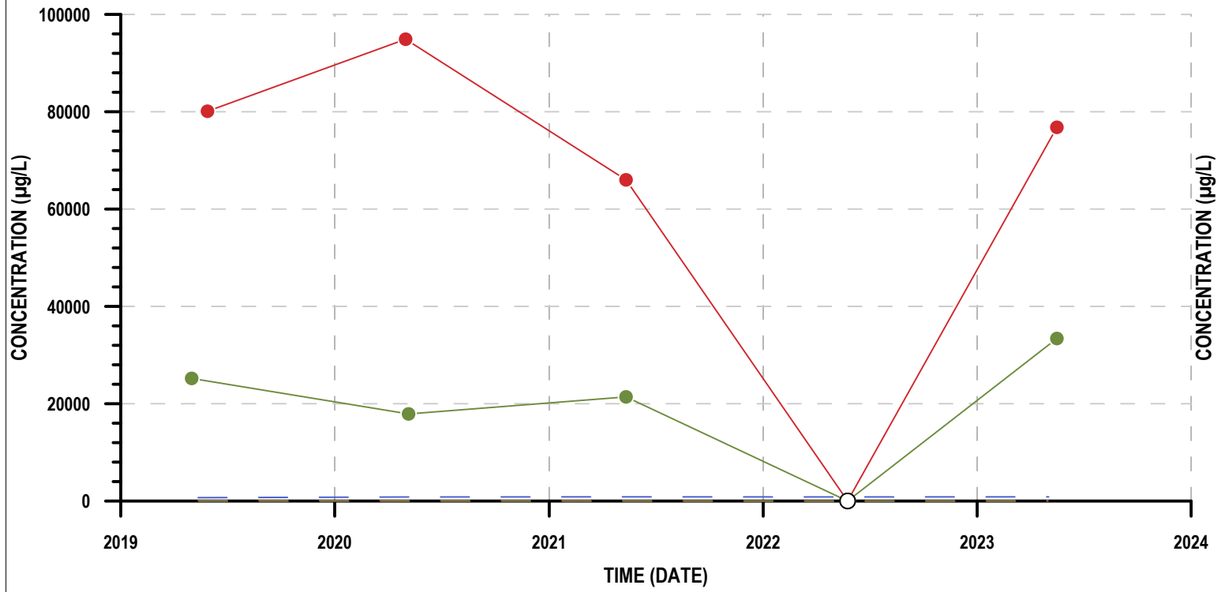
CONCENTRATION VERSUS TIME PLOTS
LEACHATE AND TAILINGS SOURCE WELLS

Project No. **12630729**
Date **July 2024**

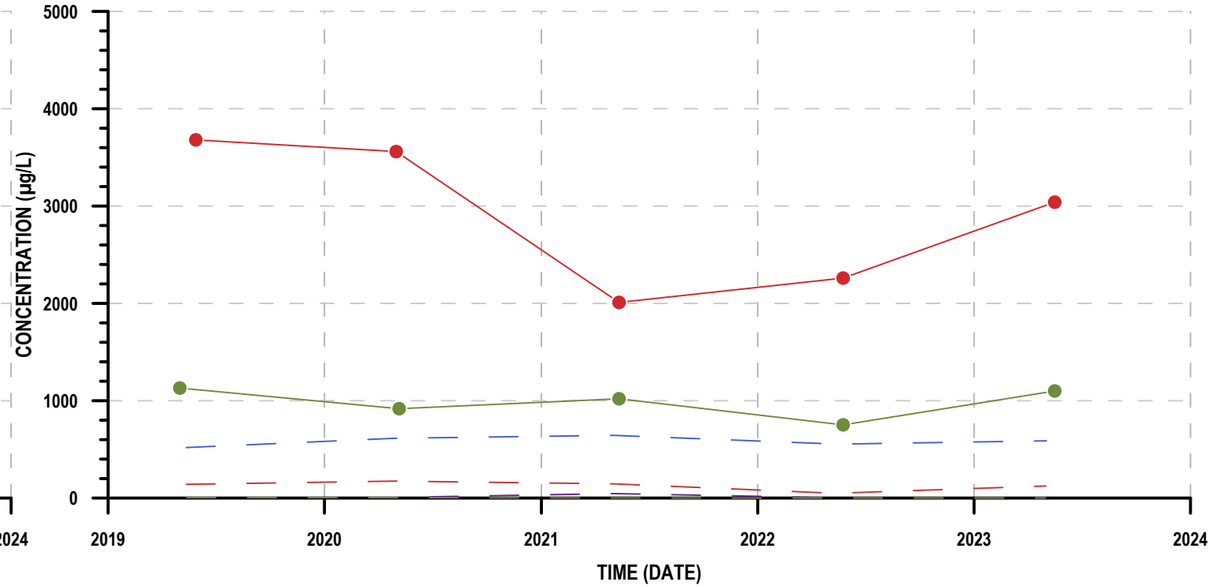
FIGURE I-1

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-1 - Leachate (1).gpj
Plot Date: July 19 2024 11:07 AM

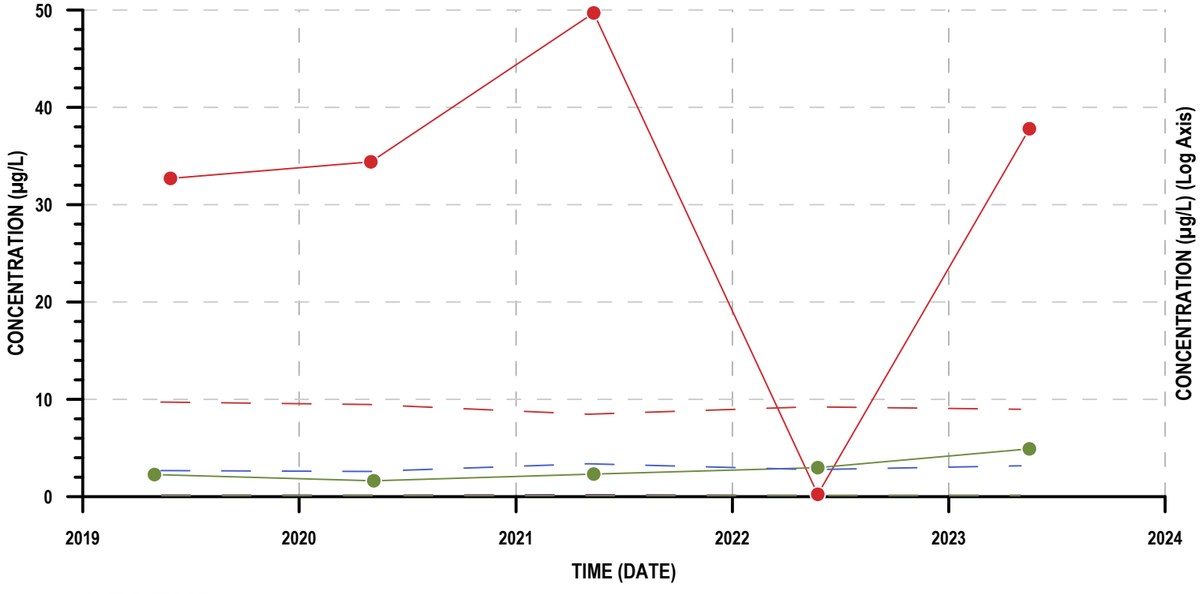
IRON



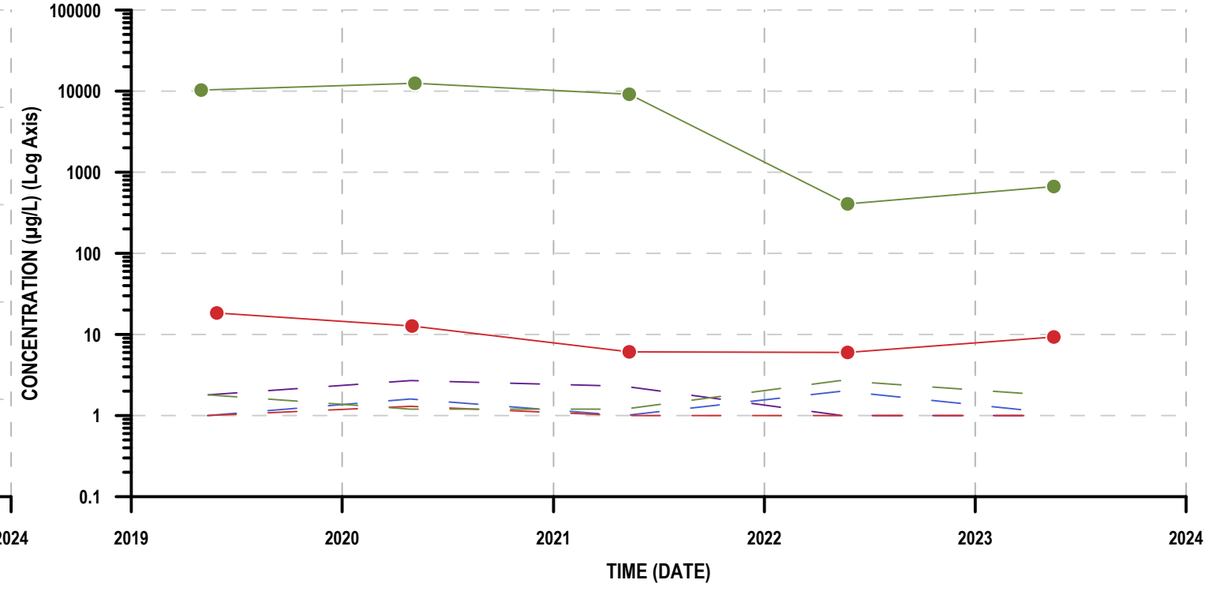
MANGANESE



ARSENIC



ZINC



LEGEND

LW-03-01 — MW-02A-01* — MW-07-01*
MW-06-01 — MW-03A-01* ○○○ Non-Detect
S-MW-1*

* Background wells included for comparison

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

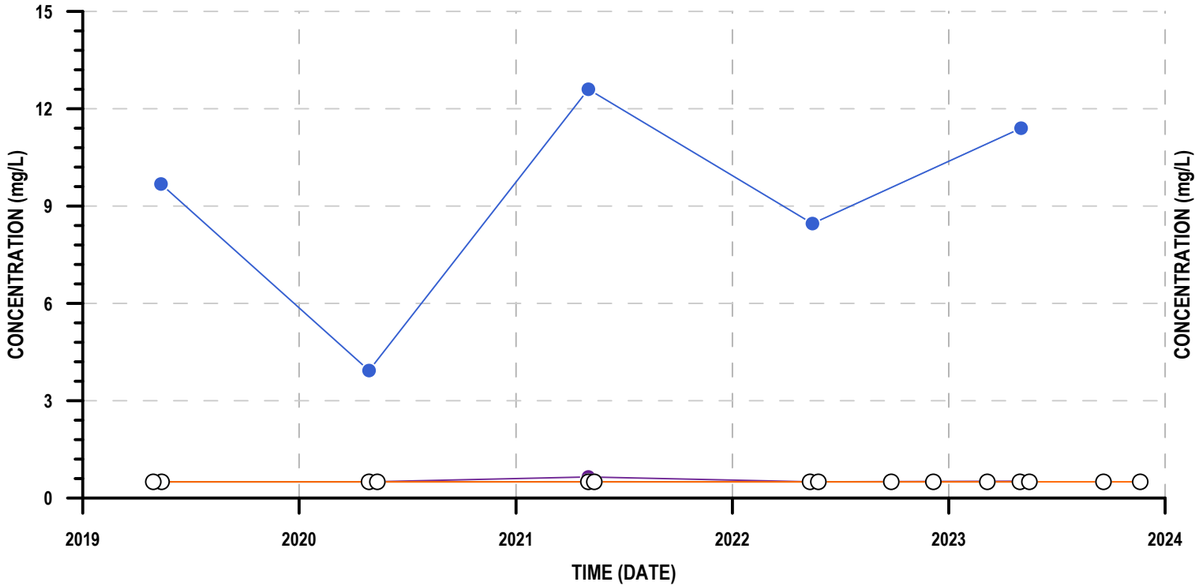
CONCENTRATION VERSUS TIME PLOTS
LEACHATE AND TAILINGS SOURCE WELLS

Project No. **12630729**
Date **July 2024**

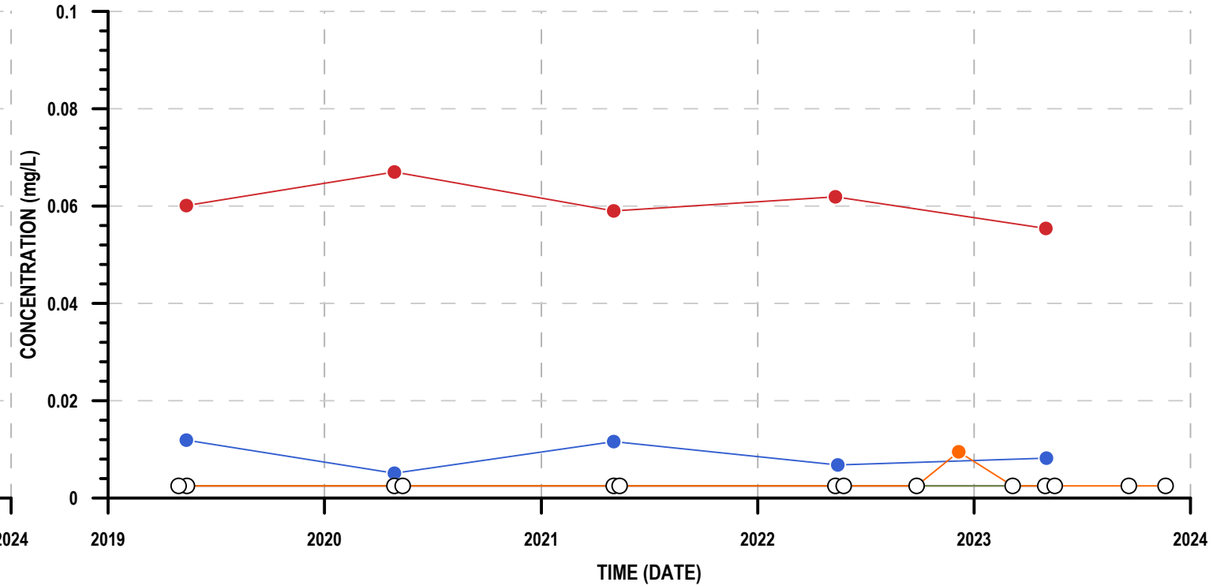
FIGURE I-2

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-2 - Leachate (2).gpj
Plot Date: July 19 2024 11:07 AM

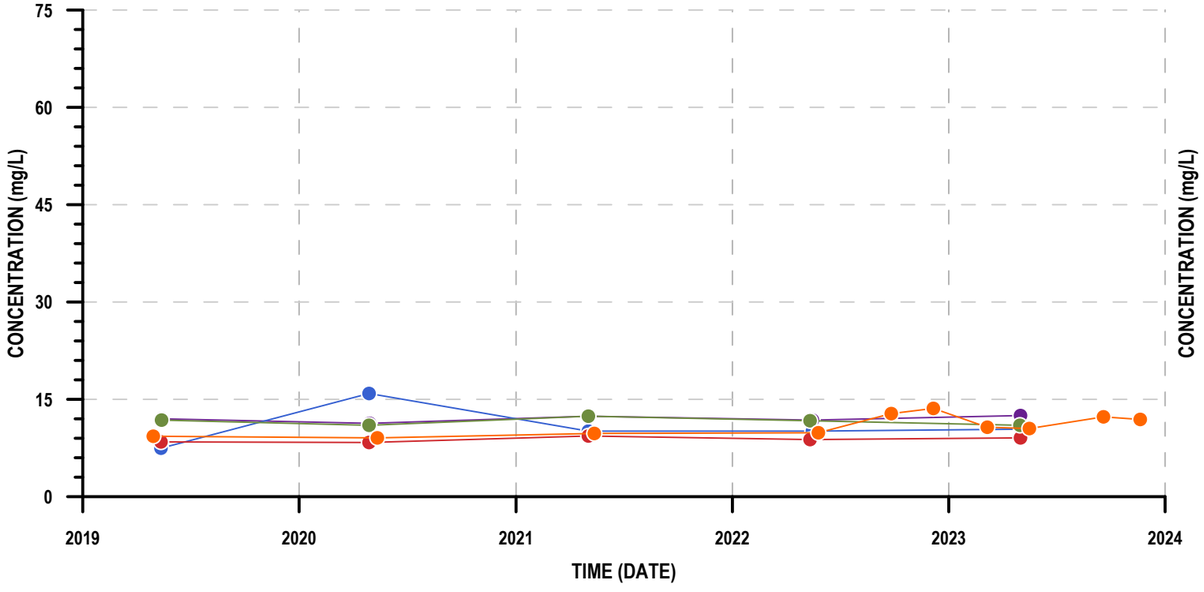
CHLORIDE



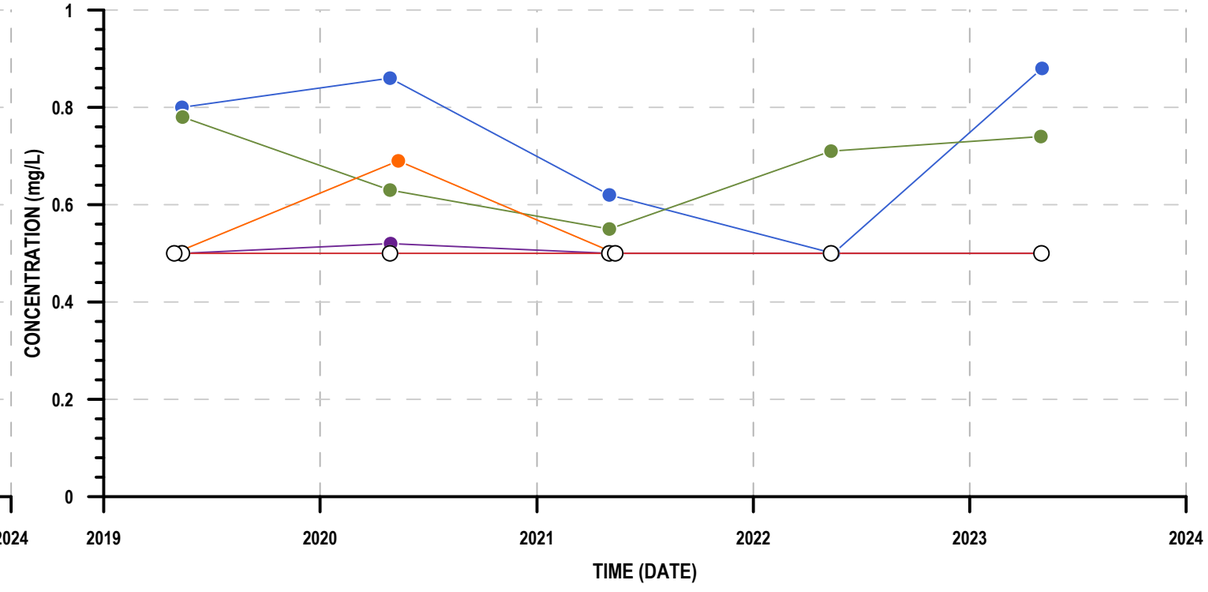
AMMONIA (as N)



SULFATE



TOC



LEGEND

S-MW-1 MW-02A-01 MW-03A-01 MW-07-01 MW-05-01 Non-Detect

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

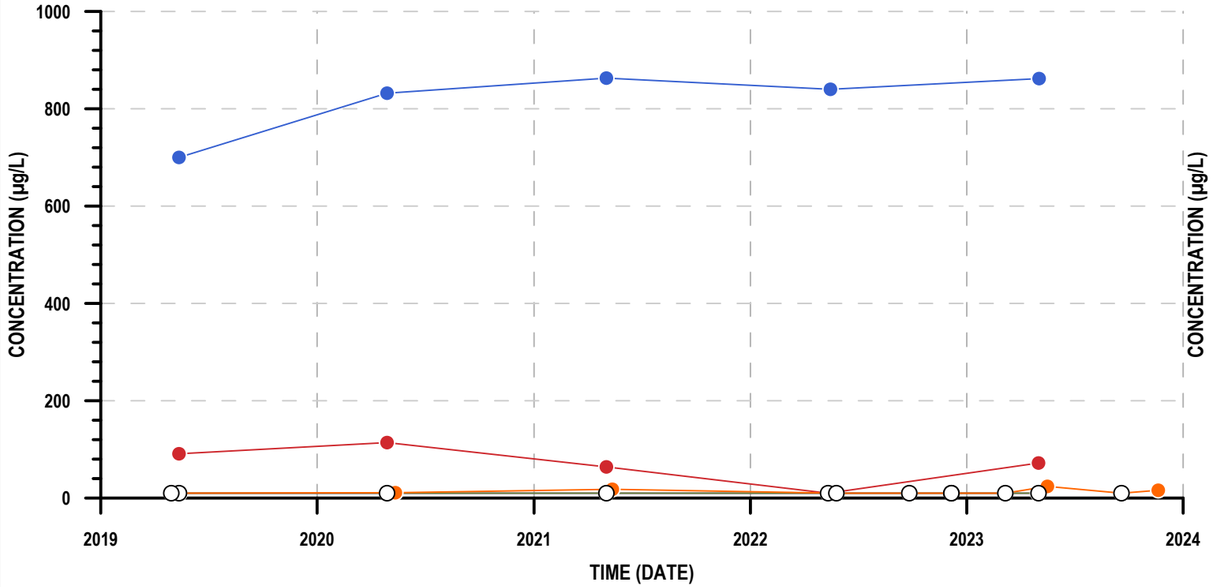
CONCENTRATION VERSUS TIME PLOTS
BACKGROUND WELLS

Project No. **12630729**
Date **September 2024**

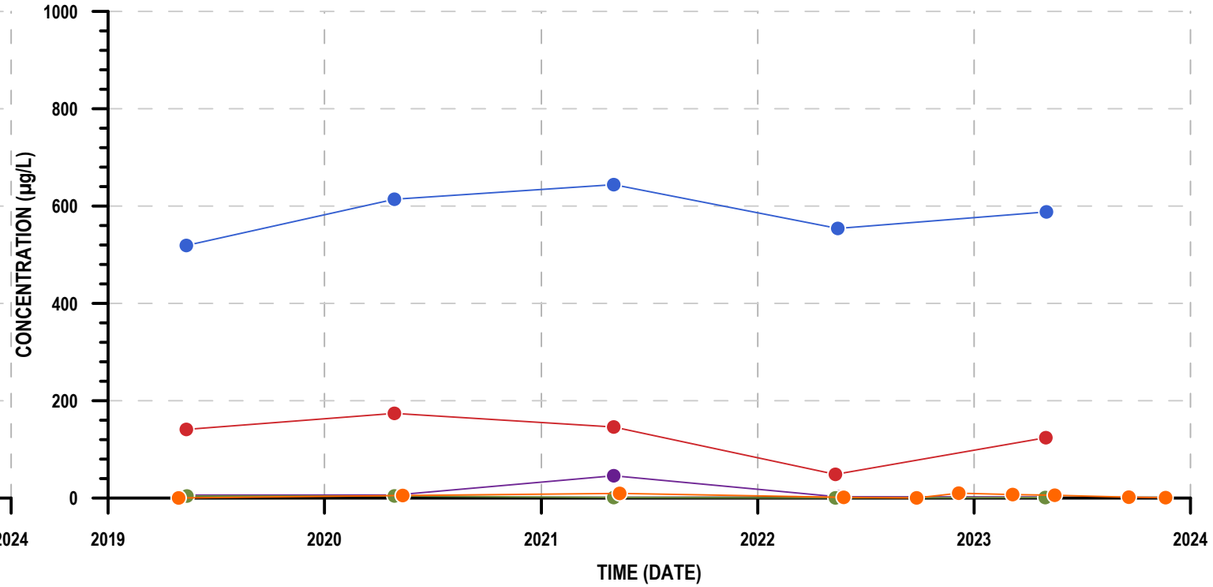
FIGURE I-3

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-3 - Background (1).gpj
Plot Date: September 23 2024 8:09 AM

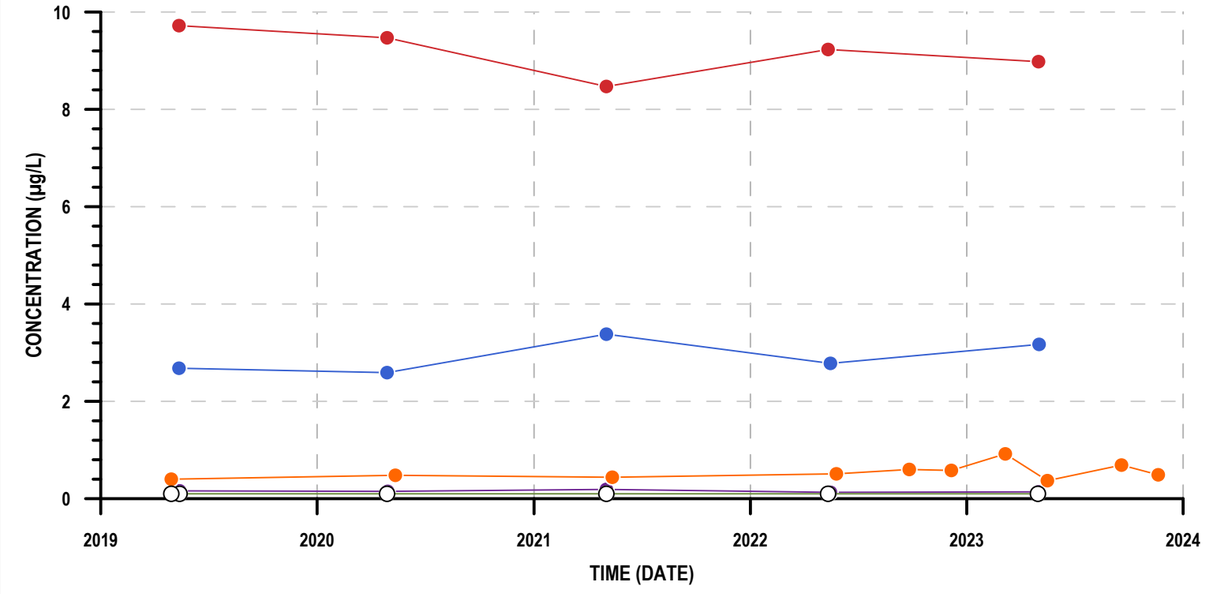
IRON



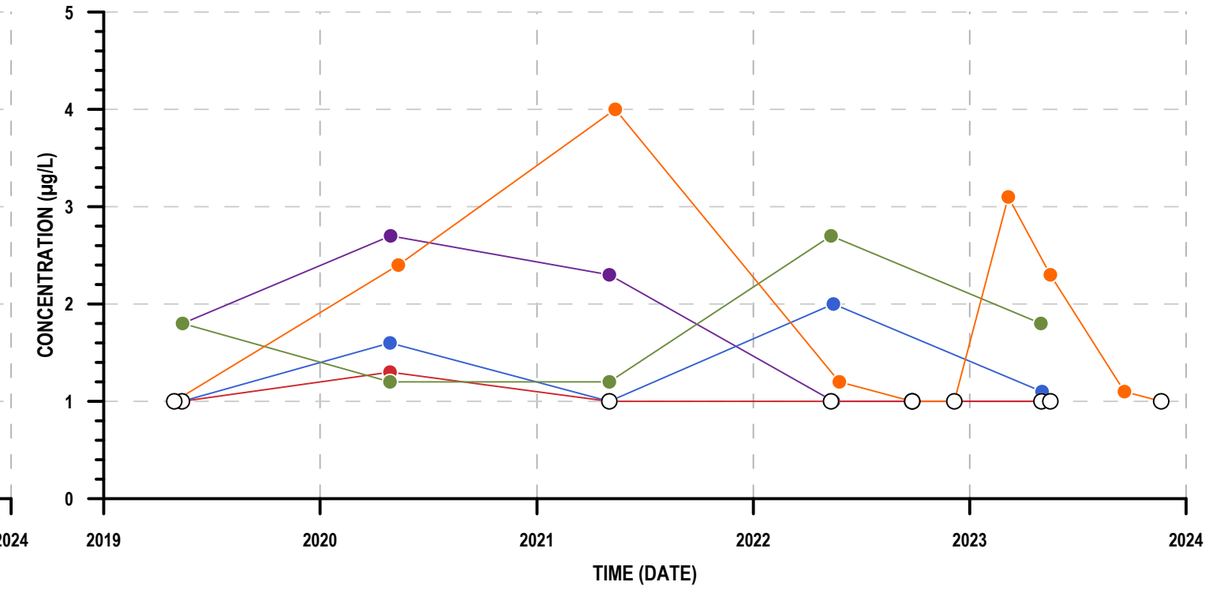
MANGANESE



ARSENIC



ZINC



LEGEND

S-MW-1 MW-02A-01 MW-03A-01 MW-07-01 MW-05-01 Non-Detect

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

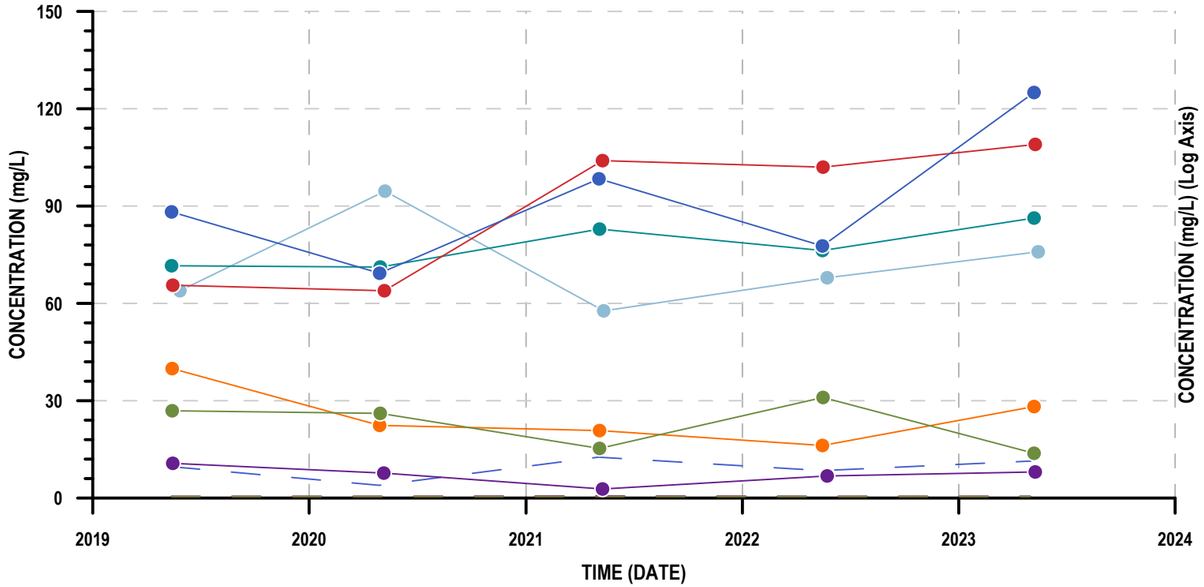
CONCENTRATION VERSUS TIME PLOTS
BACKGROUND WELLS

Project No. **12630729**
Date **September 2024**

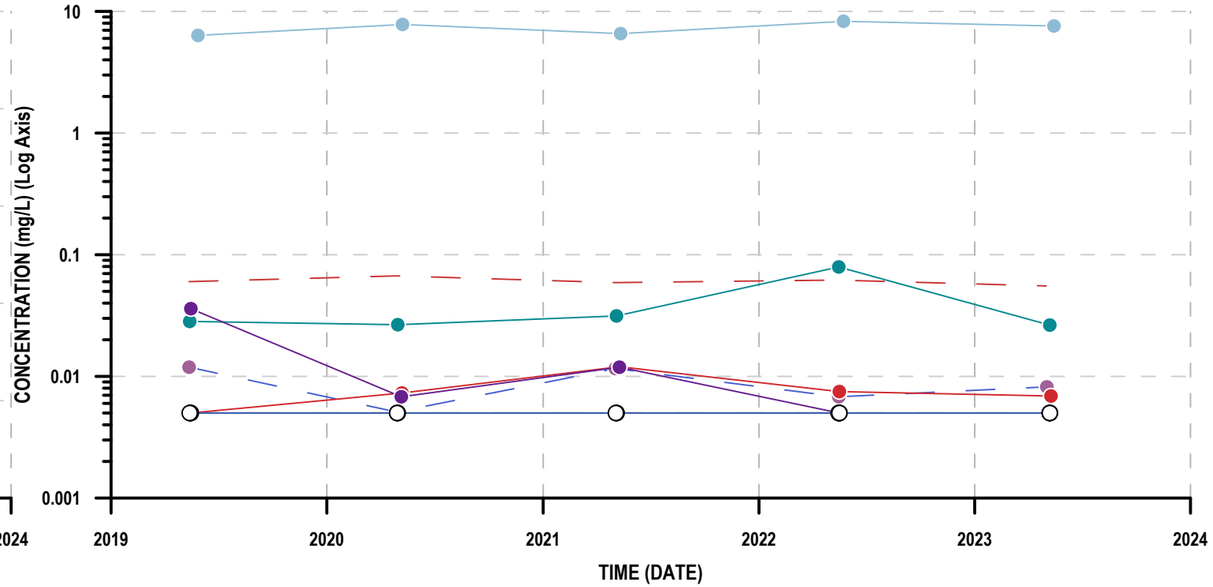
FIGURE I-4

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-4 - Background (2).gpj
Plot Date: September 23 2024 8:09 AM

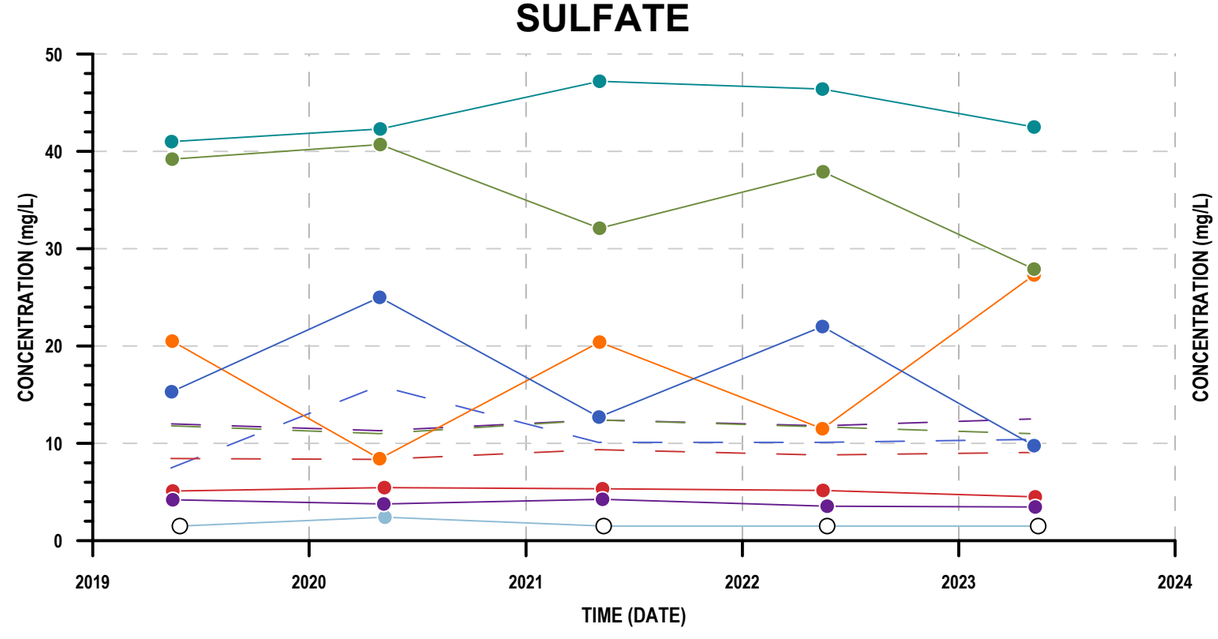
CHLORIDE



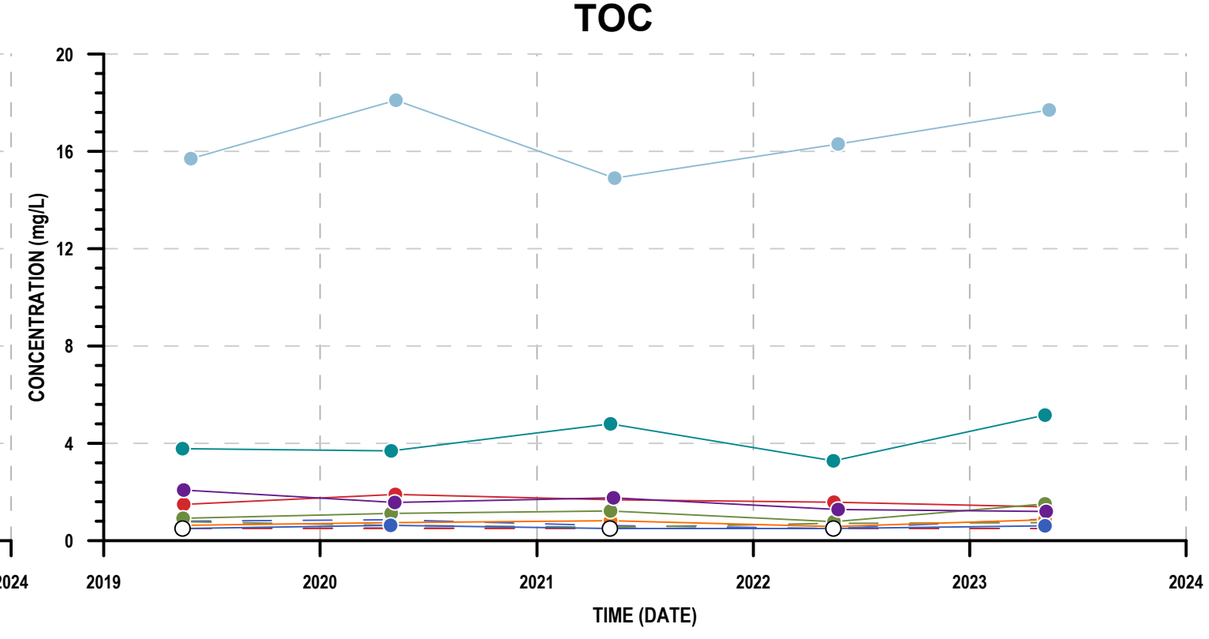
AMMONIA (as N)



SULFATE



TOC



LEGEND

MW-99-7D
MW-09-02S
MW-09-02D
81-1
81-3
81-4
200611
S-MW-1*
MW-02A-01*
MW-03A-01*
MW-07-01*
Non-Detect

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

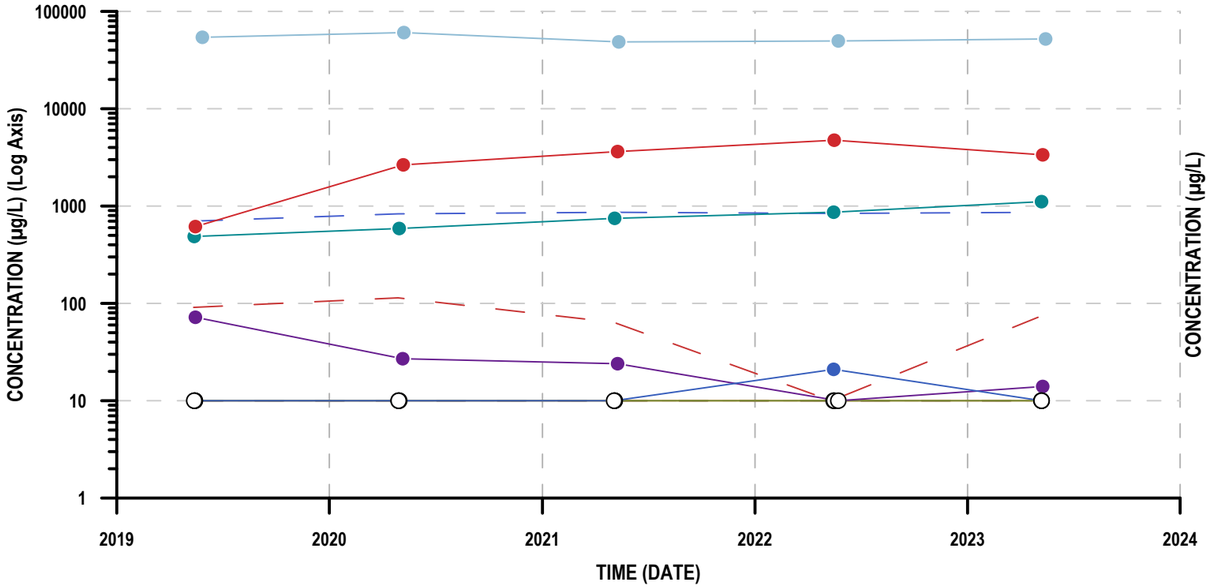
CONCENTRATION VERSUS TIME PLOTS
NCAZ WELLS

Project No. **12630729**
Date **July 2024**

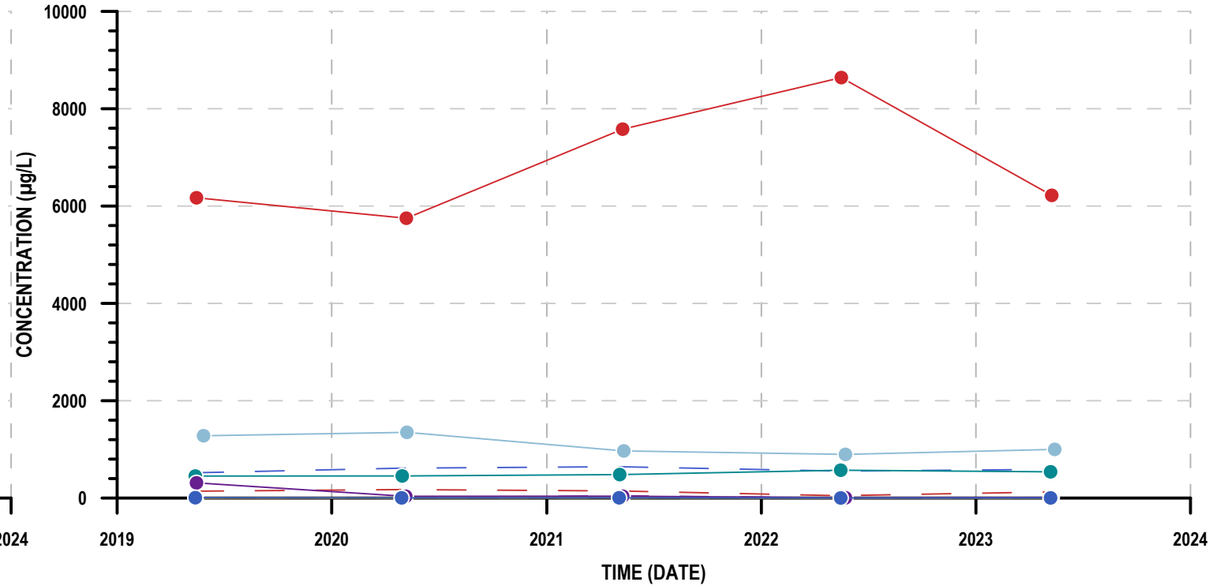
FIGURE I-5

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-5 - NCAZ (1).gpj
Plot Date: July 19 2024 11:07 AM

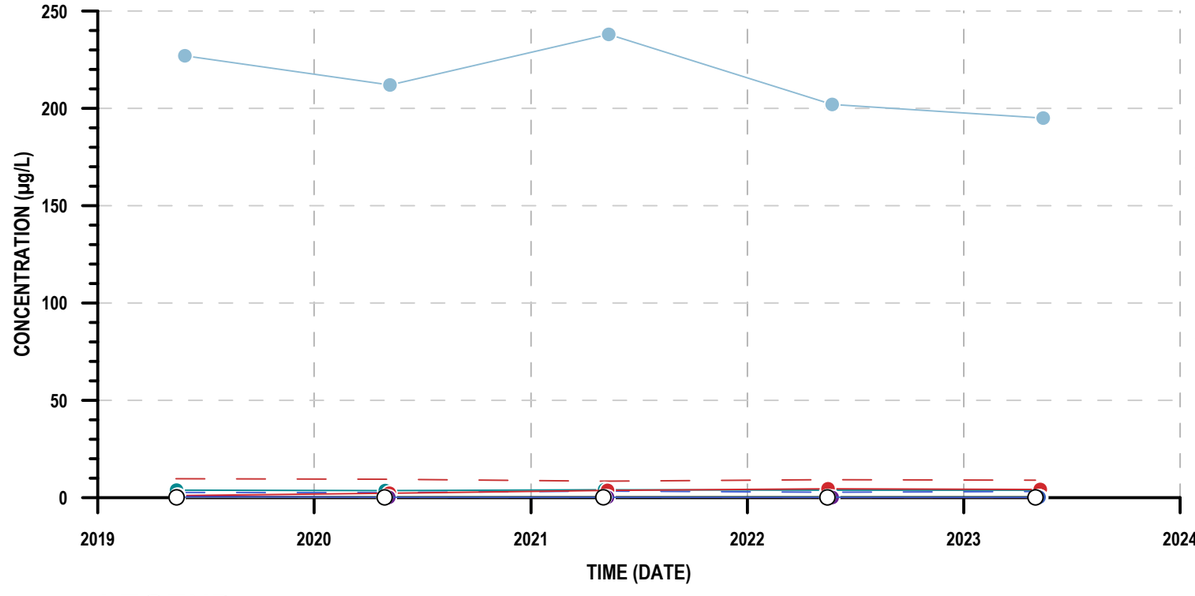
IRON



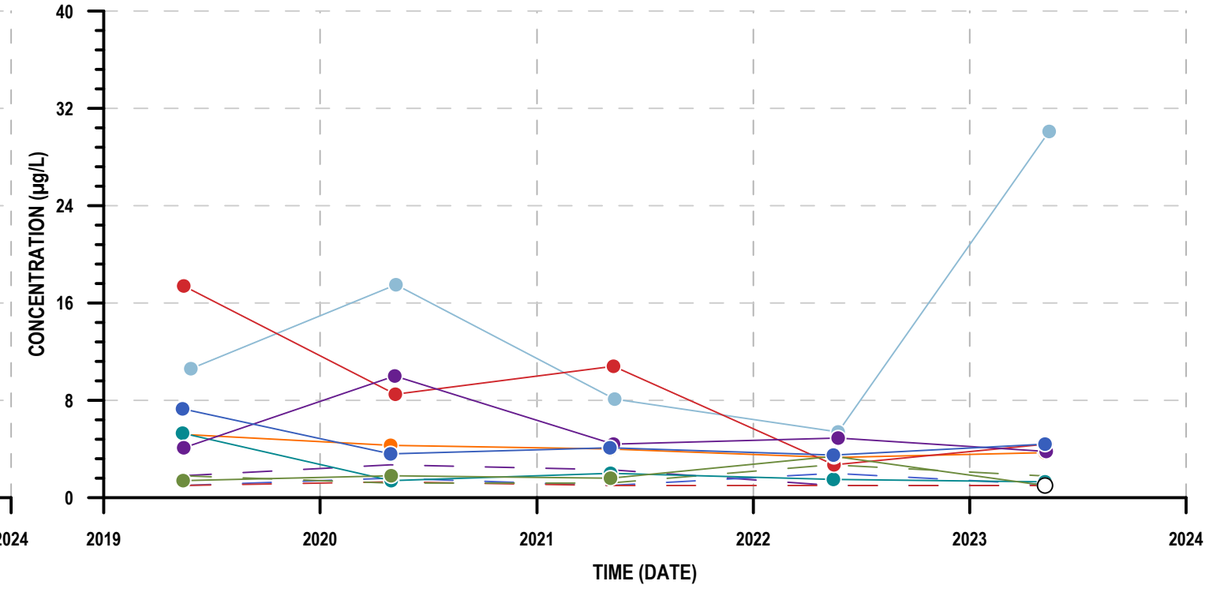
MANGANESE



ARSENIC



ZINC



LEGEND

MW-99-7D
MW-09-02S
MW-09-02D
81-1
81-3
81-4
200611
S-MW-1*
MW-02A-01*
MW-03A-01*
MW-07-01*
Non-Detect

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

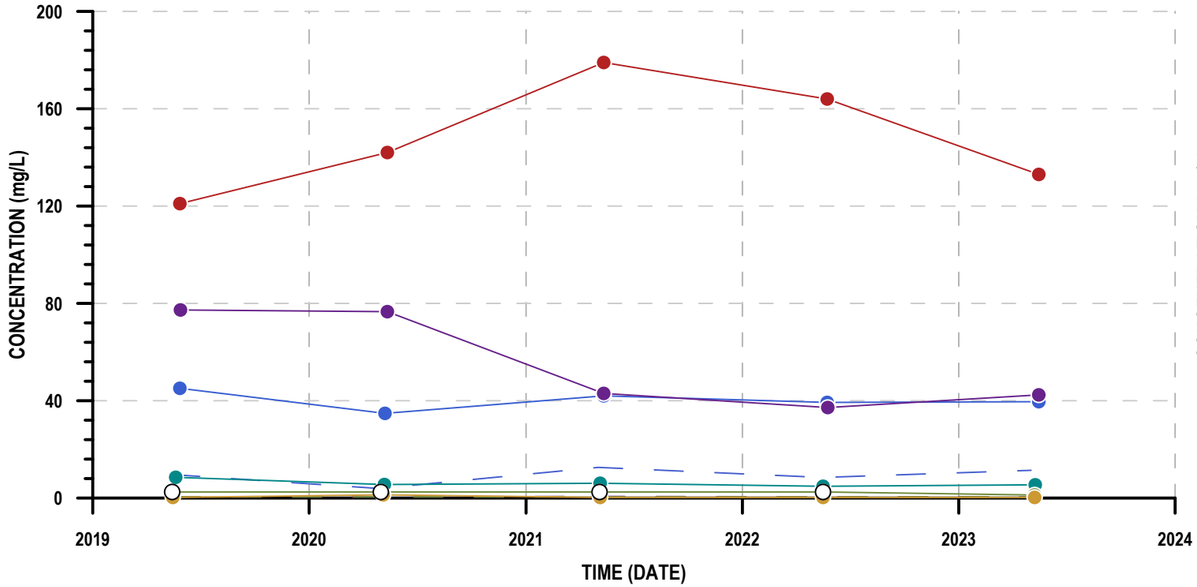
CONCENTRATION VERSUS TIME PLOTS
NCAZ WELLS

Project No. **12630729**
Date **July 2024**

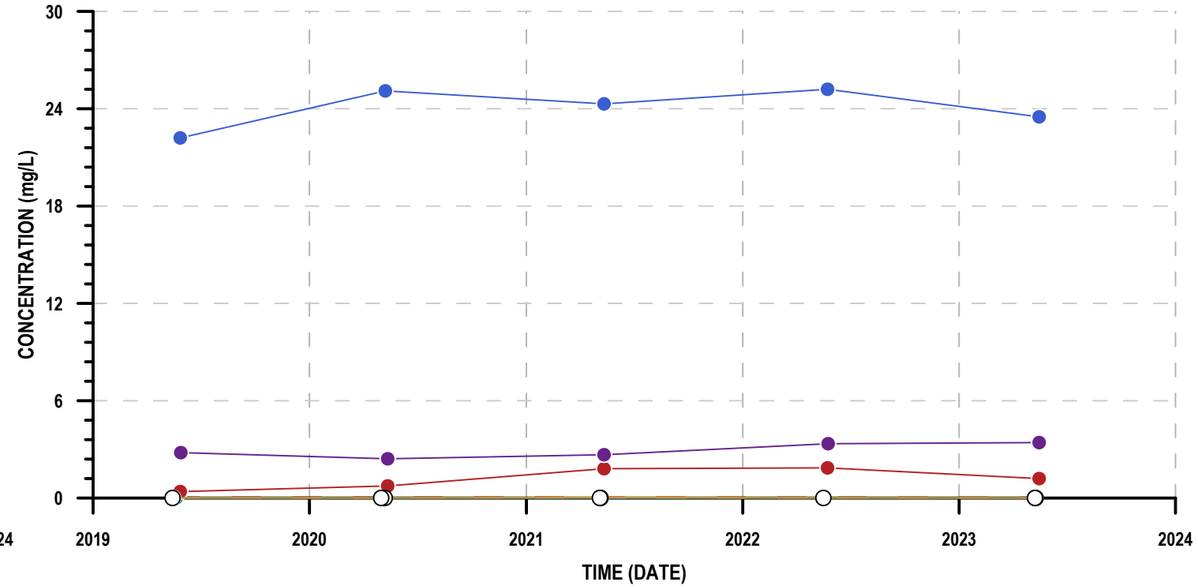
FIGURE I-6

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-6 - NCAZ (2).gpj
Plot Date: July 19 2024 11:07 AM

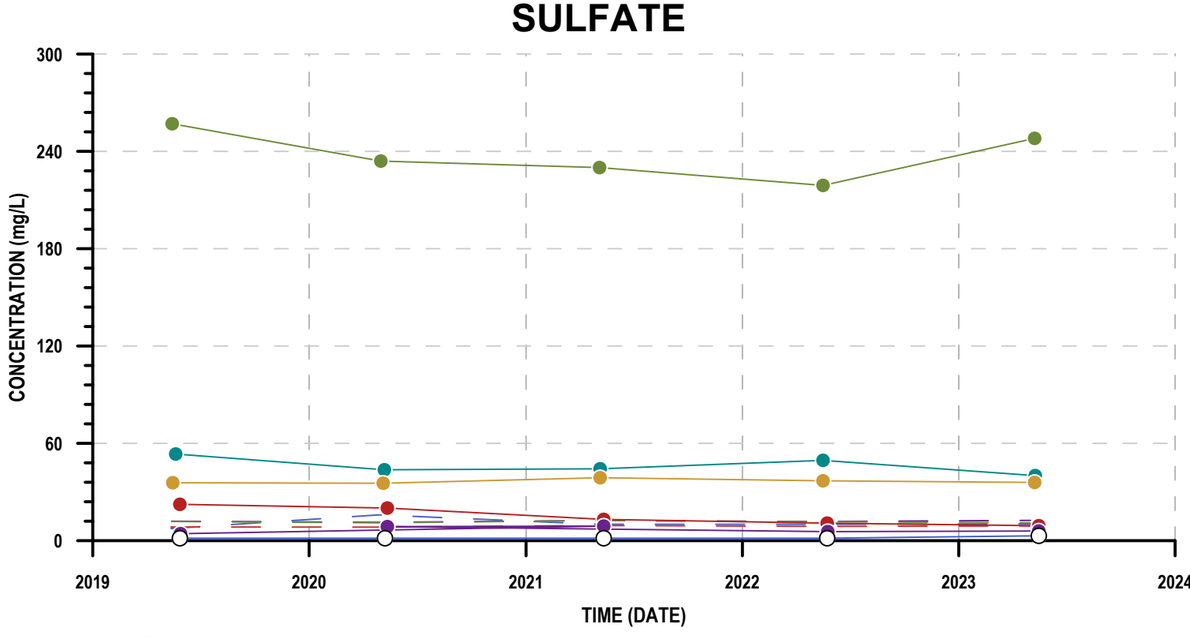
CHLORIDE



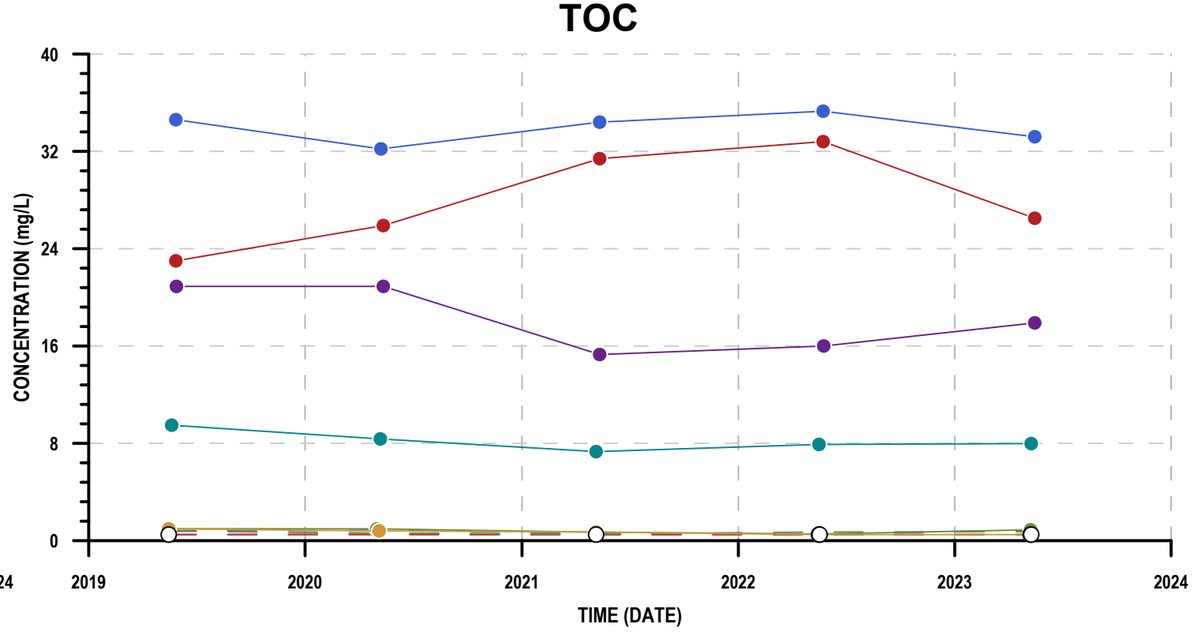
AMMONIA (as N)



SULFATE



TOC



LEGEND

E207637 · MW99-6S · S-MW-1* · MW-07-01*
S-MW-2 · MW-99-8 · MW-02A-01* · Non-Detect
MW99-3S · MW99-3D · MW-03A-01*

* Background wells included for comparison

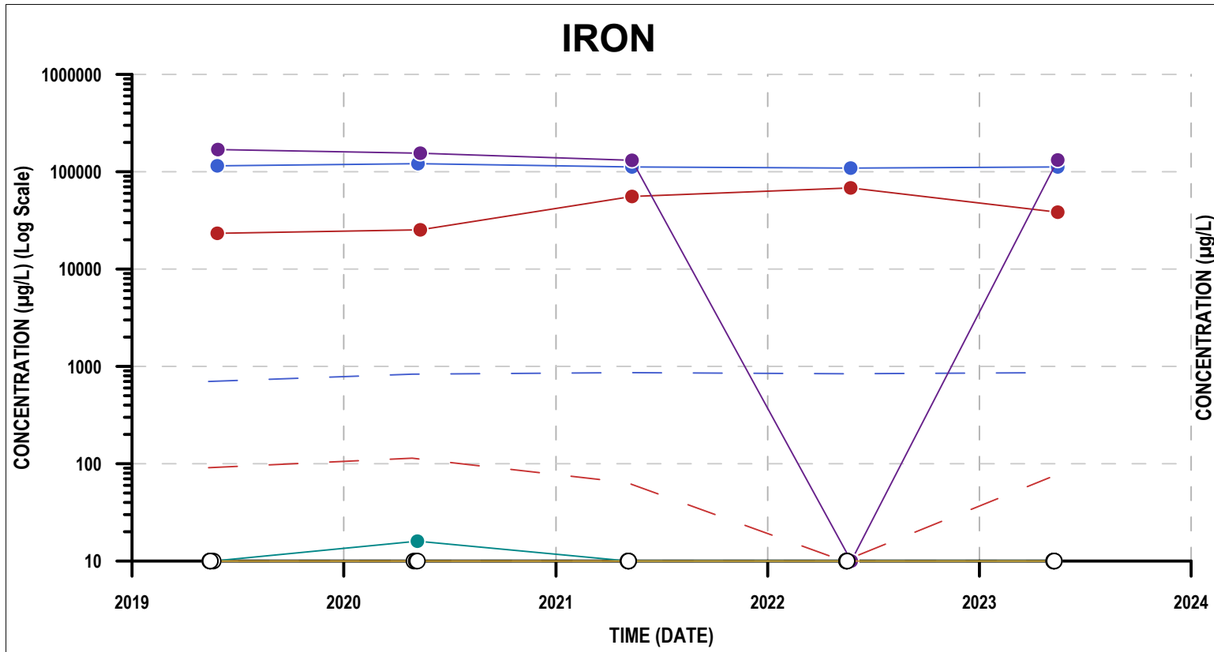
REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

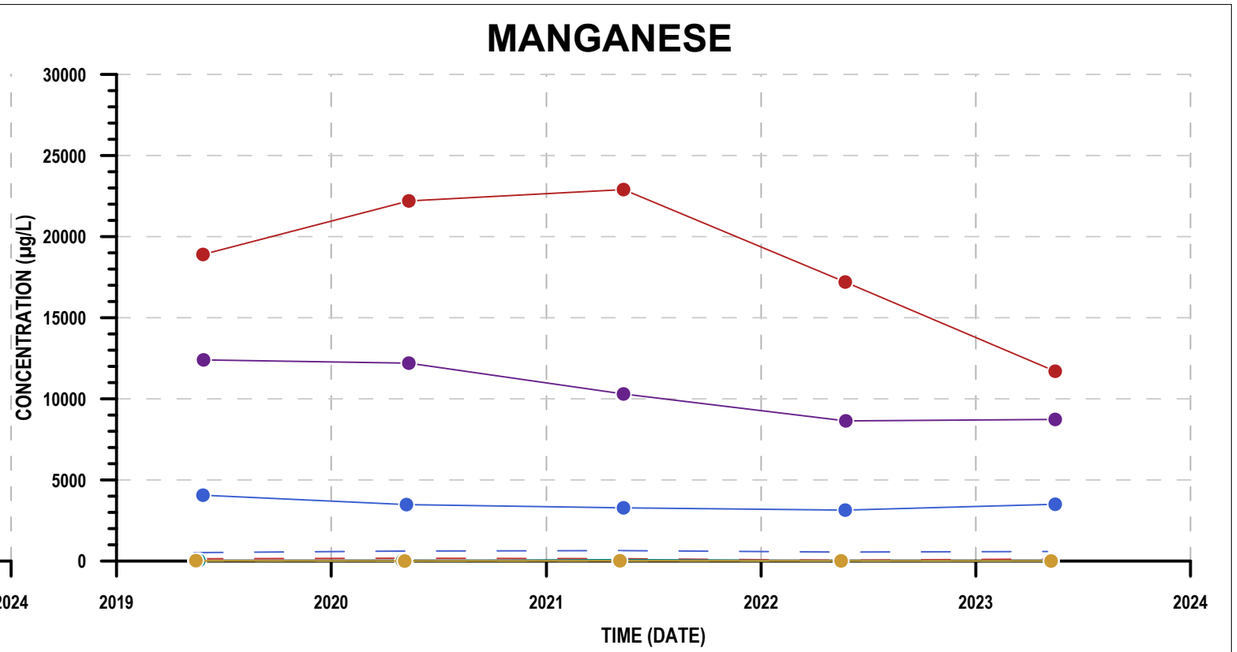
CONCENTRATION VERSUS TIME PLOTS
UPGRADIENT SCAZ WELLS

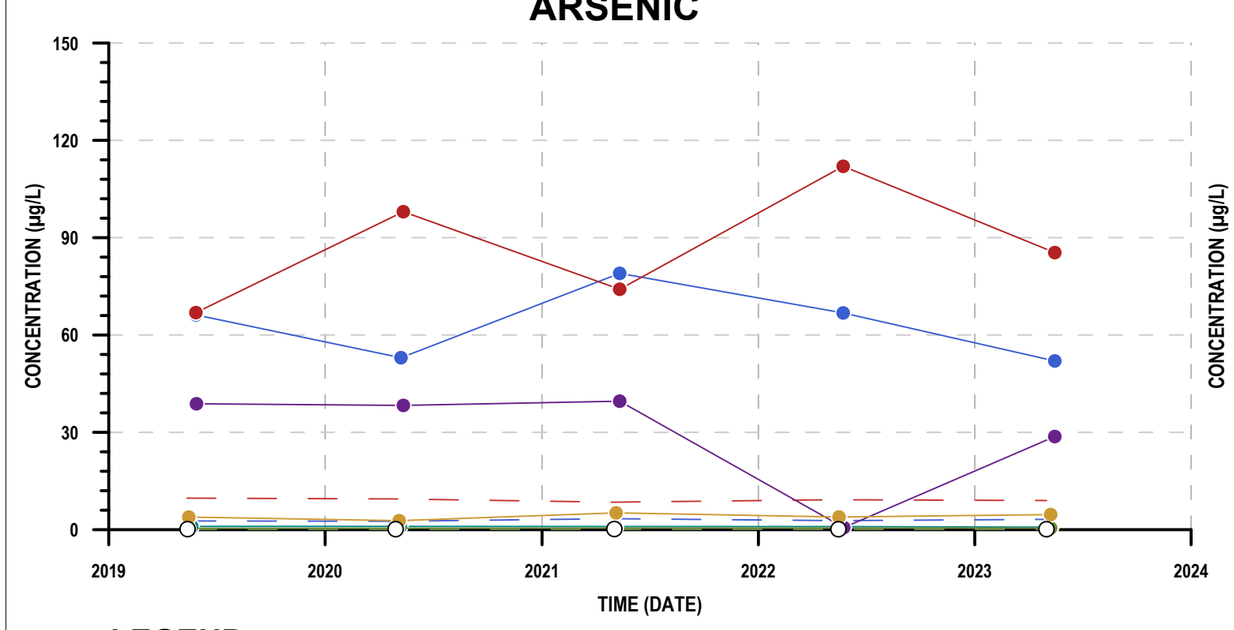
Project No. **12630729**
Date **July 2024**

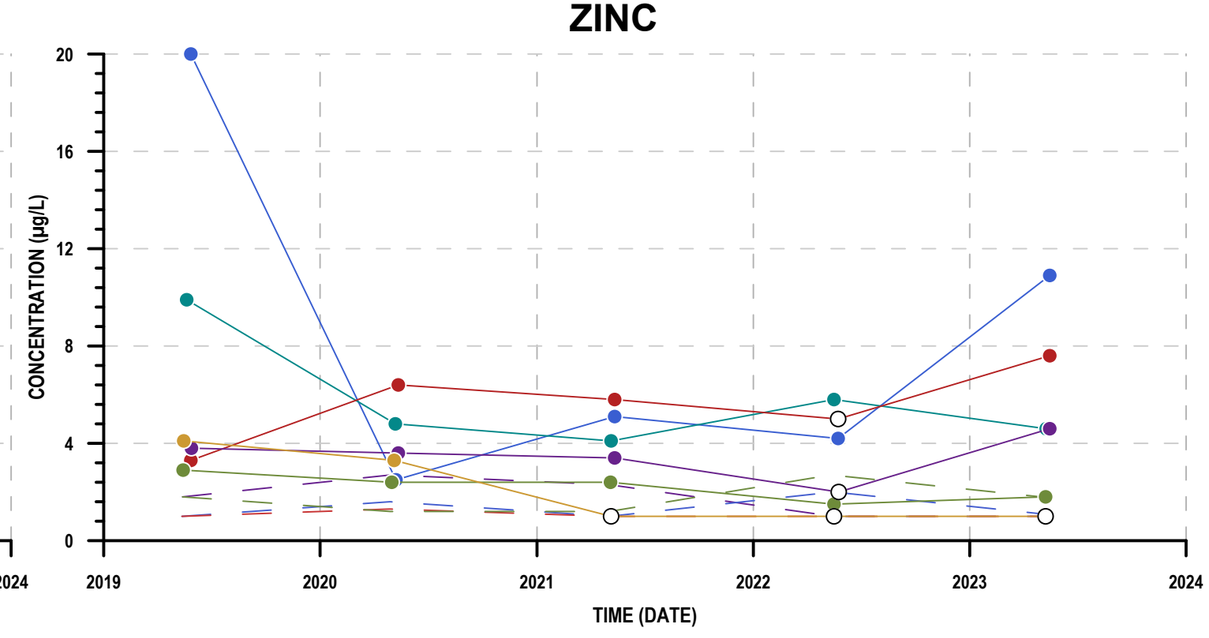
FIGURE I-7

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-7 - SCAZ Upgradient (1).gpj
Plot Date: July 19 2024 11:07 AM









LEGEND

E207637 · S-MW-2 · MW99-3S · MW99-6S · MW-99-8 · MW99-3D · S-MW-1* · MW-02A-01* · MW-03A-01* · MW-07-01* · Non-Detect

* Backround wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

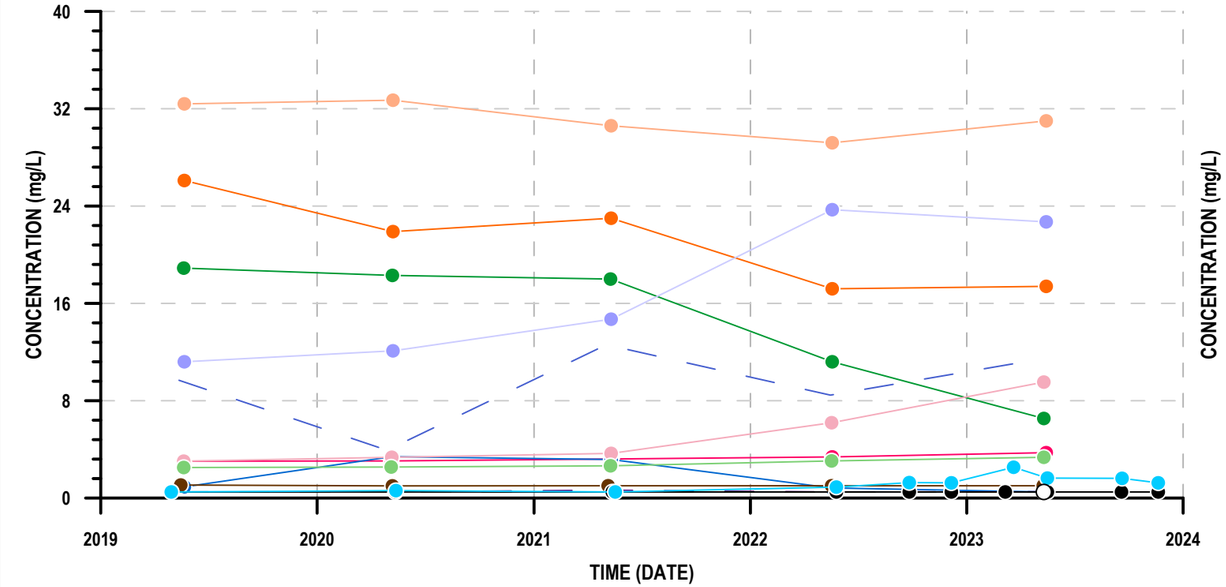
CONCENTRATION VERSUS TIME PLOTS
UPGRADIENT SCAZ WELLS

Project No. **12630729**
Date **July 2024**

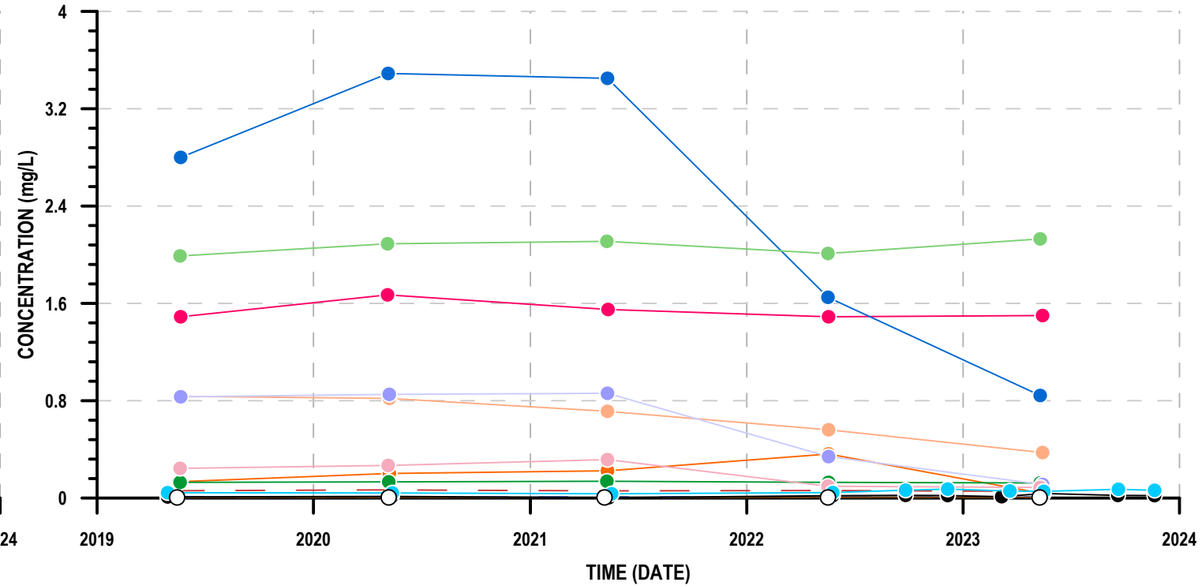
FIGURE I-8

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-8 - SCAZ Upgradient (2).gpj
Plot Date: July 05 2024 8:07 PM

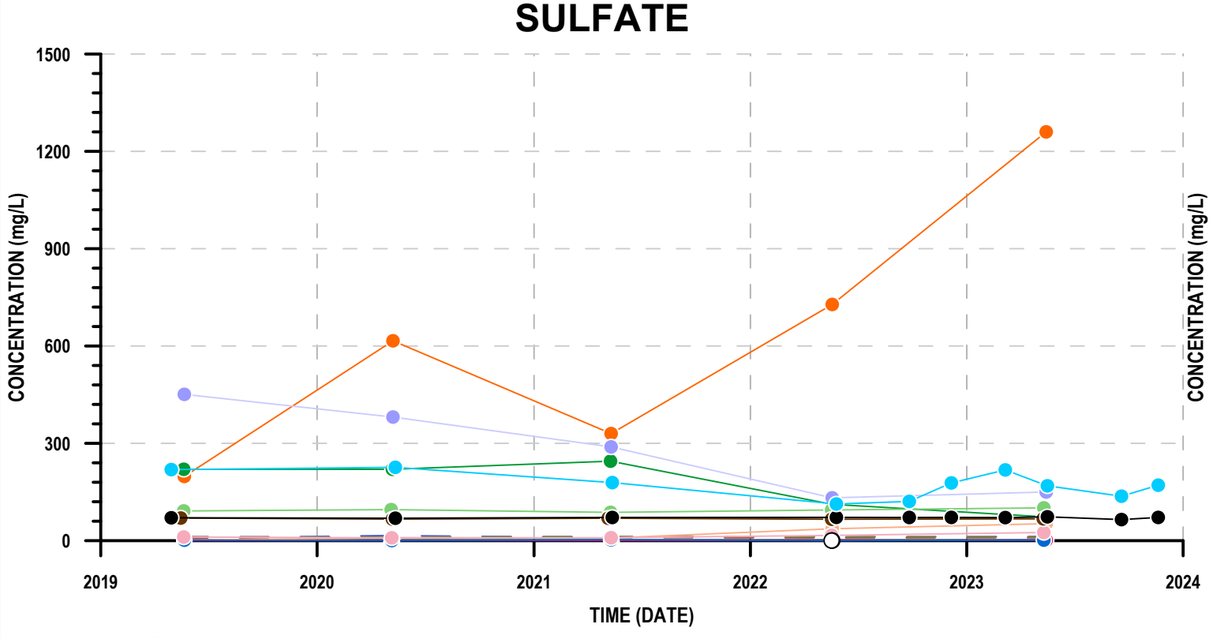
CHLORIDE



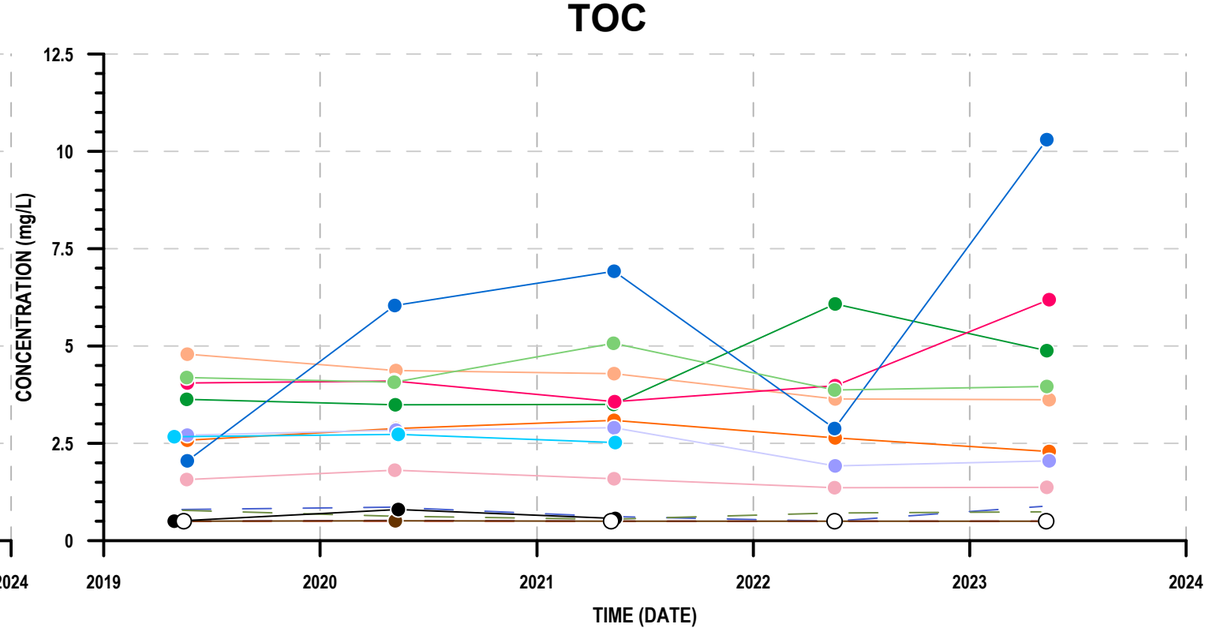
AMMONIA (as N)



SULFATE



TOC



LEGEND

MW-02S-03	MW-02-05	MW-01A-03	MW-02A-01*	
MW-02D-03	MW-03S-05	MW-99-2S	MW-03A-01*	
MW-01C-03	MW-04S-05	MW-99-2D	MW-07-01*	
MW-03S-03	MW-05-05	S-MW-1*	Non-Detect	

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

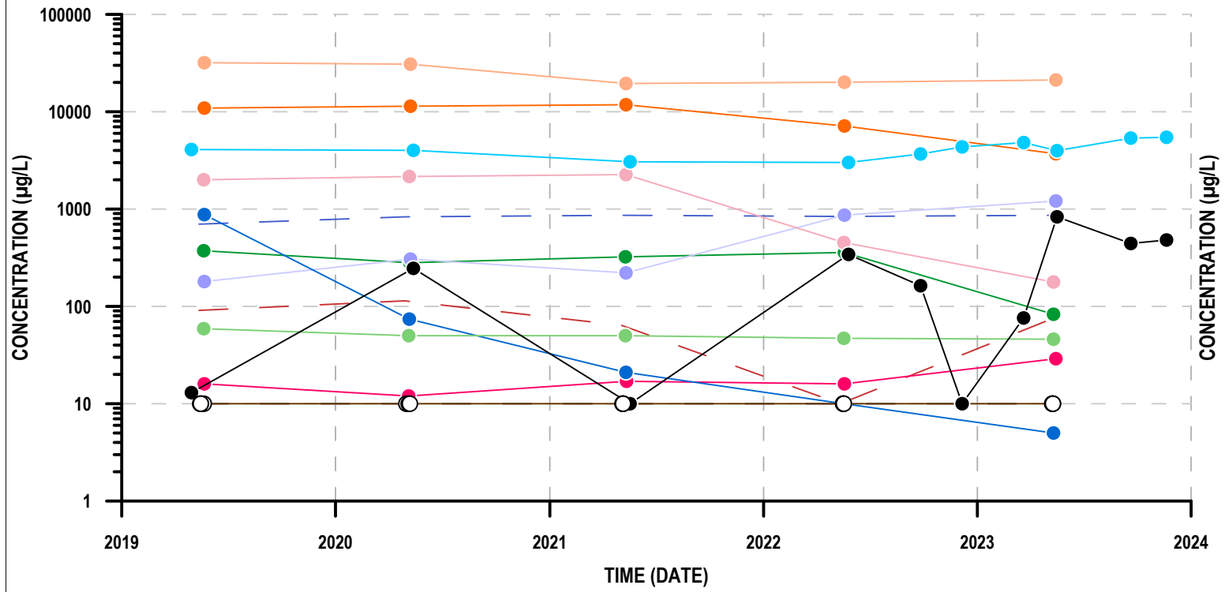
CONCENTRATION VERSUS TIME PLOTS
DOWNGRADIENT SCAZ WELLS

Project No. **12630729**
Date **September 2024**

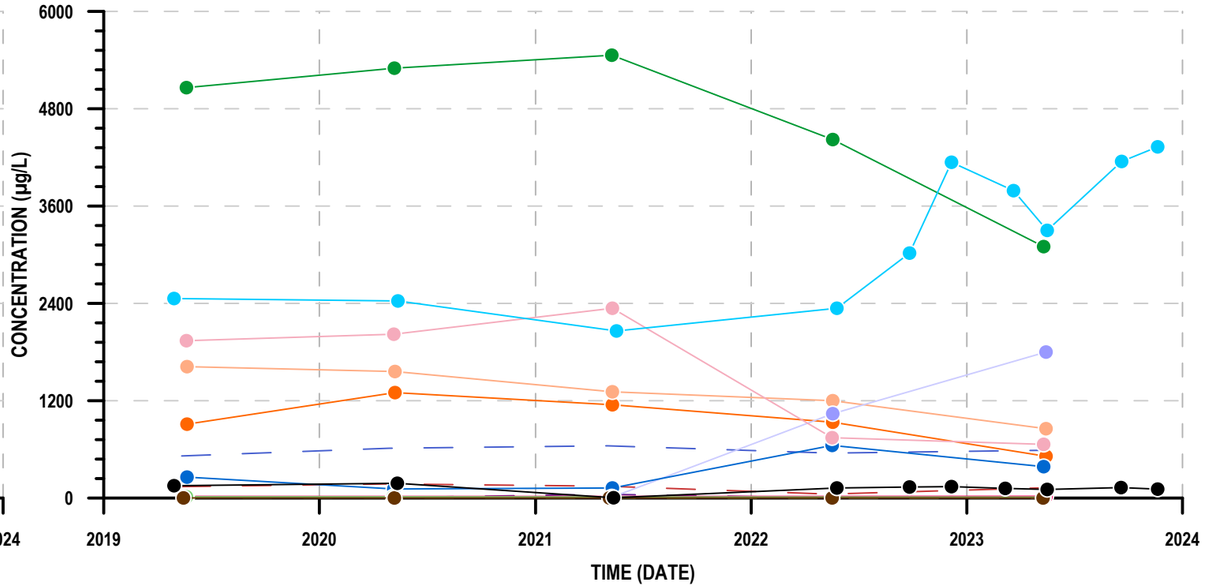
FIGURE I-9

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-9 - SCAZ Downgradient (1).gpj
Plot Date: September 23 2024 8:09 AM

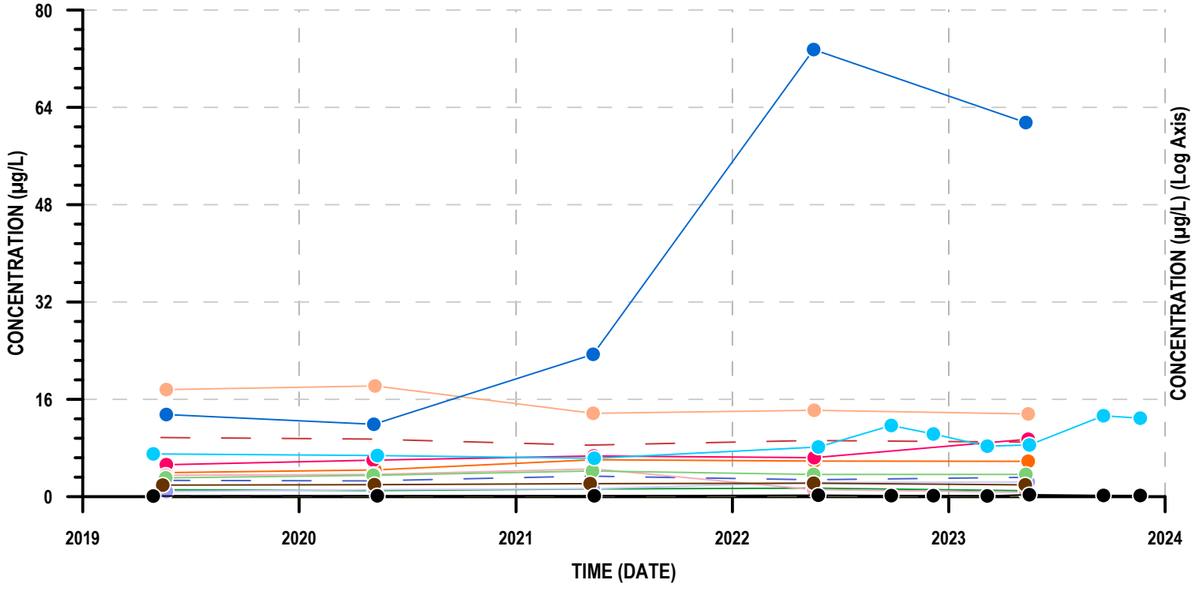
IRON



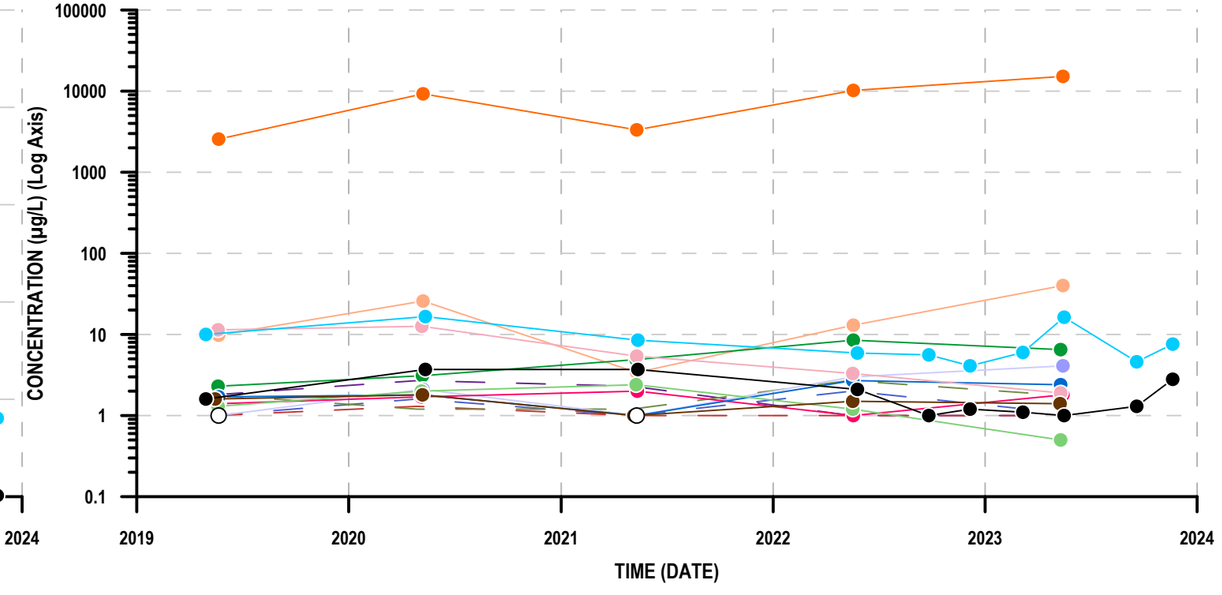
MANGANESE



ARSENIC



ZINC



LEGEND

- MW-02S-03
- MW-02-05
- MW-01A-03
- MW-02A-01*
- MW-02D-03
- MW-03S-05
- MW99-2S
- MW-03A-01*
- MW-01C-03
- MW-04S-05
- MW-99-2D
- MW-07-01*
- MW-03S-03
- MW-05-05
- S-MW-1*
- Non-Detect

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

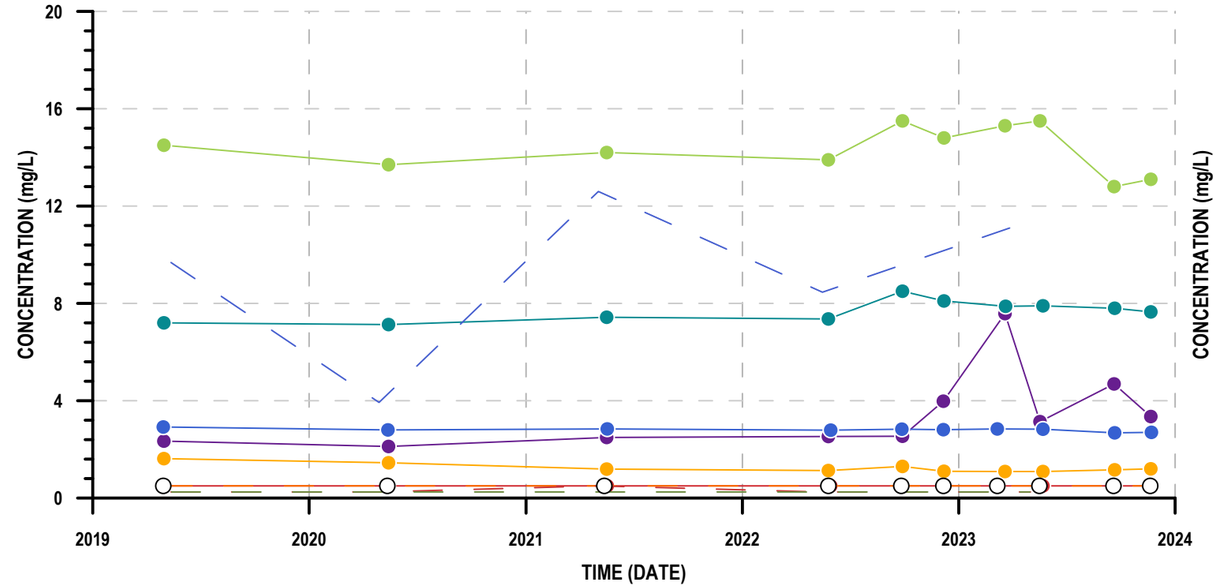
CONCENTRATION VERSUS TIME PLOTS DOWNGRADIENT SCAZ WELLS

Project No. **12630729**
Date **September 2024**

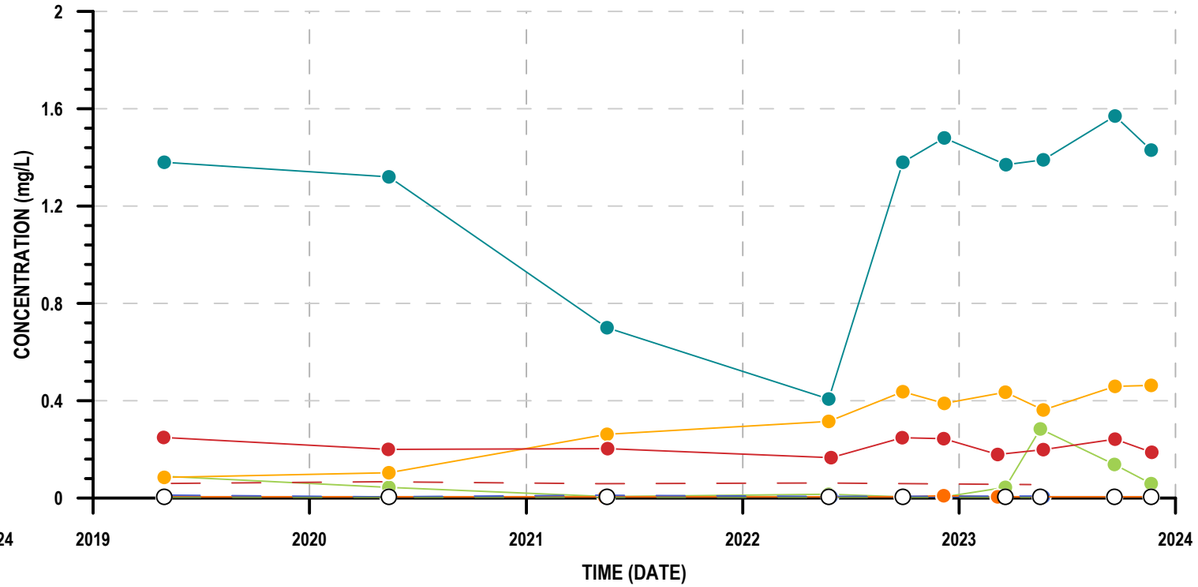
FIGURE I-10

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-10 - SCAZ Downgradient (2).gpj
Plot Date: September 23 2024 8:09 AM

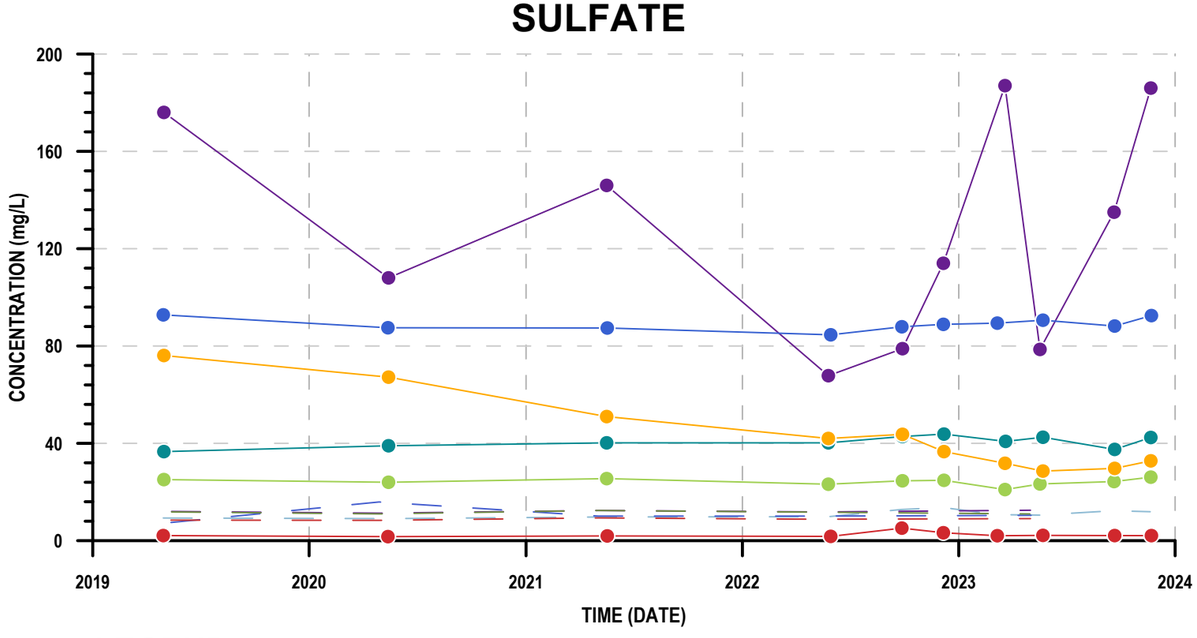
CHLORIDE



AMMONIA (as N)



SULFATE



TOC



LEGEND

- MW-01-2004 (S)
- MW-01-2004 (D)
- MW99-1S
- MW99-1D
- MW-02-2004 (S)
- MW-02-2004 (D)
- MW-05-01*
- S-MW-1*
- MW-02A-01*
- MW-03A-01*
- MW-07-01*
- Non-Detect

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

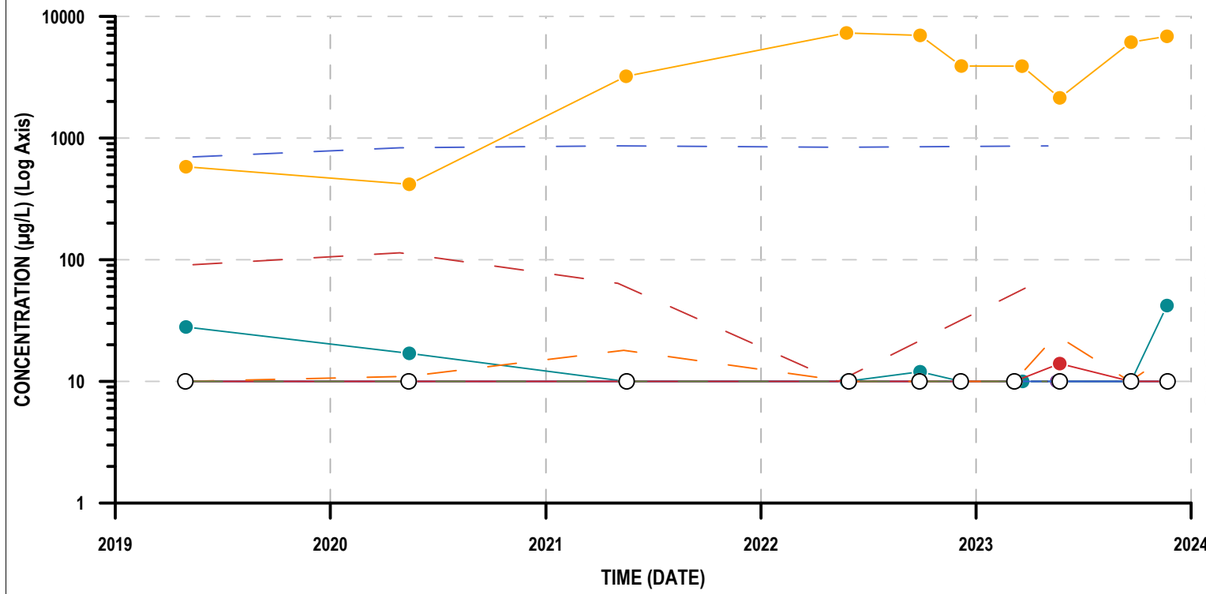
CONCENTRATION VERSUS TIME PLOTS
TSF DOWNGRADIENT

Project No. **12630729**
Date **September 2024**

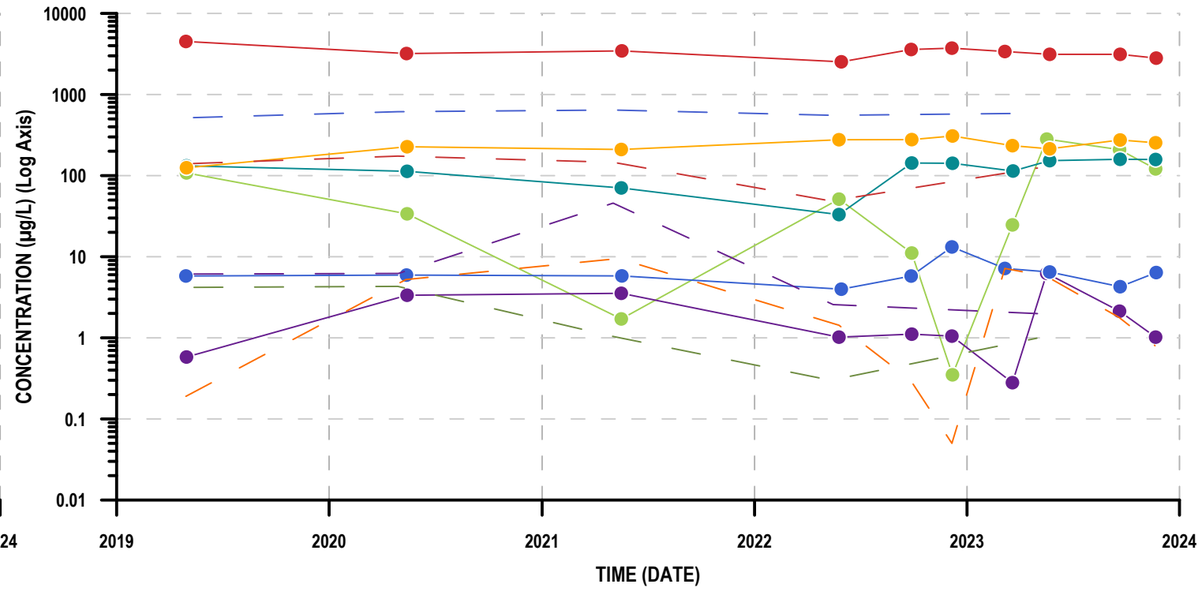
FIGURE I-11

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-11 - TSF Downgradient (1).gpj
Plot Date: September 23 2024 8:09 AM

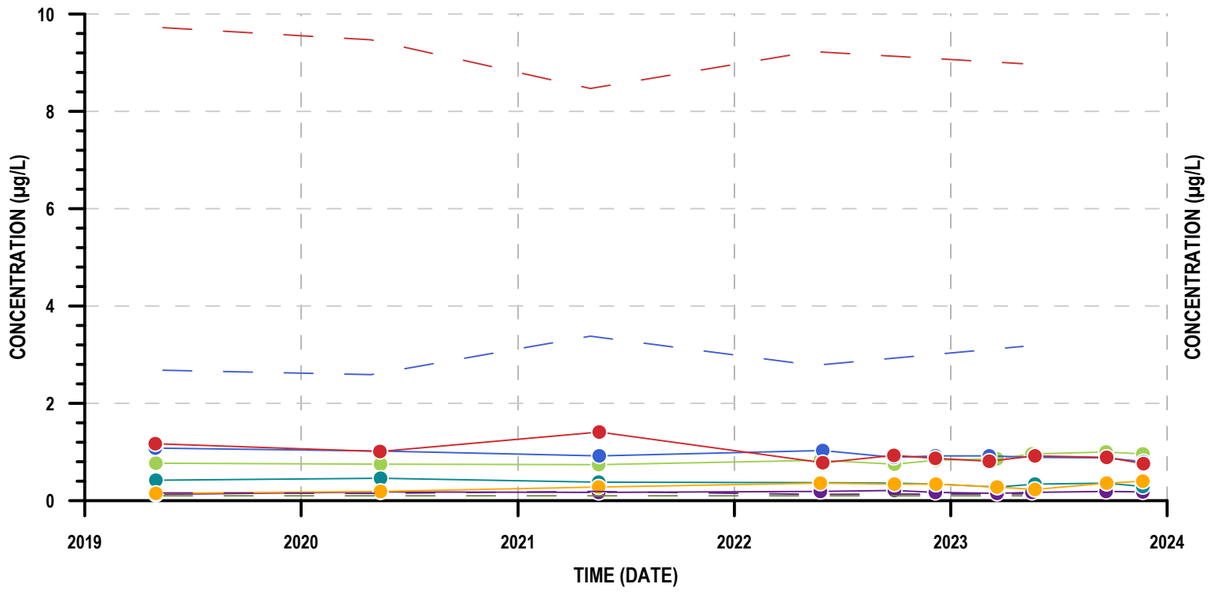
IRON



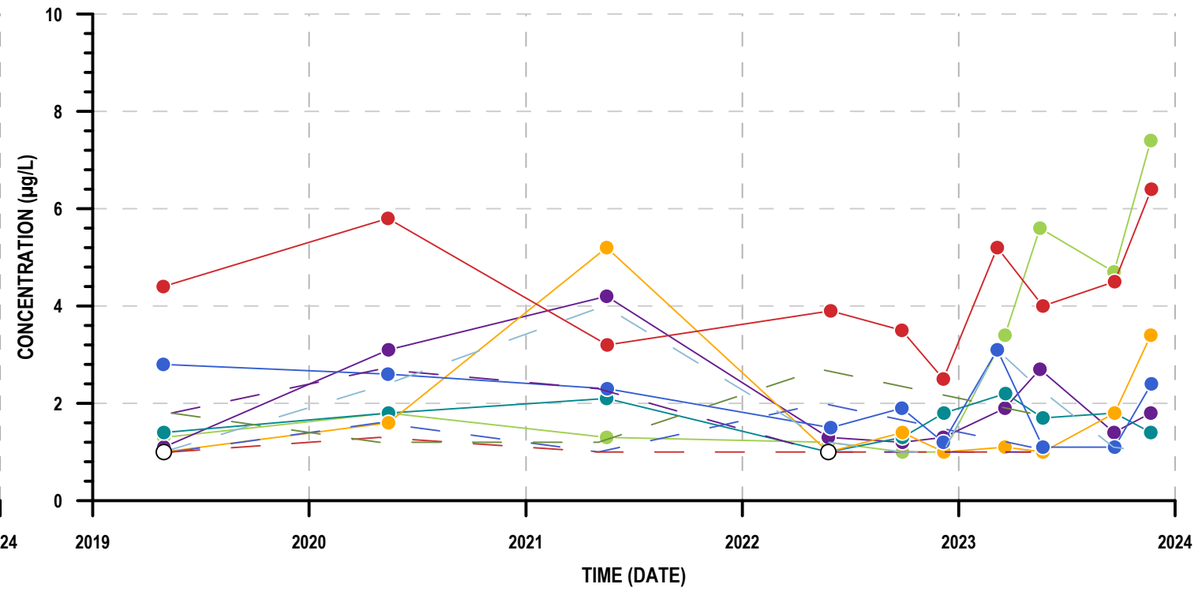
MANGANESE



ARSENIC



ZINC



LEGEND

- MW-01-2004 (S)
- MW-01-2004 (D)
- MW99-1S
- MW99-1D
- MW-02-2004 (S)
- MW-02-2004 (D)
- MW-05-01*
- S-MW-1*
- MW-02A-01*
- MW-03A-01*
- MW-07-01*
- Non-Detect

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

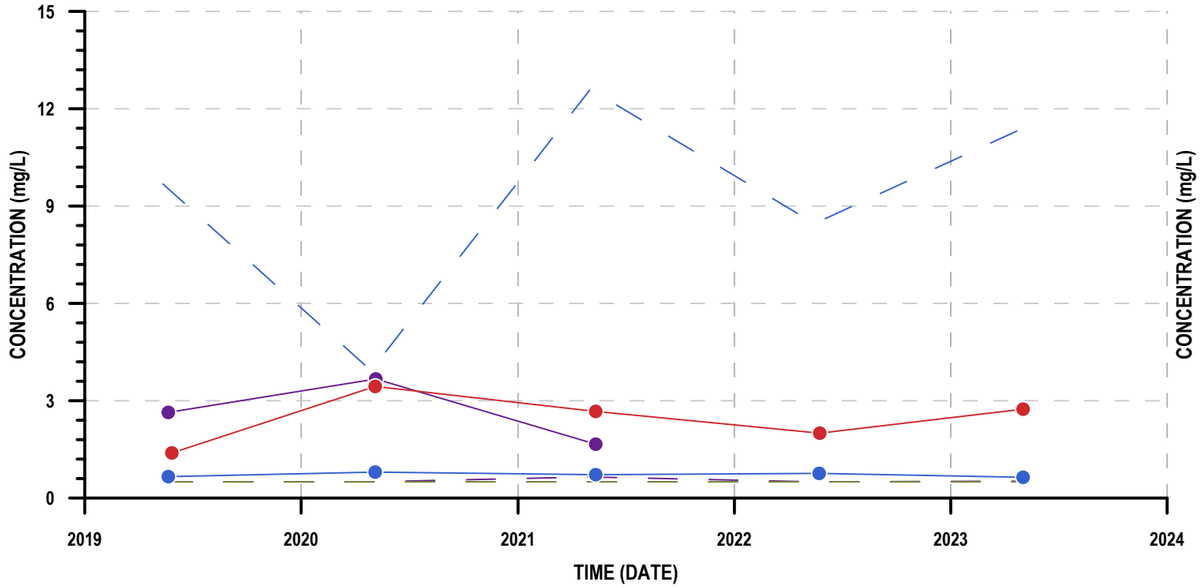
CONCENTRATION VERSUS TIME PLOTS
TSF DOWNGRADIENT

Project No. **12630729**
Date **December 2024**

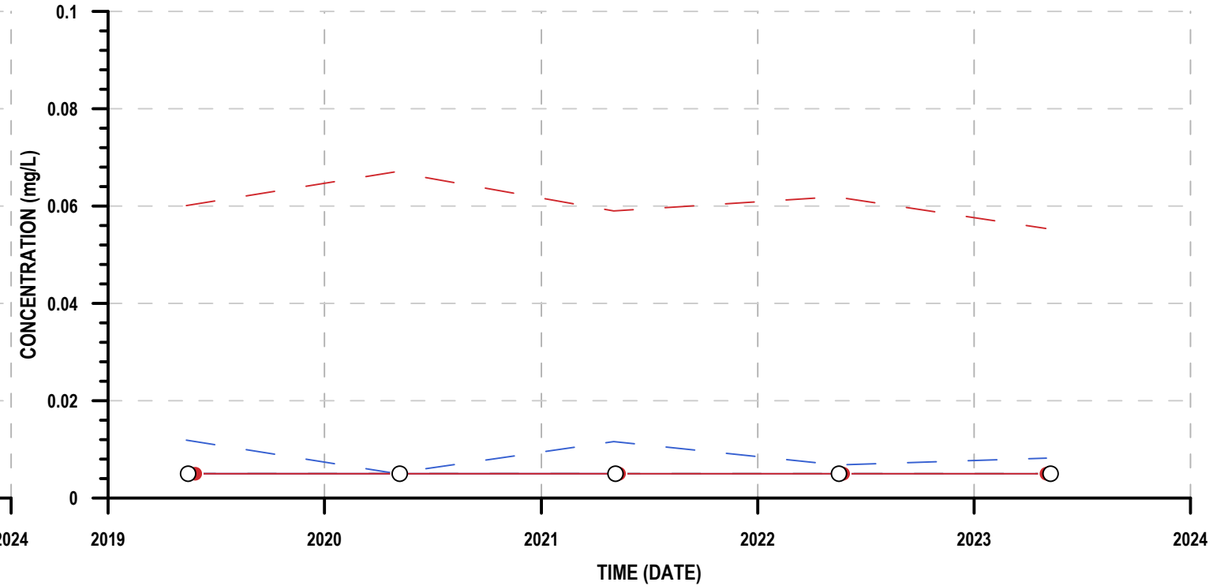
FIGURE I-12

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-12 - TSF Downgradient (2).gpj
Plot Date: December 18 2024 1:12 PM

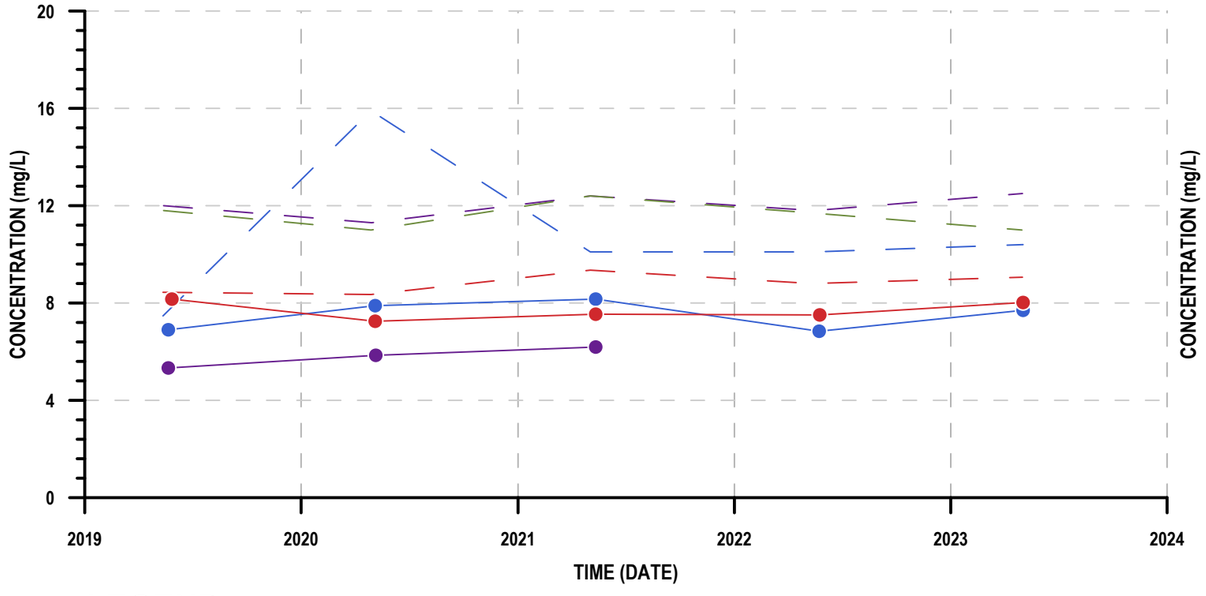
CHLORIDE



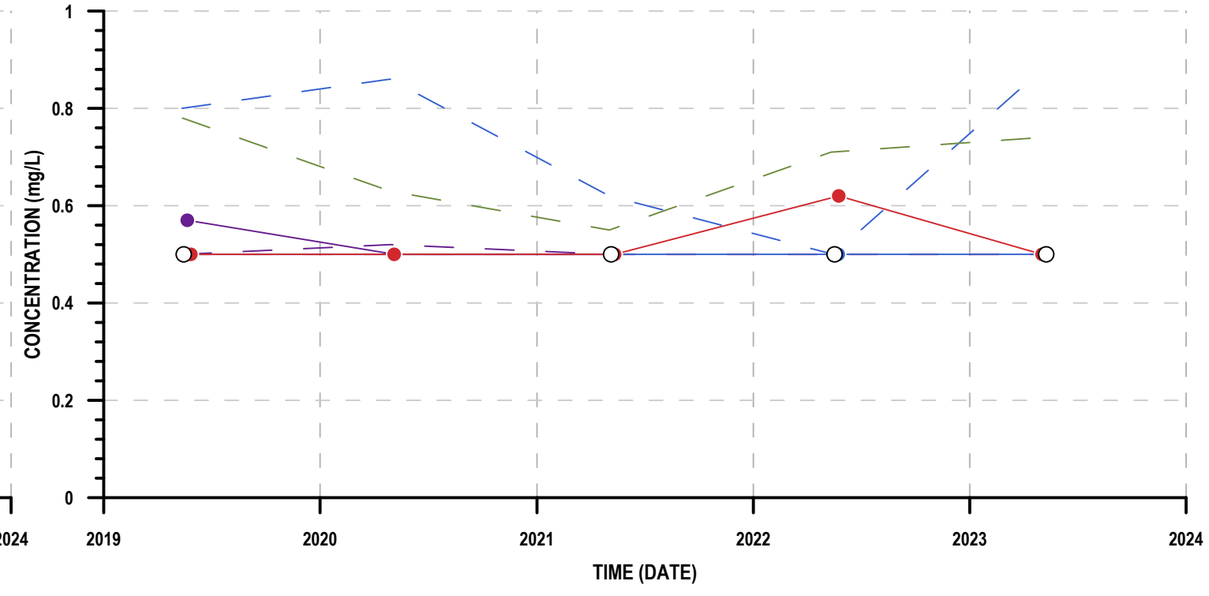
AMMONIA (as N)



SULFATE



TOC



LEGEND

110 Emerald Rd. — S-MW-1* — MW-07-01*

111 Emerald Rd. — MW-02A-01* — ○ ○ ○ Non-Detect

1780 Airport Rd. — MW-03A-01*

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

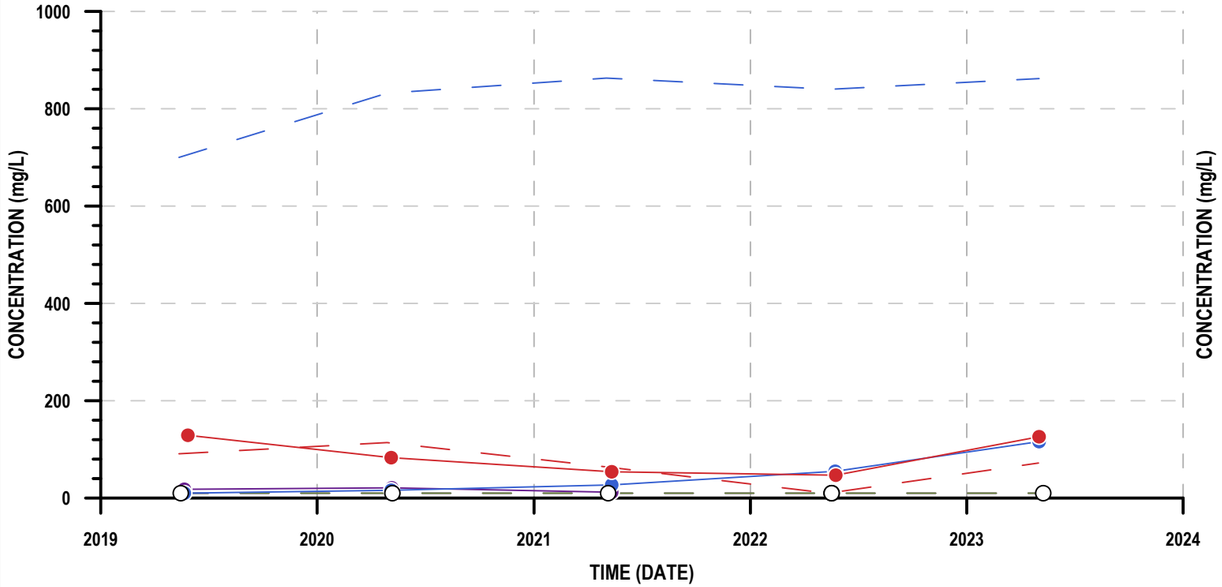
CONCENTRATION VERSUS TIME PLOTS
OFF-SITE RESIDENTIAL WELLS

Project No. **12630729**
Date **July 2024**

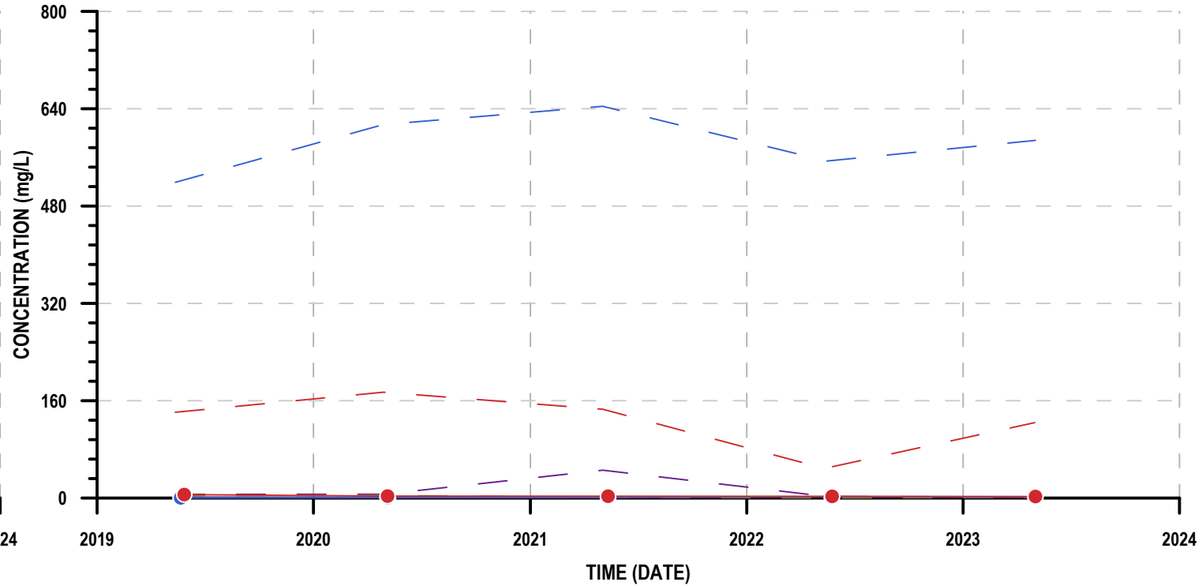
FIGURE I-13

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-13 - Off-Site Residential (1).gpj
Plot Date: July 22 2024 12:07 PM

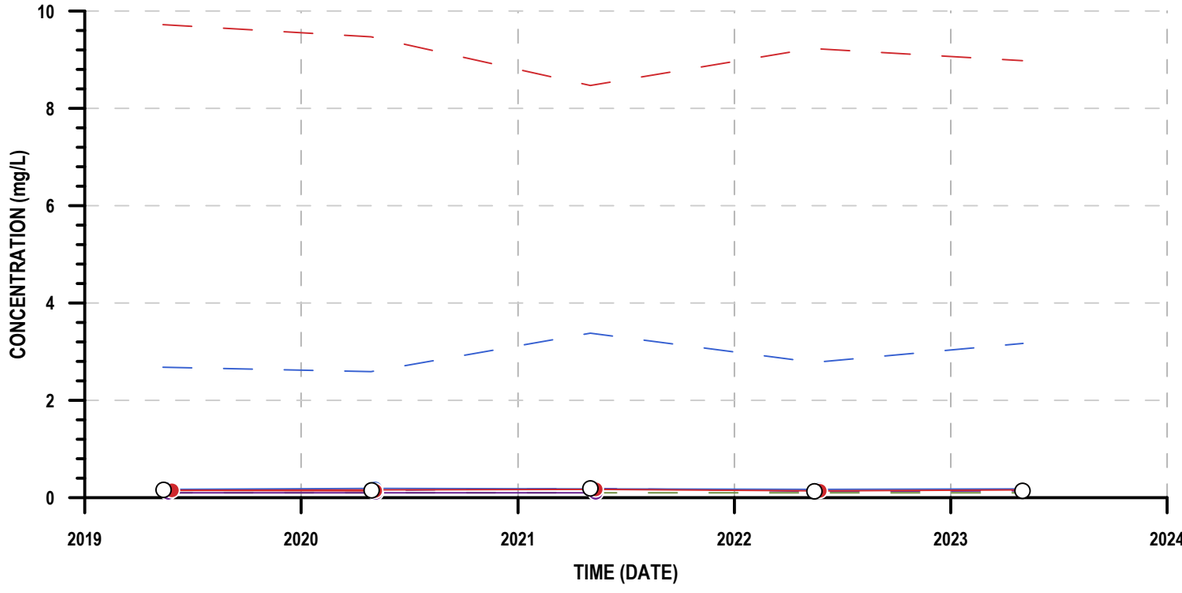
IRON



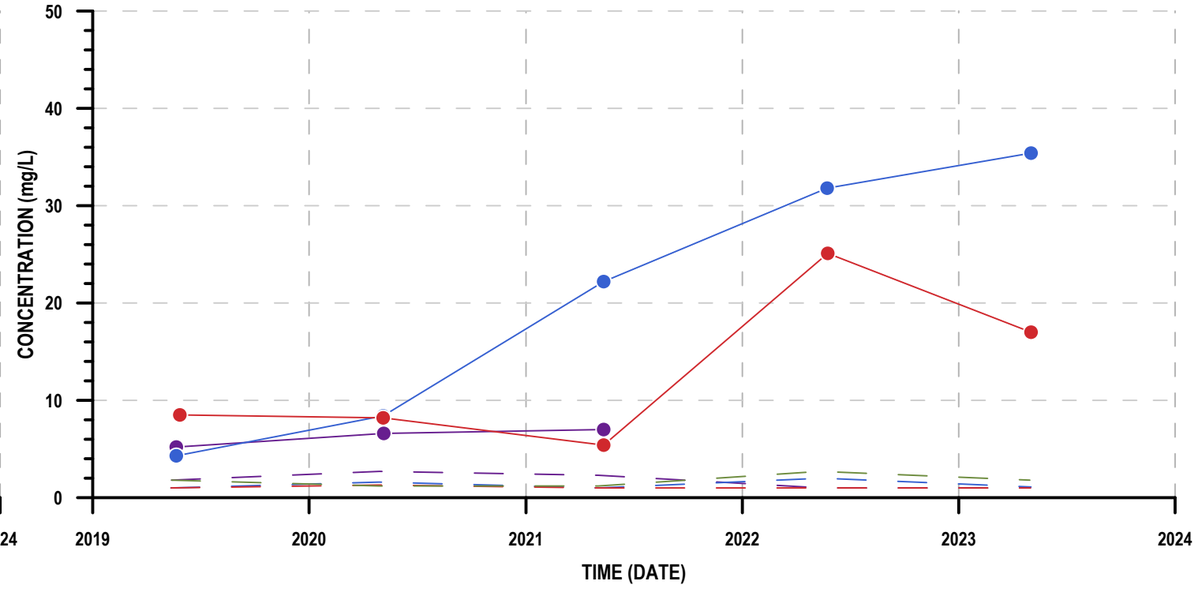
MANGANESE



ARSENIC



ZINC



LEGEND

110 Emerald Rd. — S-MW-1* — MW-07-01*

111 Emerald Rd. — MW-02A-01* — Non-Detect

1780 Airport Rd. — MW-03A-01*

* Background wells included for comparison

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

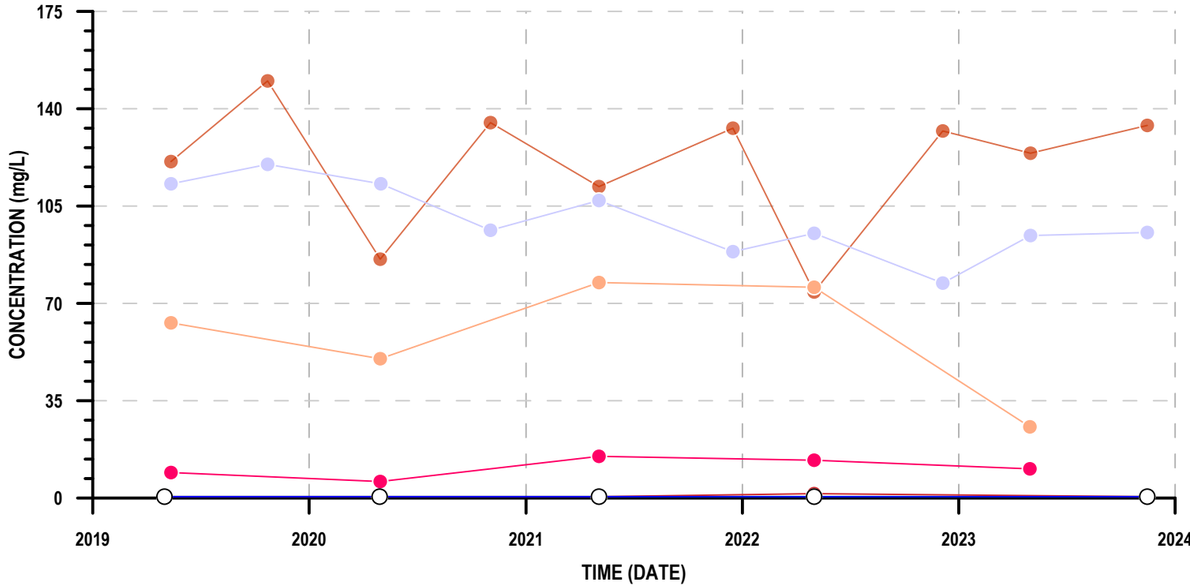
CONCENTRATION VERSUS TIME PLOTS
OFF-SITE RESIDENTIAL WELLS

Project No. **12630729**
Date **July 2024**

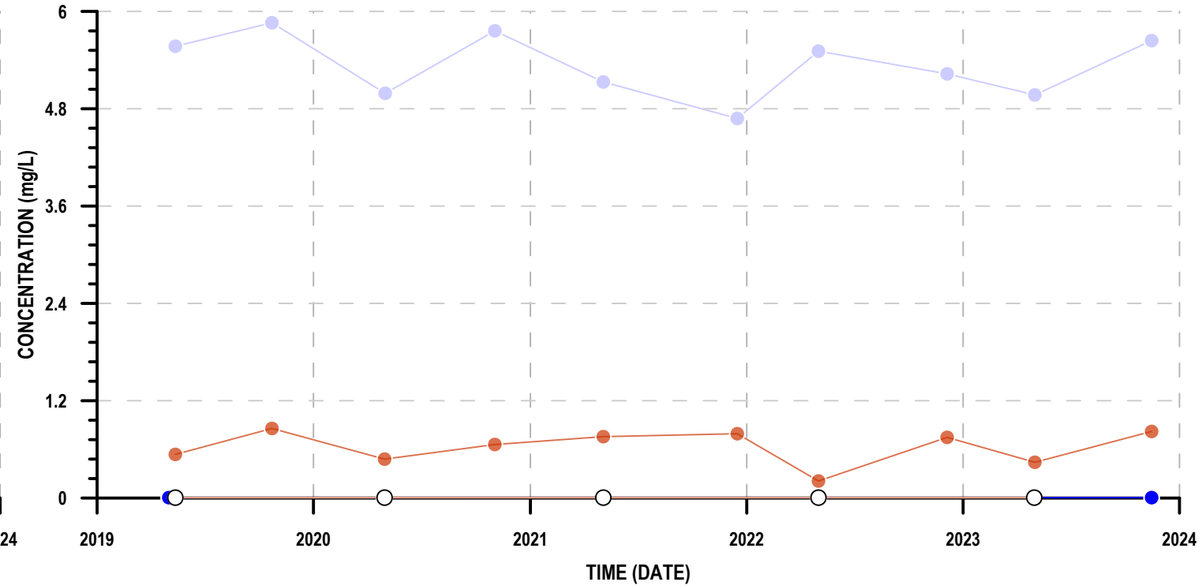
FIGURE I-14

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-14 - Off-Site Residential (2).gpj
Plot Date: July 22 2024 1:07 PM

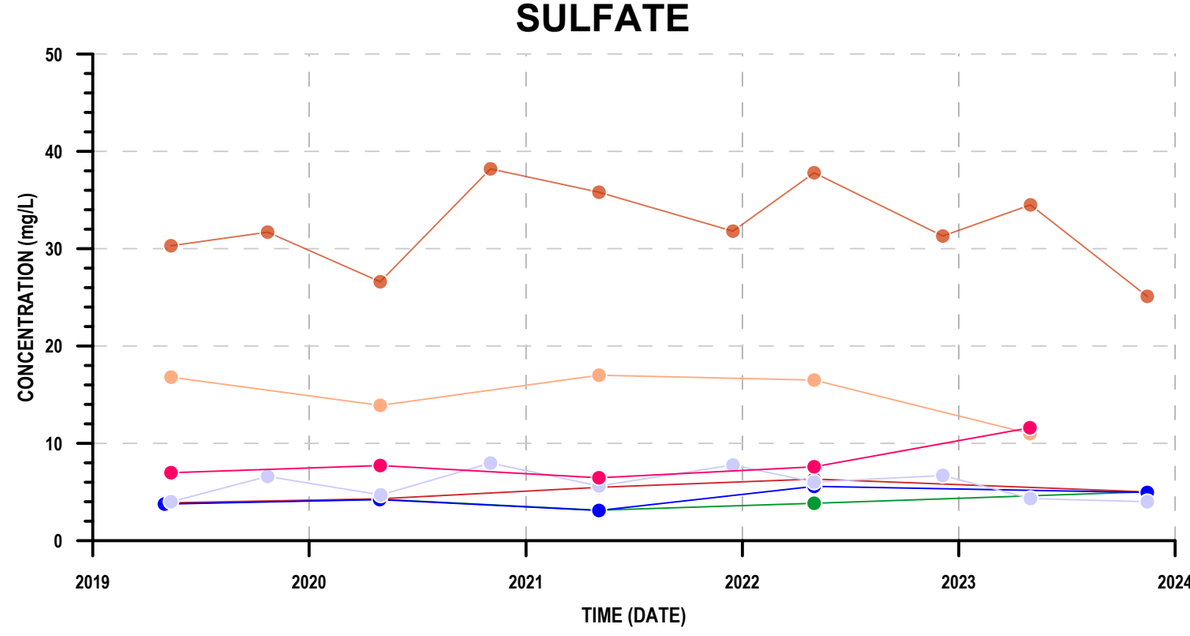
CHLORIDE



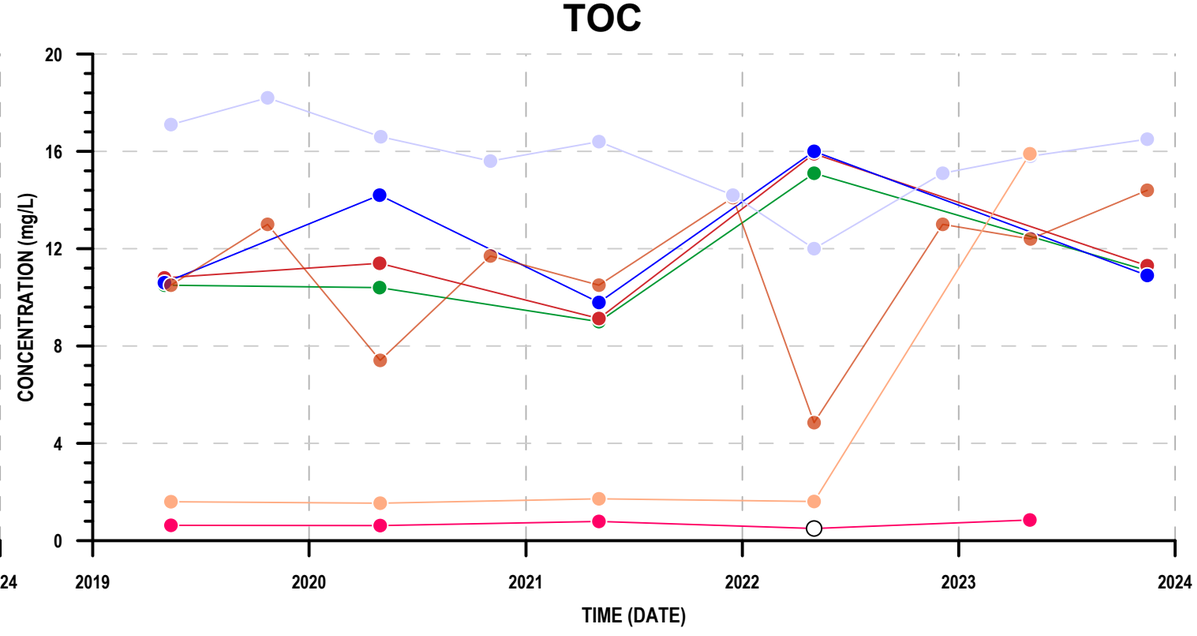
AMMONIA (as N)



SULFATE



TOC



LEGEND

SW-A SW-C SEEP E SEEP I
SW-B SEEP A SEEP G Non-Detect

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

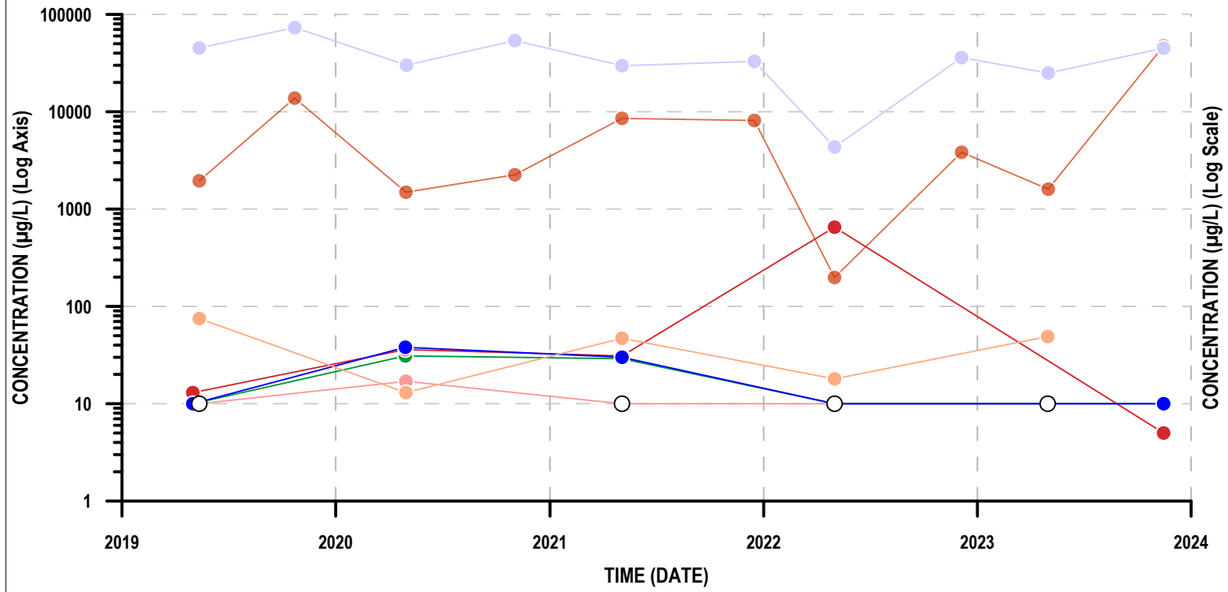
CONCENTRATION VERSUS TIME PLOTS
SURFACE WATER - SEEPS AND SHEEP CREEK

Project No. **12630729**
Date **July 2024**

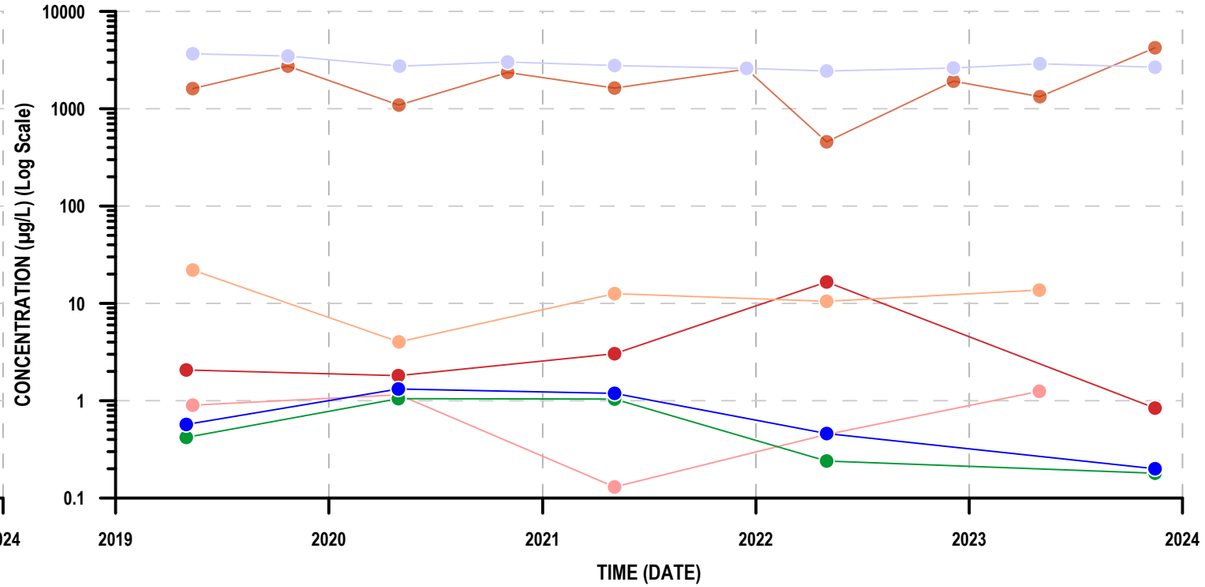
FIGURE I-15

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-15 - Sepps and Sheep Creek (1).gpj
Plot Date: July 05 2024 8:07 PM

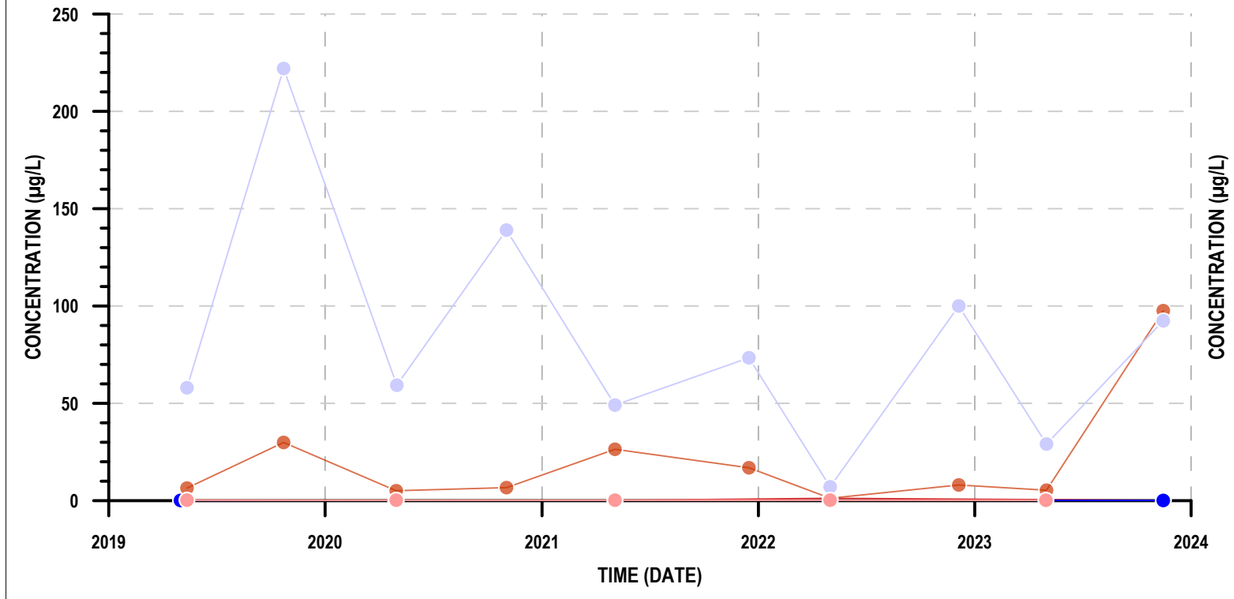
IRON



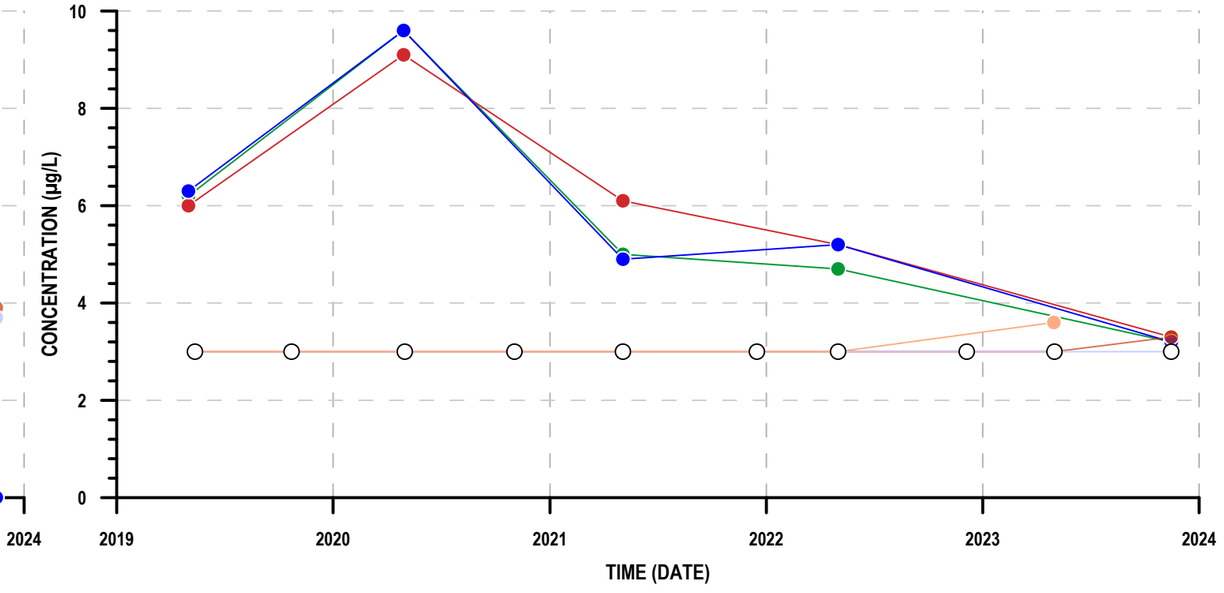
MANGANESE



ARSENIC



ZINC



LEGEND

SW-A SW-C SEEP E SEEP I
SW-B SEEP A SEEP G Non-Detect

GHD

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

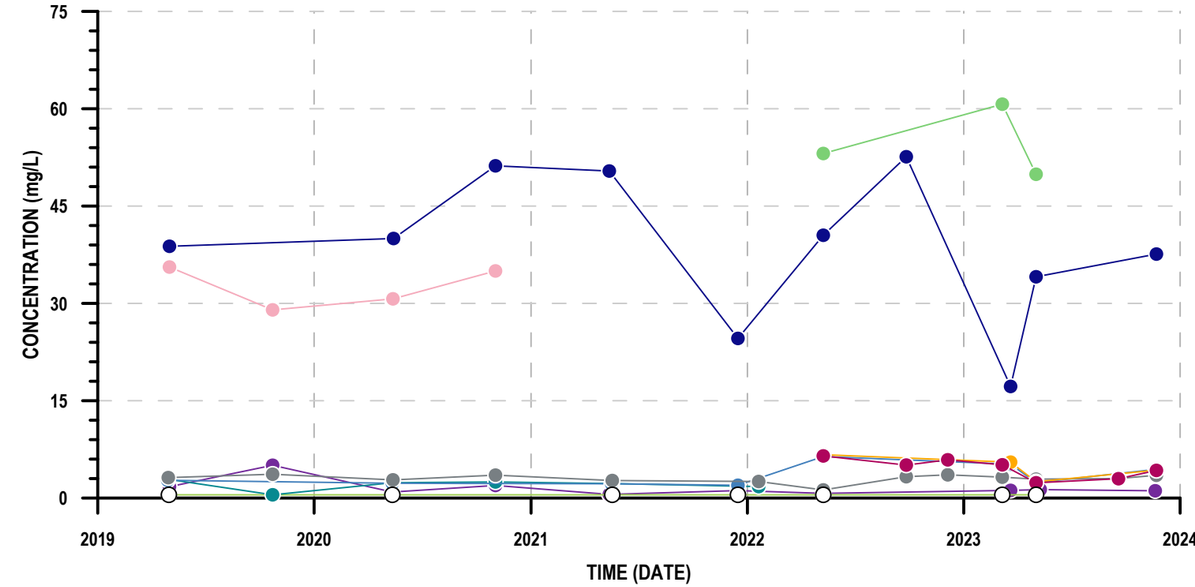
CONCENTRATION VERSUS TIME PLOTS
SURFACE WATER - SEEPS AND SHEEP CREEK

Project No. **12630729**
Date **July 2024**

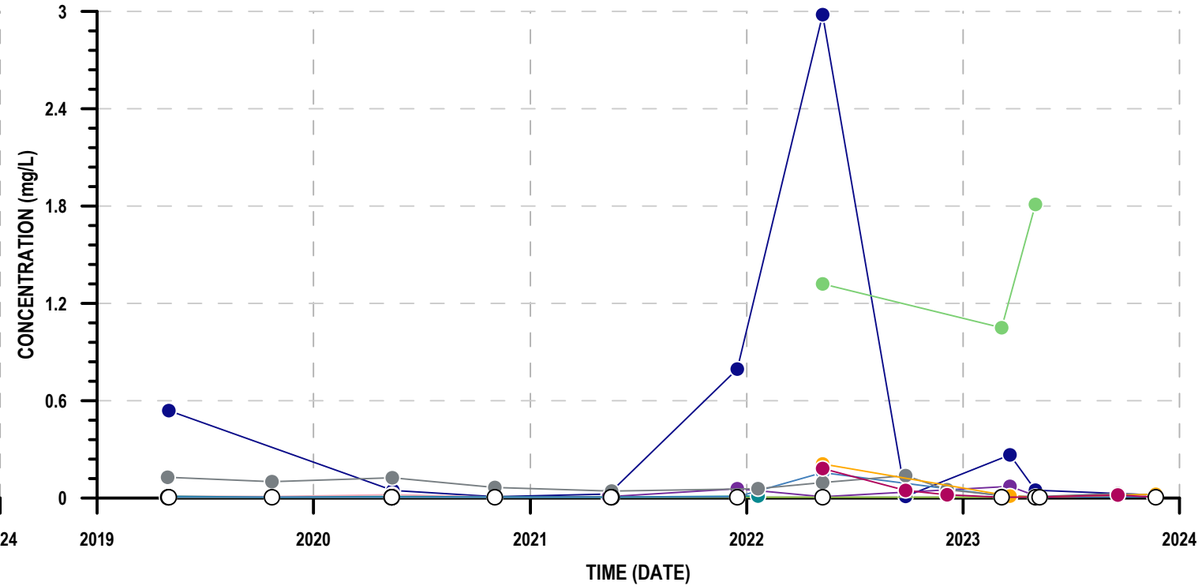
FIGURE I-16

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-16 - Sepps and Sheep Creek (2).gpj
Plot Date: July 05 2024 8:07 PM

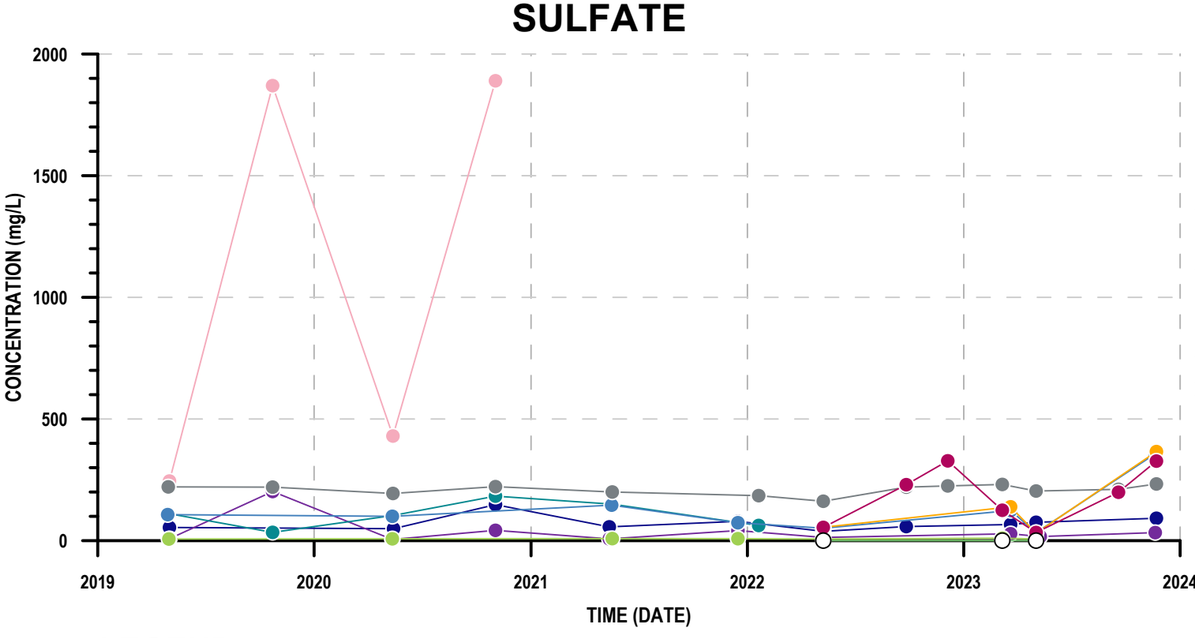
CHLORIDE



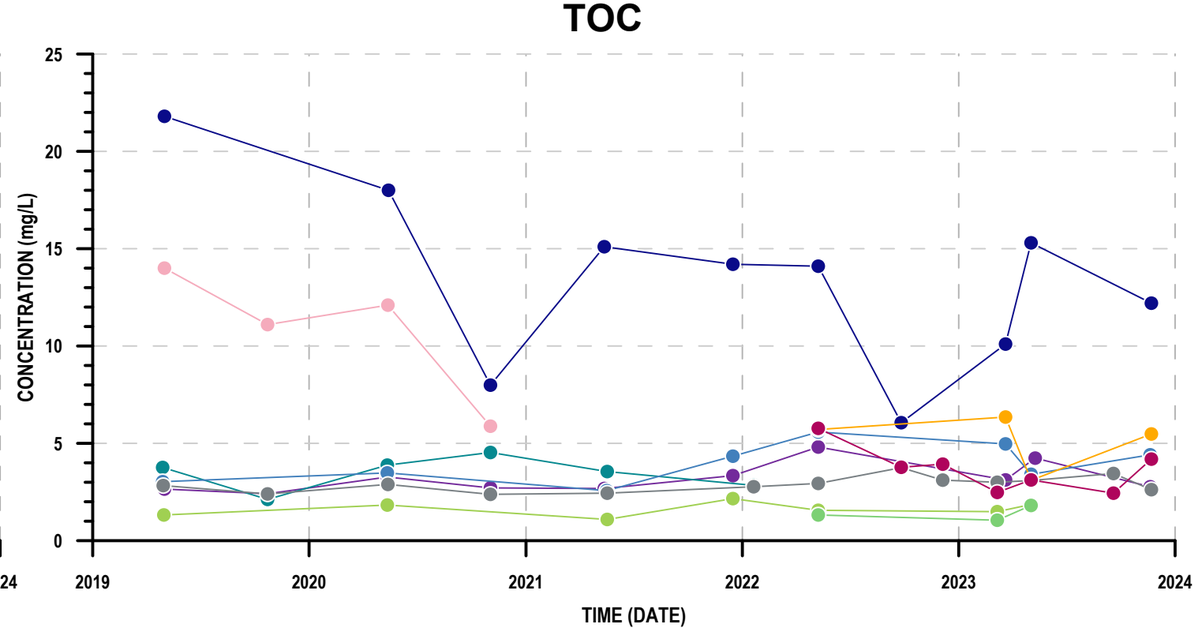
AMMONIA (as N)



SULFATE



TOC



LEGEND

- SW1-07
- SW2-07
- SW3-07
- SW4-07
- Tailings Pond Outlet
- Outlet Ditch
- SW5-19
- Seepage Weir
- Spillway Inlet
- Spillway Outlet
- Non-Detect

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

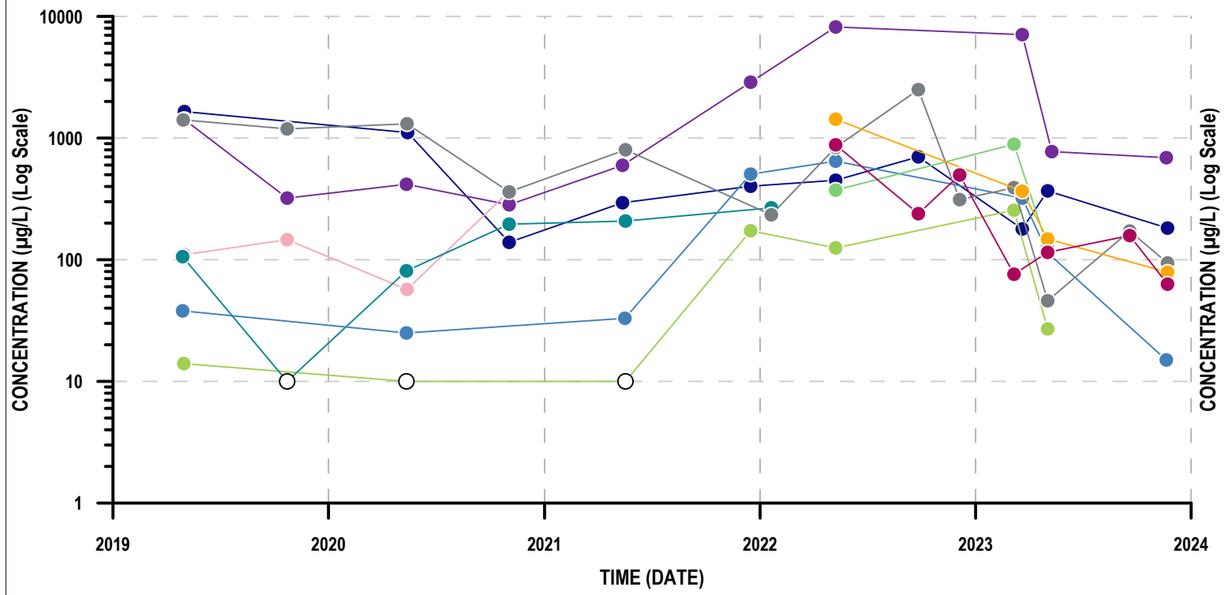
CONCENTRATION VERSUS TIME PLOTS
TSF SURFACE WATER

Project No. **12630729**
Date **July 2024**

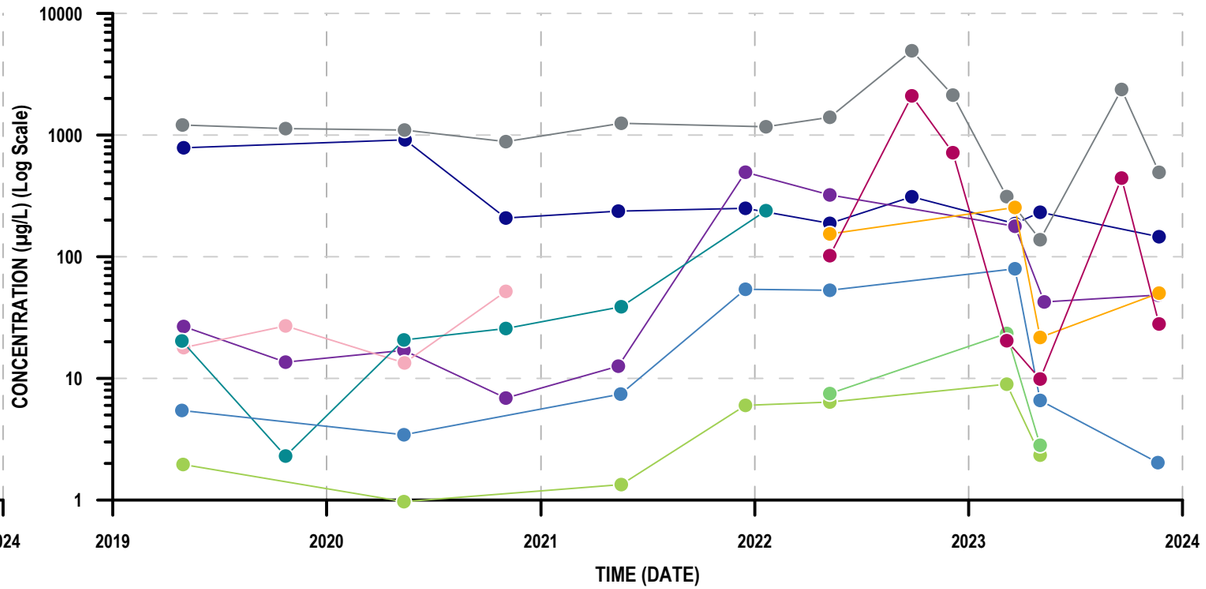
FIGURE I-17

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-17 - TSF Surface Water (1).gpj
Plot Date: July 05 2024 8:07 PM

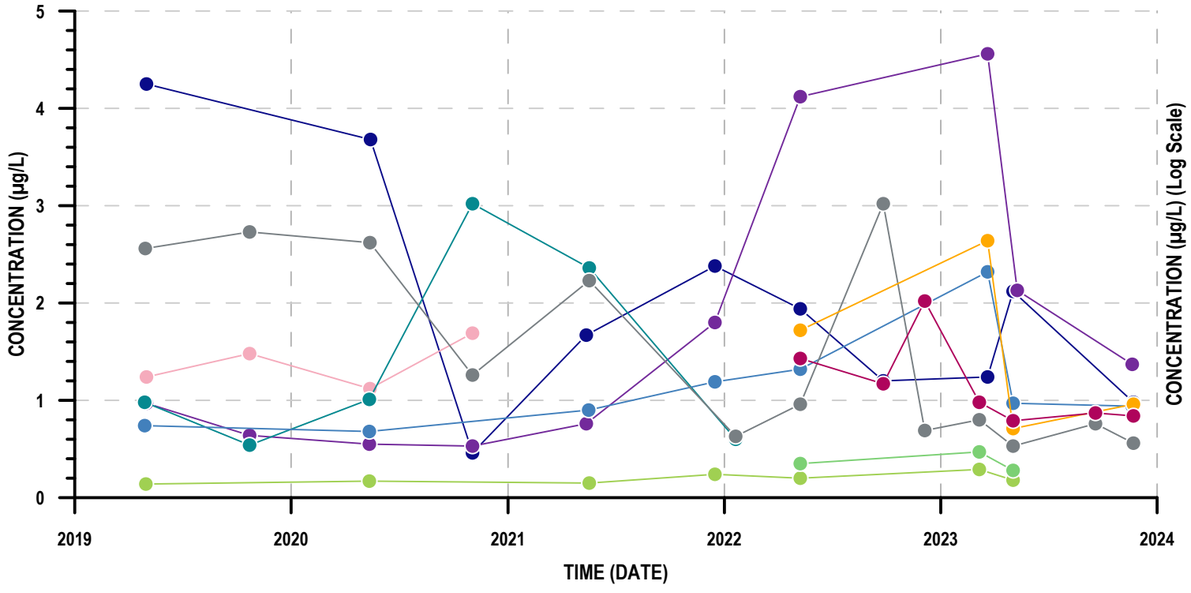
IRON



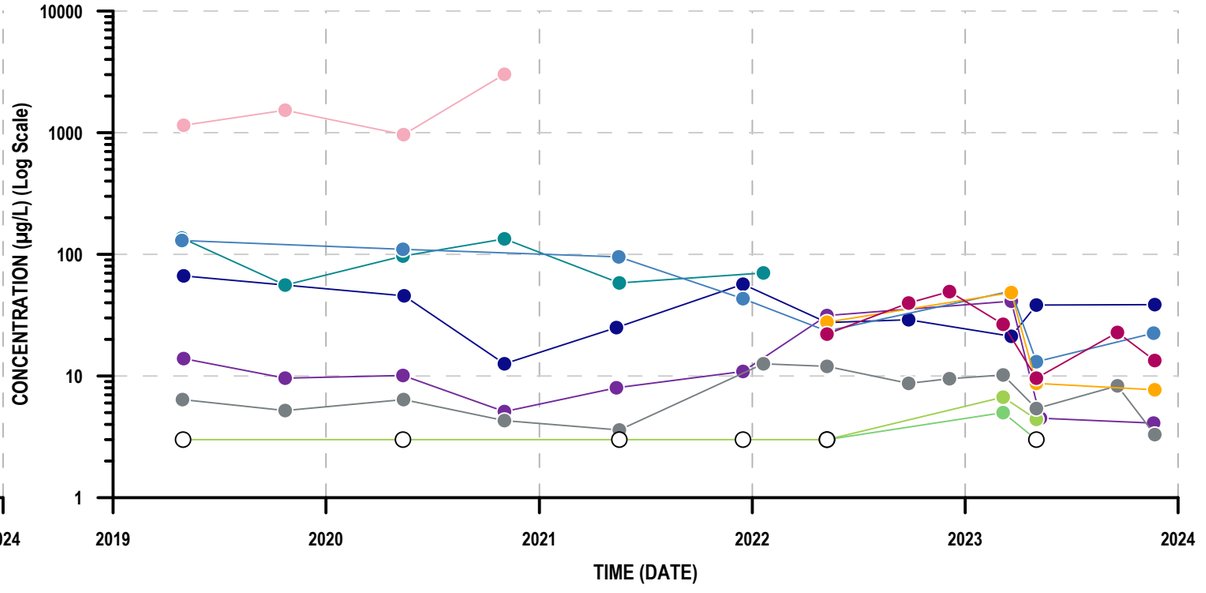
MANGANESE



ARSENIC



ZINC



LEGEND

- SW1-07
- SW2-07
- SW3-07
- SW4-07
- Tailings Pond Outlet
- Outlet Ditch
- SW5-19
- Seepage Weir
- Spillway Inlet
- Spillway Outlet
- Non-Detect

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

CONCENTRATION VERSUS TIME PLOTS
TSF SURFACE WATER

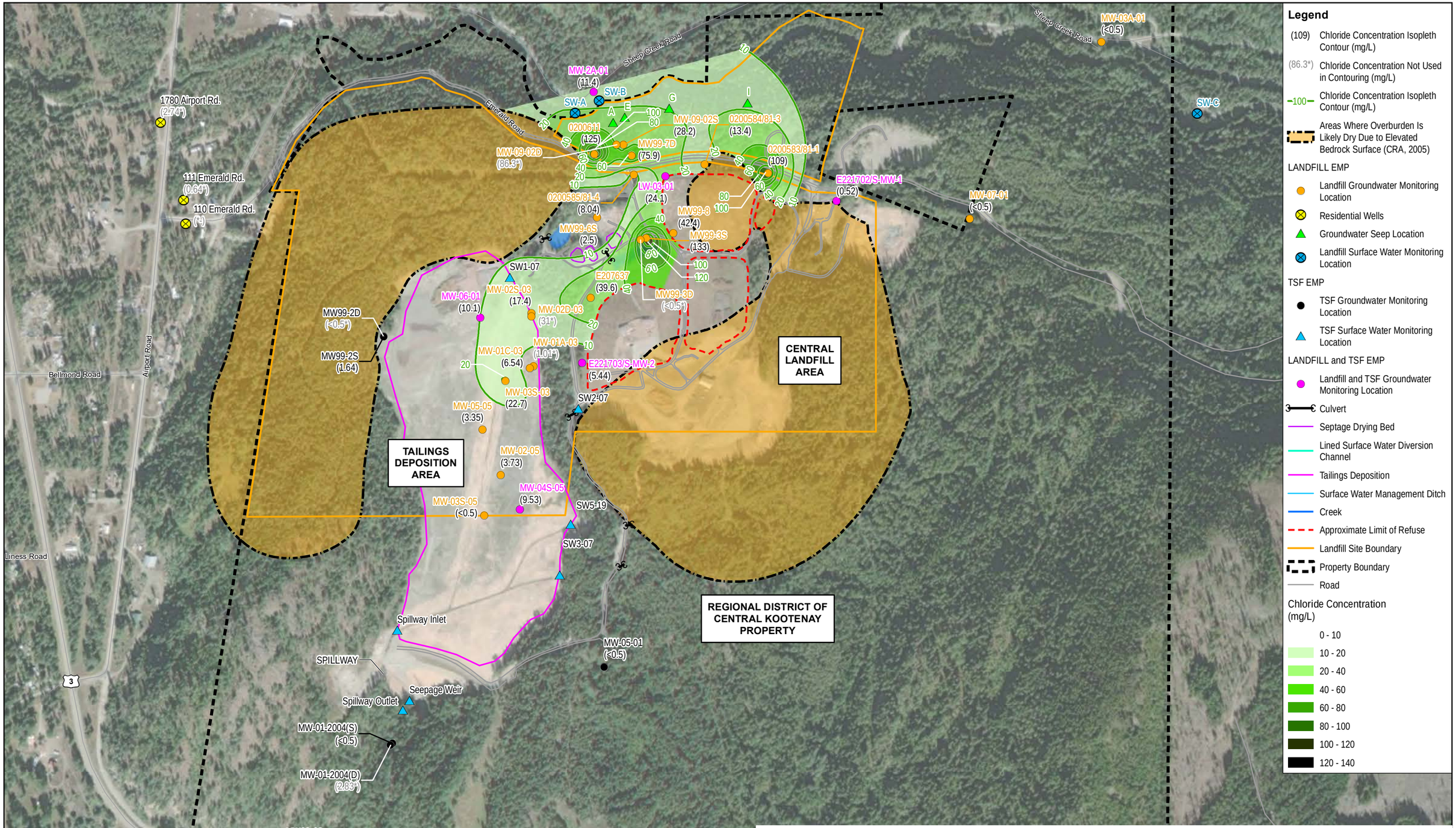
Project No. **12630729**
Date **July 2024**

FIGURE I-18

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\CvT Plots\Figure I-18 - TSF Surface Water (2).gpj
Plot Date: July 05 2024 8:07 PM

Appendix J

Concentration Isopleth Figures



Legend

- (109) Chloride Concentration Isopleth Contour (mg/L)
- (86.3*) Chloride Concentration Not Used in Contouring (mg/L)
- 100 Chloride Concentration Isopleth Contour (mg/L)
- Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)

LANDFILL EMP

- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP

- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP

- Landfill and TSF Groundwater Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Chloride Concentration (mg/L)

- 0 - 10
- 10 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- 100 - 120
- 120 - 140

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

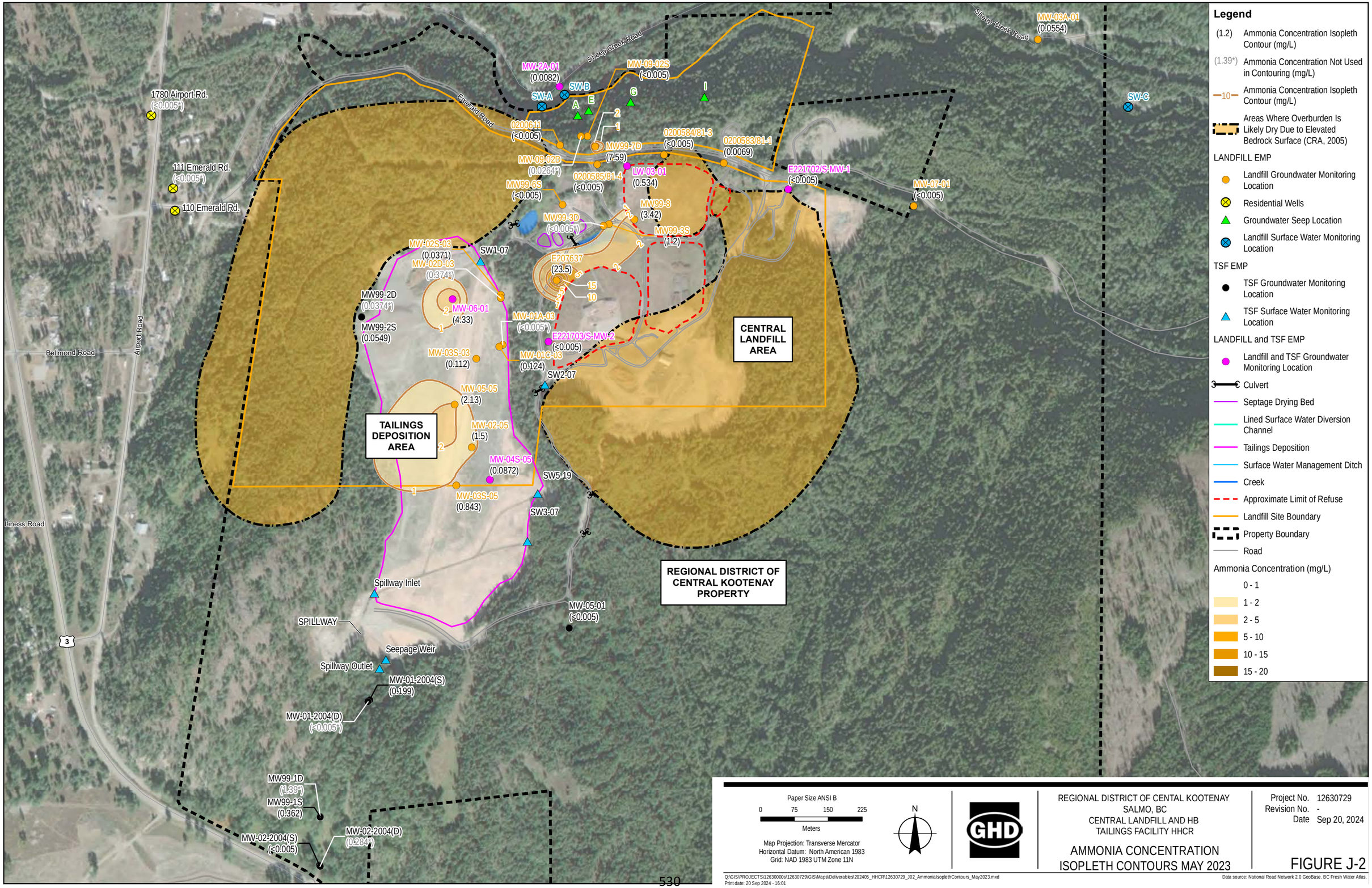
CHLORIDE CONCENTRATION ISOPLETH CONTOURS MAY 2023

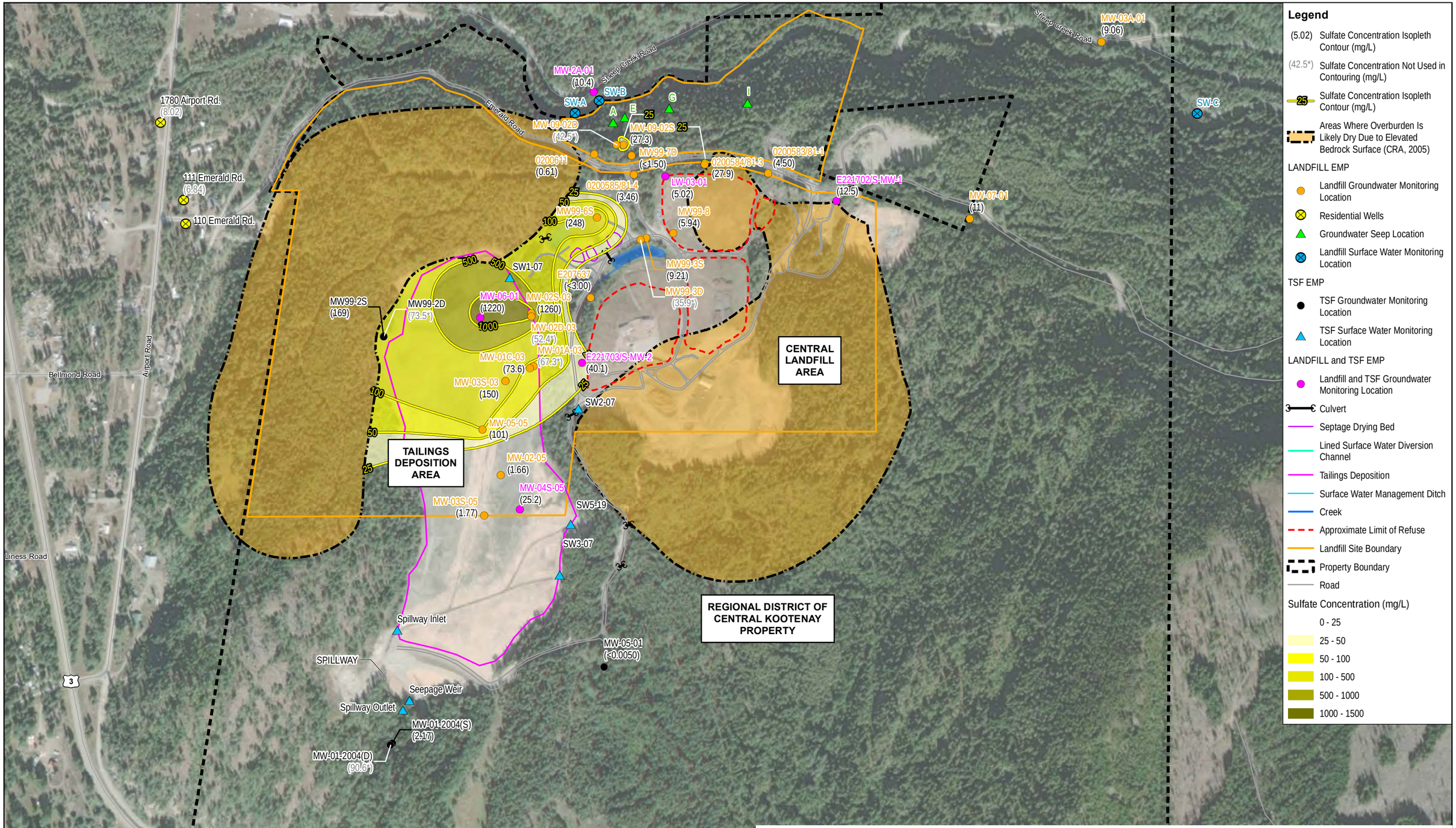
Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-1

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J01_ChlorideIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:00

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.


Sheep Creek Road
Emerald Road
Bellmond Road
Airport Road
Liness Road
1780 Airport Rd.
(<0.005*)
111 Emerald Rd.
(<0.005*)
110 Emerald Rd.
MW-2A-01
(0.0082)
SW-A
SW-B
MW-09-02S
(<0.005)
A
E
G
I
2
1
0200611
(<0.005)
MW99-7D
(7.59)
0200584/81-3
(<0.005)
0200583/81-1
(0.0069)
MW-09-02D
(0.0264*)
0200585/81-4
(<0.005)
LW-03-01
(0.534)
E221702/S-MW-1
(<0.005)
MW-03A-01
(0.0554)
SW-C
MW-07-01
(<0.005)
MW99-6S
(<0.005)
MW99-8
(3.42)
MW99-3D
(<0.005*)
MW99-3S
(12)
MW-02S-03
(0.0371)
SW1-07
MW-02D-03
(0.374*)
E207637
(23.5)
MW99-2D
(0.0374*)
MW-06-01
(4.33)
MW99-2S
(0.0549)
MW-01A-03
(<0.005*)
E221703/S-MW-2
(<0.005)
MW-03S-03
(0.112)
MW-01C-03
(0.124)
SW2-07
MW-05-05
(2.13)
MW-02-05
(1.5)
MW-04S-05
(0.0872)
SW5-19
MW-03S-05
(0.843)
SW3-07
CENTRAL LANDFILL AREA
TAILINGS DEPOSITION AREA
REGIONAL DISTRICT OF CENTRAL KOOTENAY PROPERTY
Spillway Inlet
SPILLWAY
Seepage Weir
Spillway Outlet
MW-05-01
(<0.005)
MW-01-2004(S)
(0.199)
MW-01-2004(D)
(<0.005*)
MW99-1D
(1.39*)
MW99-1S
(0.362)
MW-02-2004(S)
(<0.005)
MW-02-2004(D)
(0.284*)
3
Legend
(1.2) Ammonia Concentration Isopleth Contour (mg/L)
(1.39*) Ammonia Concentration Not Used in Contouring (mg/L)
10 Ammonia Concentration Isopleth Contour (mg/L)
Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)
LANDFILL EMP
Landfill Groundwater Monitoring Location
Residential Wells
Groundwater Seep Location
Landfill Surface Water Monitoring Location
TSF EMP
TSF Groundwater Monitoring Location
TSF Surface Water Monitoring Location
LANDFILL and TSF EMP
Landfill and TSF Groundwater Monitoring Location
Culvert
Septage Drying Bed
Lined Surface Water Diversion Channel
Tailings Deposition
Surface Water Management Ditch
Creek
Approximate Limit of Refuse
Landfill Site Boundary
Property Boundary
Road
Ammonia Concentration (mg/L)
0 - 1
1 - 2
2 - 5
5 - 10
10 - 15
15 - 20
Paper Size ANSI B
0 75 150 225
Meters
Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N
N
GHD
REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR
AMMONIA CONCENTRATION
ISOPLETH CONTOURS MAY 2023
Project No. 12630729
Revision No. -
Date Sep 20, 2024
FIGURE J-2
Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J02_AmmoniaIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:01
Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Legend

- (5.02) Sulfate Concentration Isopleth Contour (mg/L)
- (42.5*) Sulfate Concentration Not Used in Contouring (mg/L)
- 25 Sulfate Concentration Isopleth Contour (mg/L)
- Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)

LANDFILL EMP

- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP

- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP

- Landfill and TSF Groundwater Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Sulfate Concentration (mg/L)

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 500
- 500 - 1000
- 1000 - 1500

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

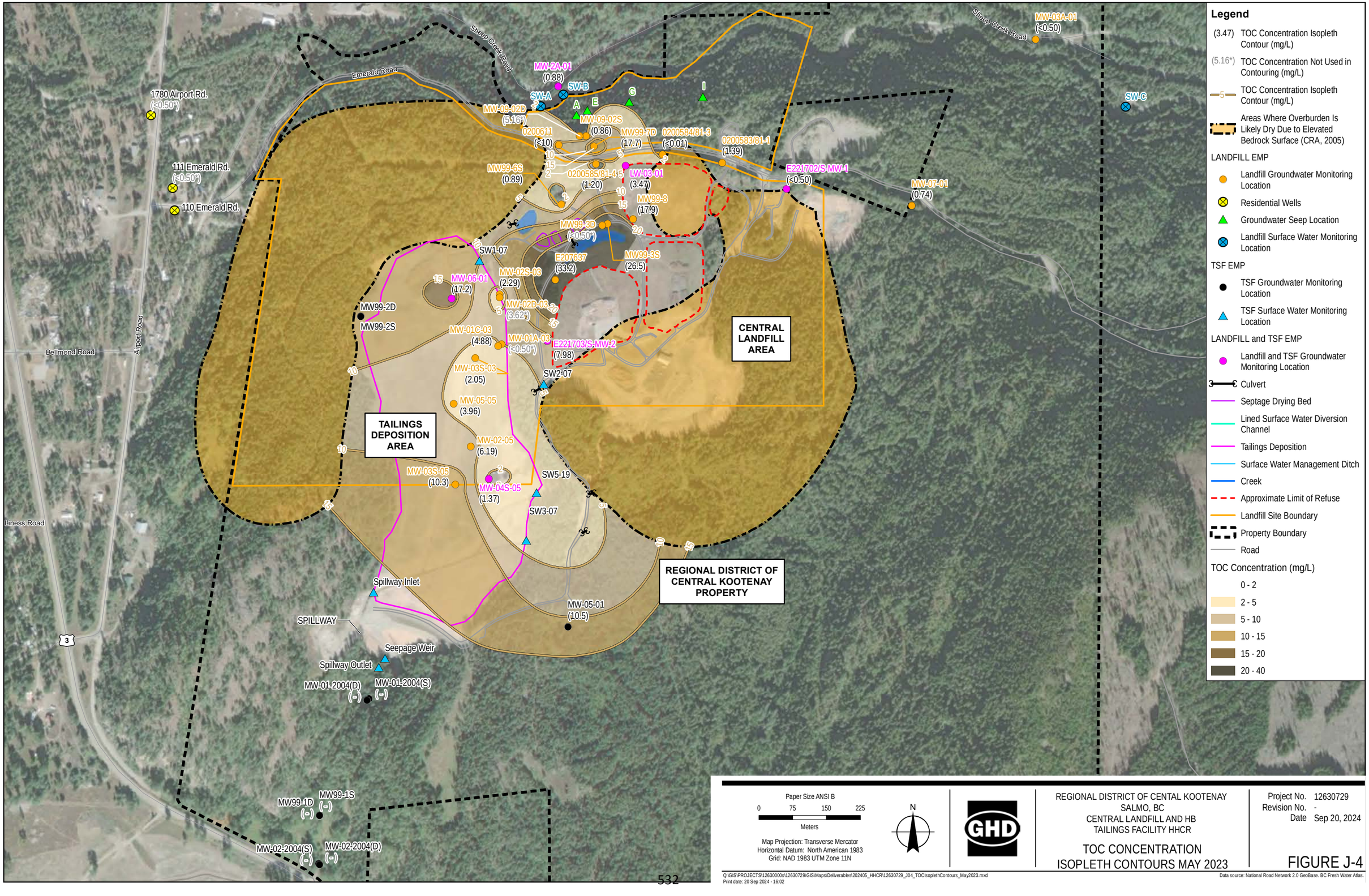
SULFATE CONCENTRATION
ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-3

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J03_SulfateIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:01

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

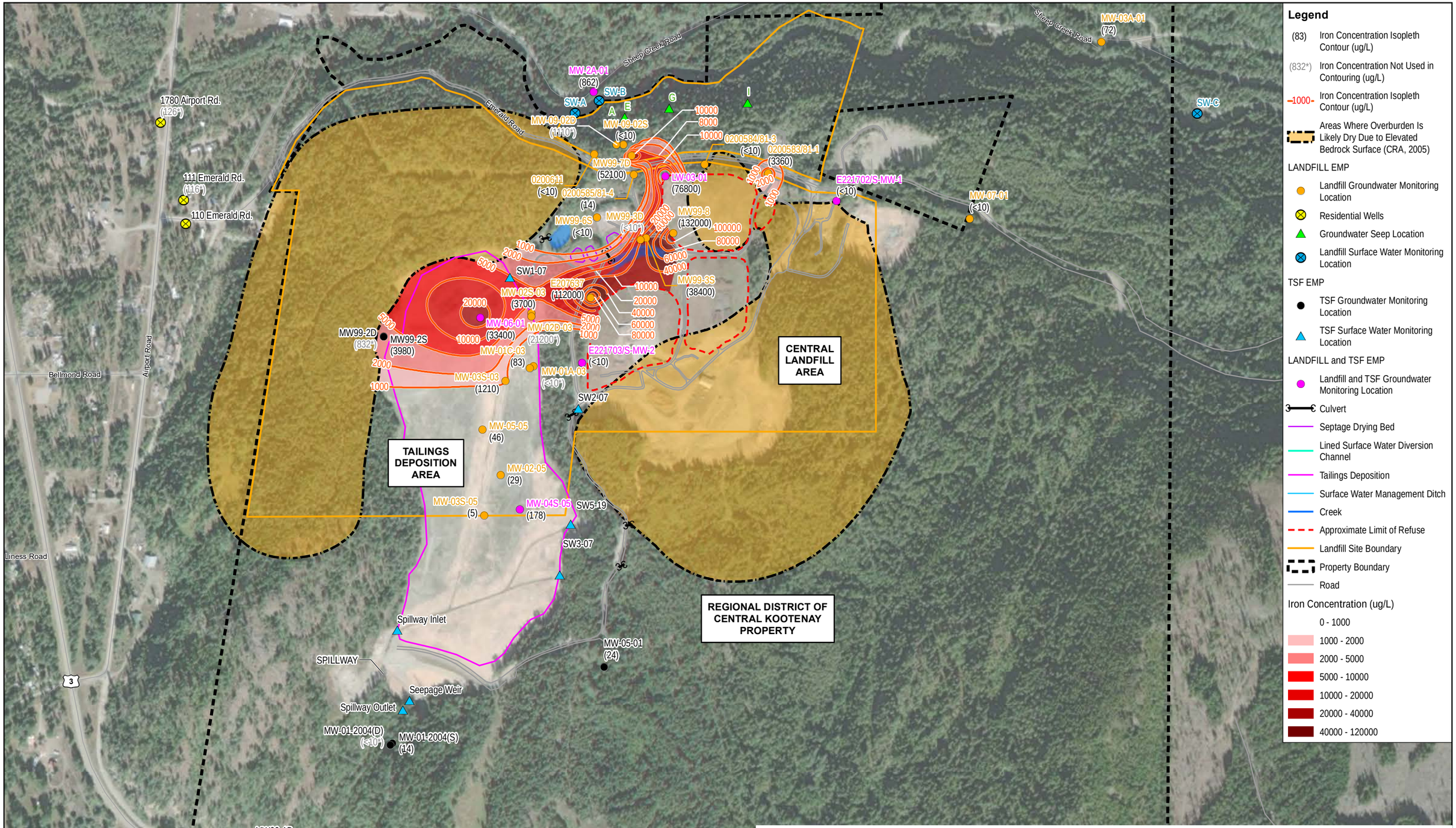
TOC CONCENTRATION
ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-4

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J04_TOCIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:02

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

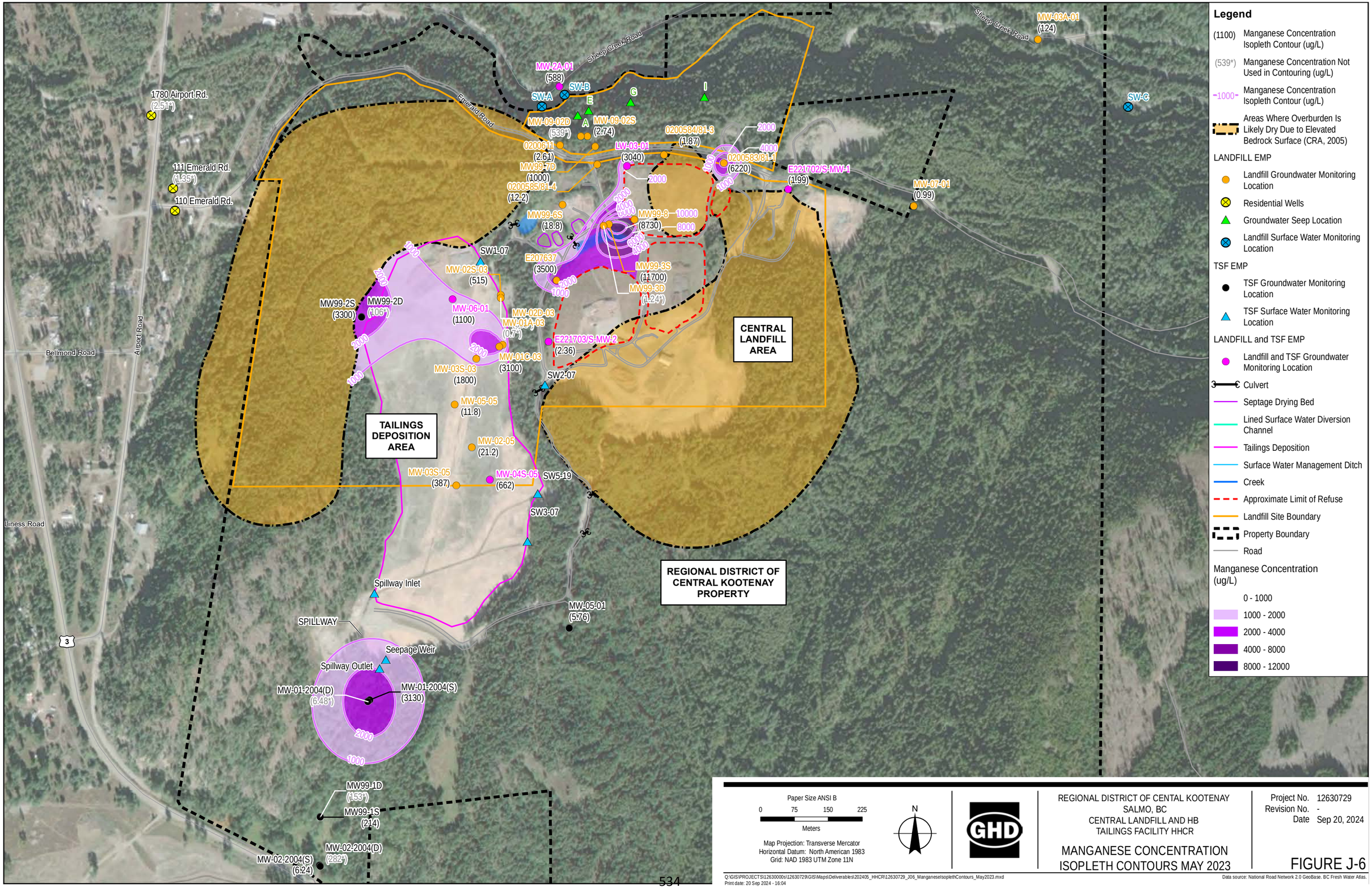
IRON CONCENTRATION
ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-5

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J05_IronIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:03

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Legend

(1100) Manganese Concentration Isopleth Contour (ug/L)

(539*) Manganese Concentration Not Used in Contouring (ug/L)

-1000- Manganese Concentration Isopleth Contour (ug/L)

Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)

LANDFILL EMP

- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP

- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP

- Landfill and TSF Groundwater Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Manganese Concentration (ug/L)

- 0 - 1000
- 1000 - 2000
- 2000 - 4000
- 4000 - 8000
- 8000 - 12000

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

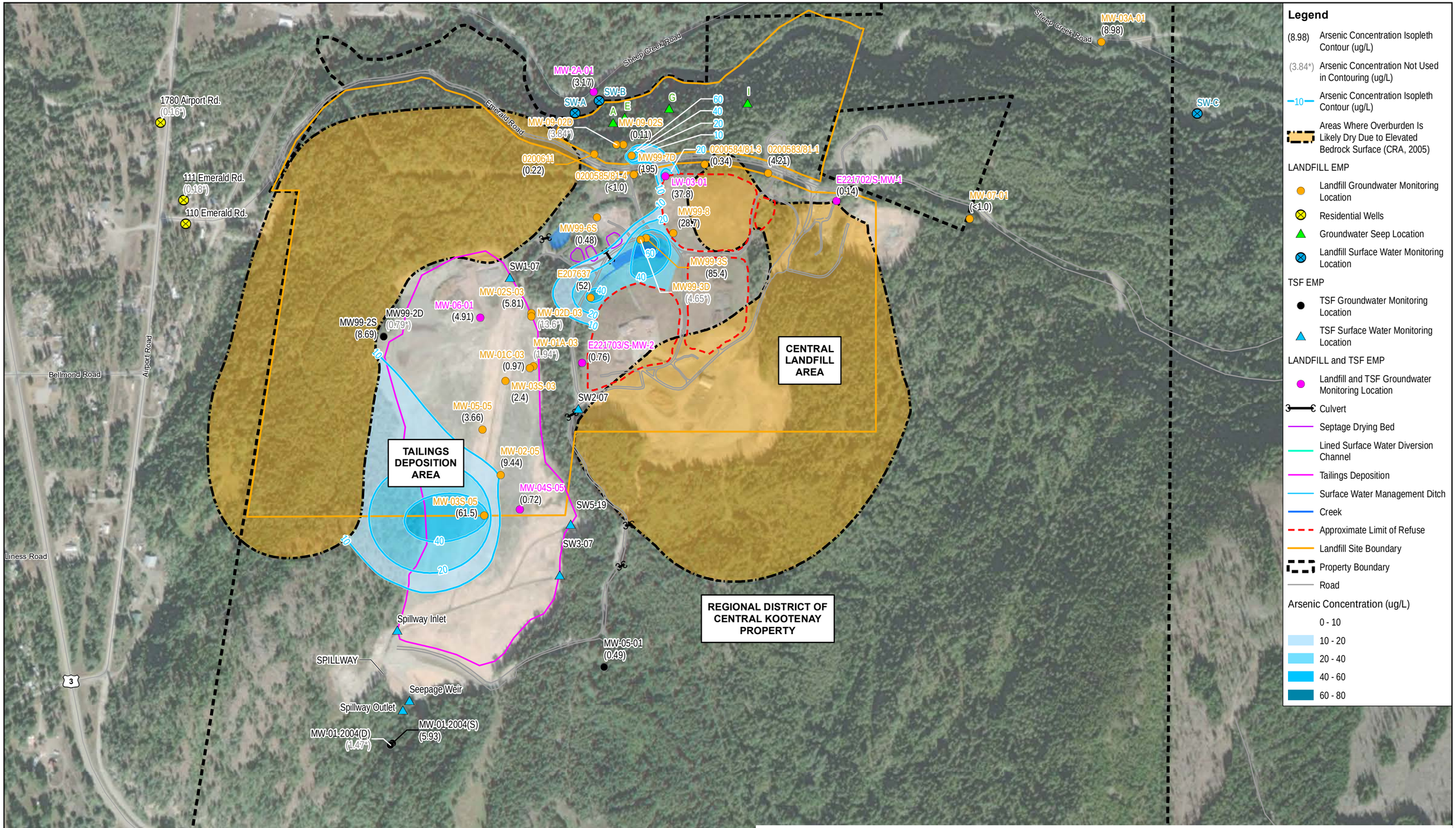
MANGANESE CONCENTRATION ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-6

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J06_ManganeseIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:04

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

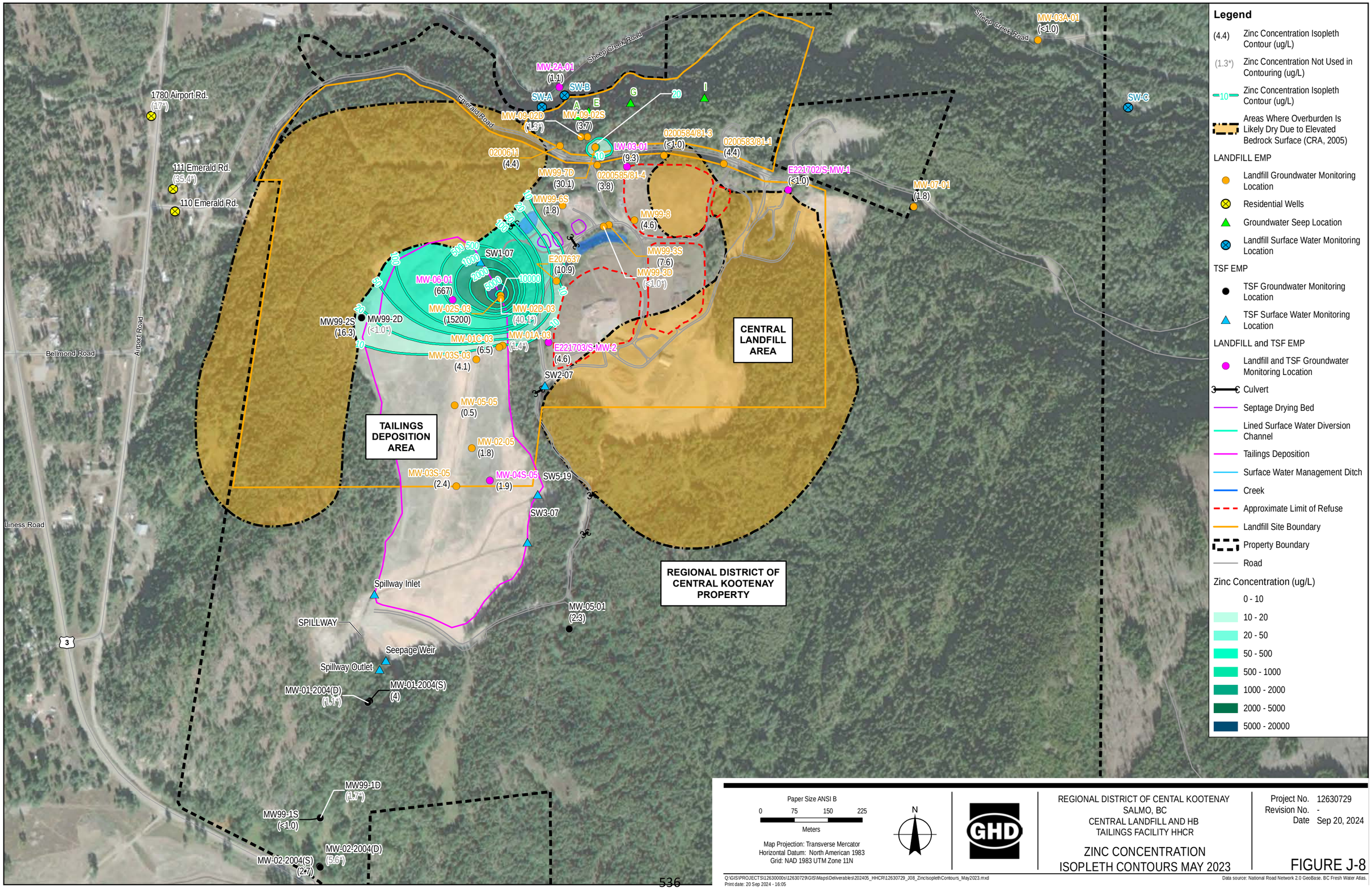
ARSENIC CONCENTRATION
ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-7

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J07_ArsenicIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:05

Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.



Legend

- (4.4) Zinc Concentration Isopleth Contour (ug/L)
- (1.3*) Zinc Concentration Not Used in Contouring (ug/L)
- 10 Zinc Concentration Isopleth Contour (ug/L)
- Areas Where Overburden Is Likely Dry Due to Elevated Bedrock Surface (CRA, 2005)

LANDFILL EMP

- Landfill Groundwater Monitoring Location
- Residential Wells
- Groundwater Seep Location
- Landfill Surface Water Monitoring Location

TSF EMP

- TSF Groundwater Monitoring Location
- TSF Surface Water Monitoring Location

LANDFILL and TSF EMP

- Landfill and TSF Groundwater Monitoring Location
- Culvert
- Septage Drying Bed
- Lined Surface Water Diversion Channel
- Tailings Deposition
- Surface Water Management Ditch
- Creek
- Approximate Limit of Refuse
- Landfill Site Boundary
- Property Boundary
- Road

Zinc Concentration (ug/L)

- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 500
- 500 - 1000
- 1000 - 2000
- 2000 - 5000
- 5000 - 20000

Paper Size ANSI B

0 75 150 225

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 11N

N

GHD

REGIONAL DISTRICT OF CENTAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB
TAILINGS FACILITY HHCR

ZINC CONCENTRATION
ISOPLETH CONTOURS MAY 2023

Project No. 12630729
Revision No. -
Date Sep 20, 2024

FIGURE J-8

Q:\GIS\PROJECTS\12630000s\12630729\GIS\Maps\Deliverables\202405_HHCR\12630729_J08_ZincIsoplethContours_May2023.mxd
Print date: 20 Sep 2024 - 16:05

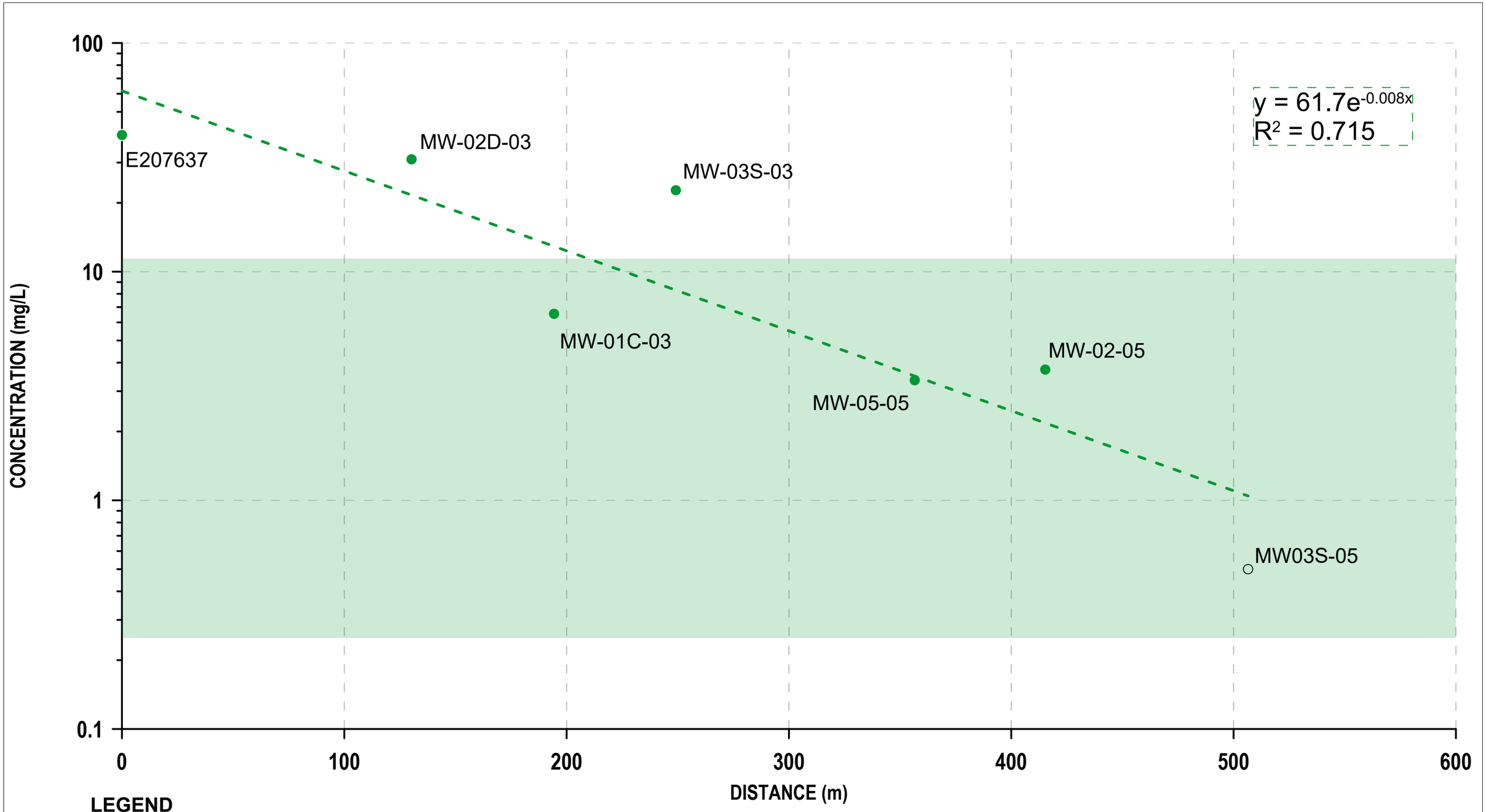
Data source: National Road Network 2.0 GeoBase. BC Fresh Water Atlas.

Appendix K

Concentration Profile Figures

Appendix K1

Concentration Profile Figures (GHD 2024)



LEGEND

- Dissolved Chloride Concentration (May 2023) (mg/L)
- Non-Detect
- Exponential Fit - Dissolved Chloride Concentration (May 2023) (mg/L)
- Background Dissolved Chloride Concentration Range (May 2023) (mg/L) (MW-07-01, MW-03A-01, S-MW-1, MW-02A-01)

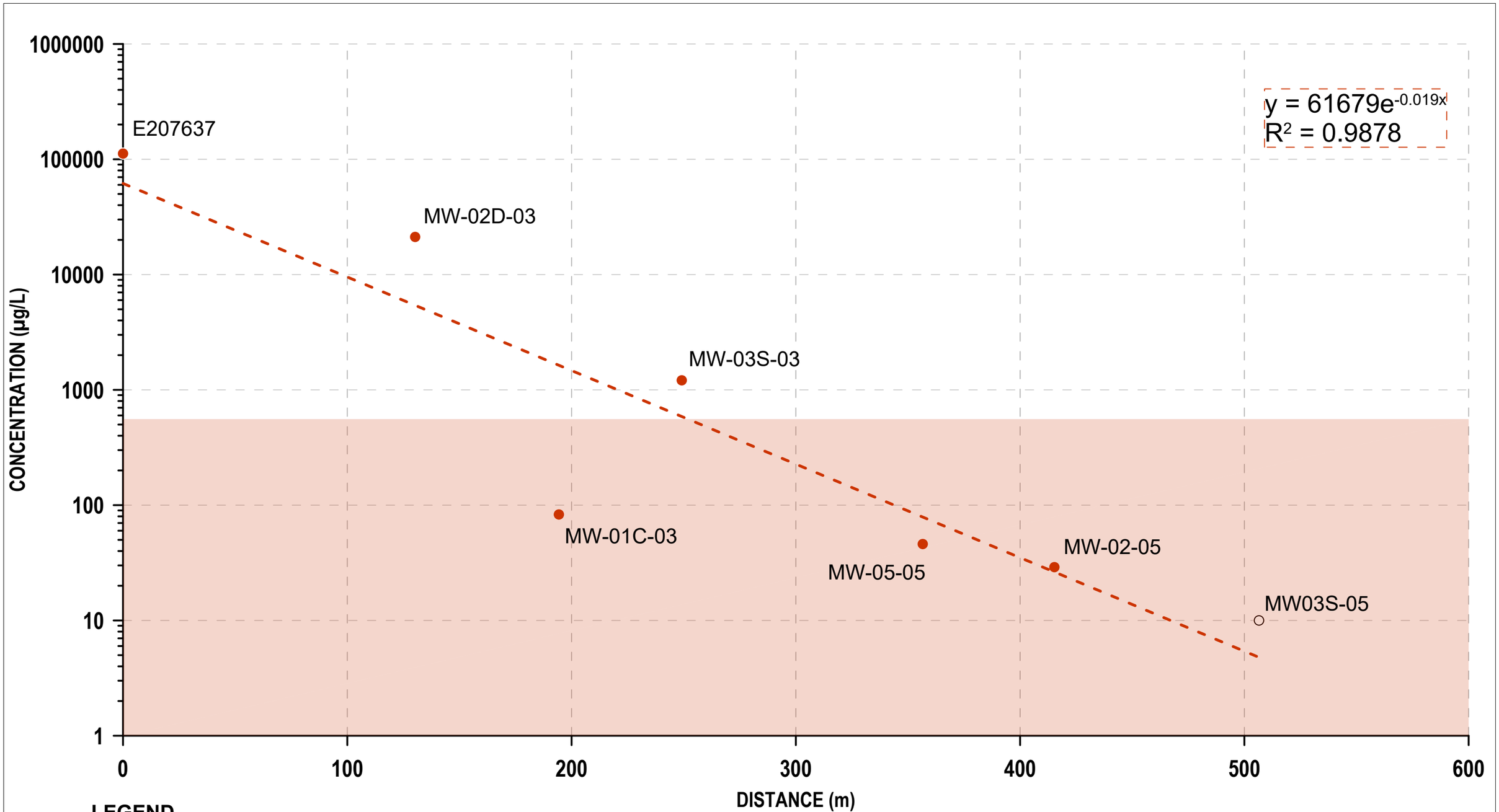
REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

CHLORIDE CONCENTRATION PROFILE ALONG SCAZ FLOWPATH

Project No. **12630729**
Date **July 2024**

FIGURE K-1

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\Concentration Profiles\Figure K-1 - Chloride.gpj
Plot Date: July 25 2024 11:07 AM



LEGEND

- Dissolved Iron Concentration (May 2023) (ug/L)
- Non-Detect
- Exponential Fit - Dissolved Iron Concentration (May 2023) (ug/L)
- Background Dissolved Iron Concentration Range (May 2023) (mg/L) (MW-07-01, MW-03A-01, S-MW-1, MW-02A-01)

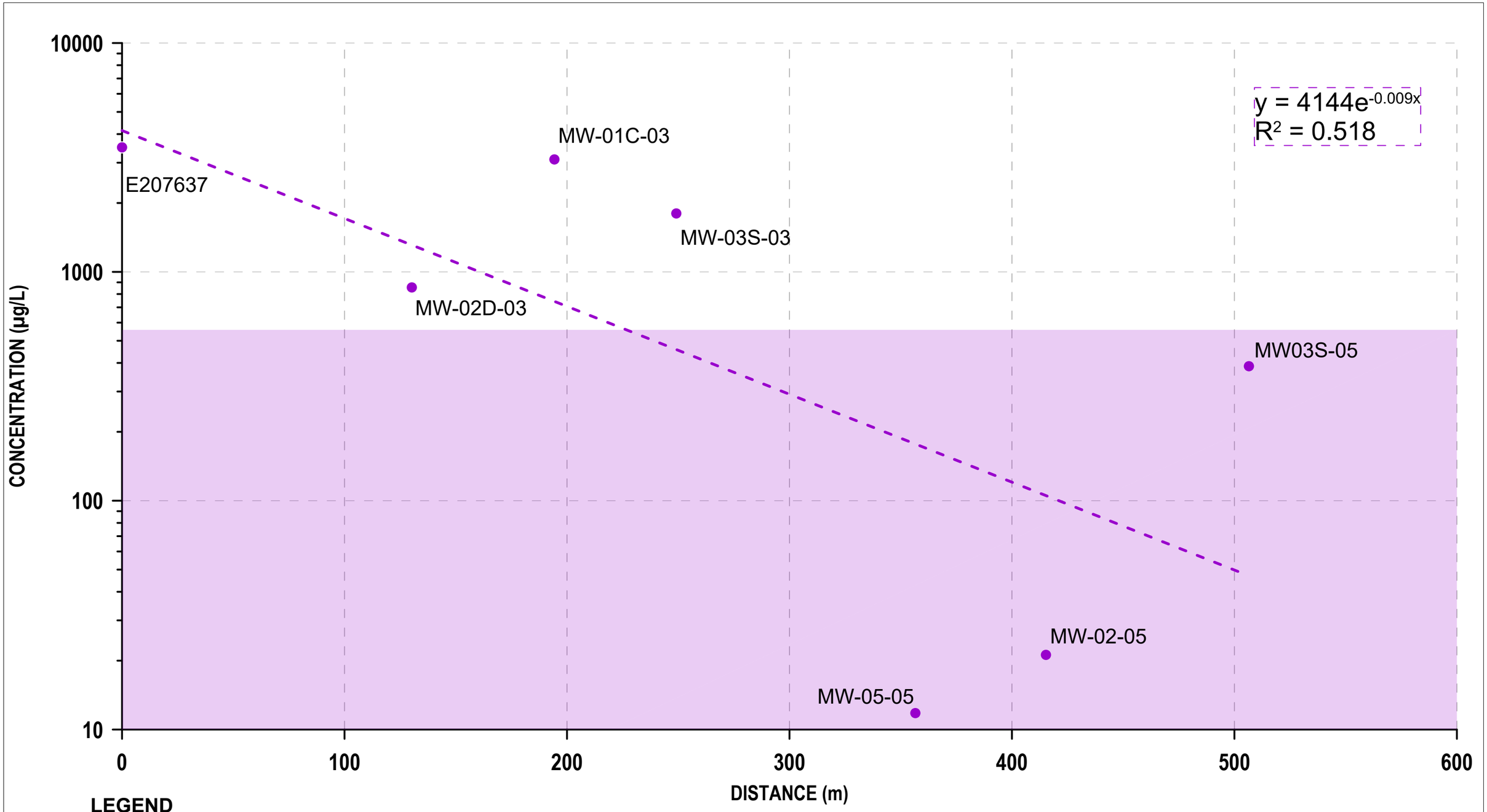
REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

IRON CONCENTRATION PROFILE ALONG SCAZ FLOWPATH

Project No. **12630729**
Date **July 2024**

FIGURE K-2

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\Concentration Profiles\Figure K-2 - Iron.gpj
Plot Date: July 25 2024 11:07 AM



LEGEND

- Dissolved Manganese Concentration (May 2023) (ug/L)
- Exponential Fit - Dissolved Manganese Concentration (May 2023) (ug/L)
- Background Dissolved Manganese Concentration Range (May 2023) (mg/L)
  (MW-07-01, MW-03A-01, S-MW-1, MW-02A-01)

REGIONAL DISTRICT OF CENTRAL KOOTENAY
SALMO, BC
CENTRAL LANDFILL AND HB TAILINGS FACILITY HHCR

MANGANESE CONCENTRATION PROFILE ALONG SCAZ FLOWPATH

Project No. **12630729**
Date **July 2024**

FIGURE K-3

HEG file: \\ghdnet\ghd\CA\Vancouver\Projects\663\12630729\Tech\Concentration Profiles\Figure K-3 - Manganese.gpj
Plot Date: July 25 2024 3:07 PM

Appendix K2

Concentration Profile Figures (CRA 2005)

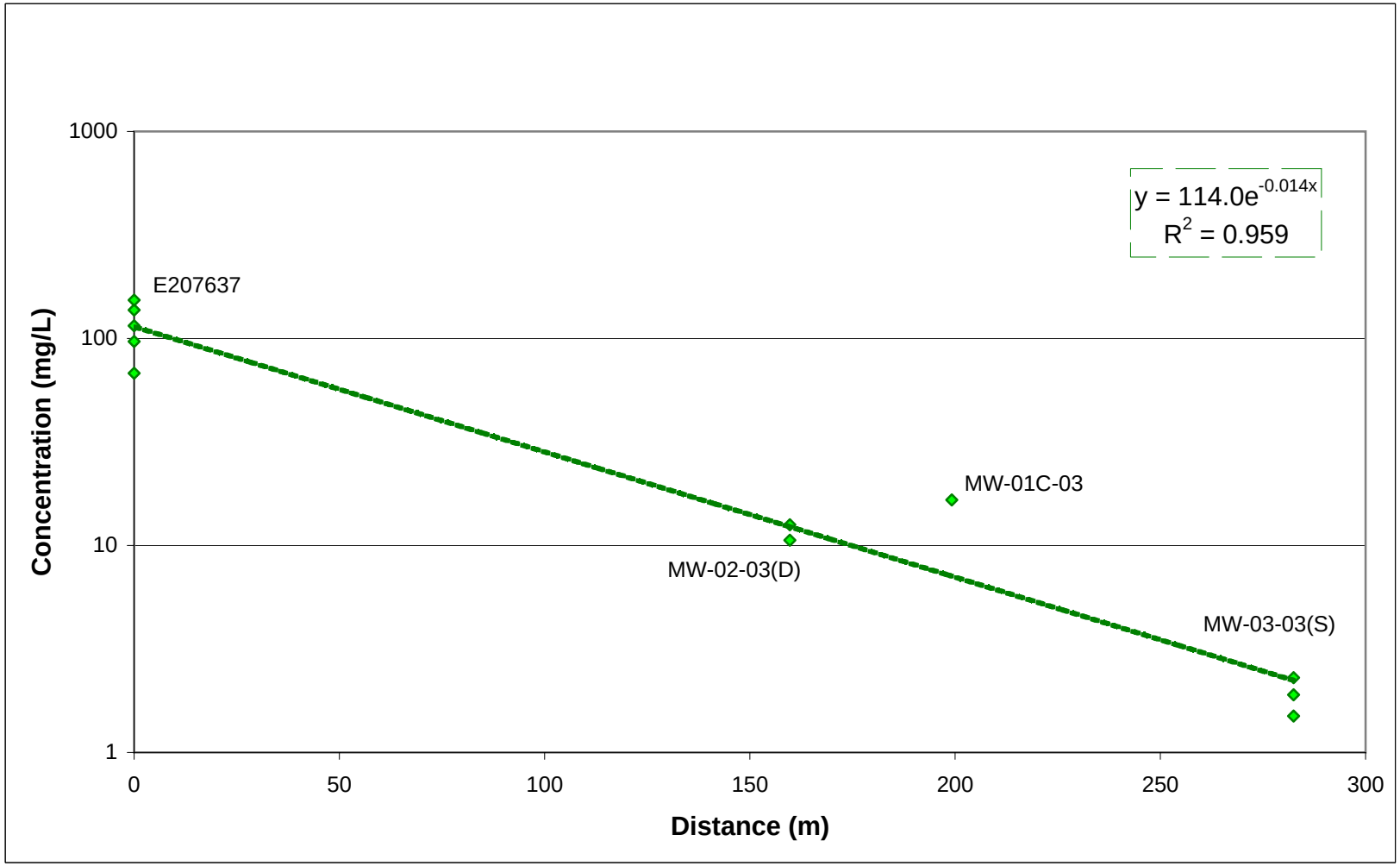


Figure 3.3

CHLORIDE CONCENTRATIONS ALONG FLOWPATH
ATTENUATION ZONE EVALUATION
CENTRAL LANDFILL, SALMO, B.C.
District of Central Kootenay

017275-06(14)GN-WA-HYD (I:\Hg\14000 to 17999 folders\17275-Can-ex\REPORT 14\FIGS.XLS\CL-CVSX) NOV 25/2004

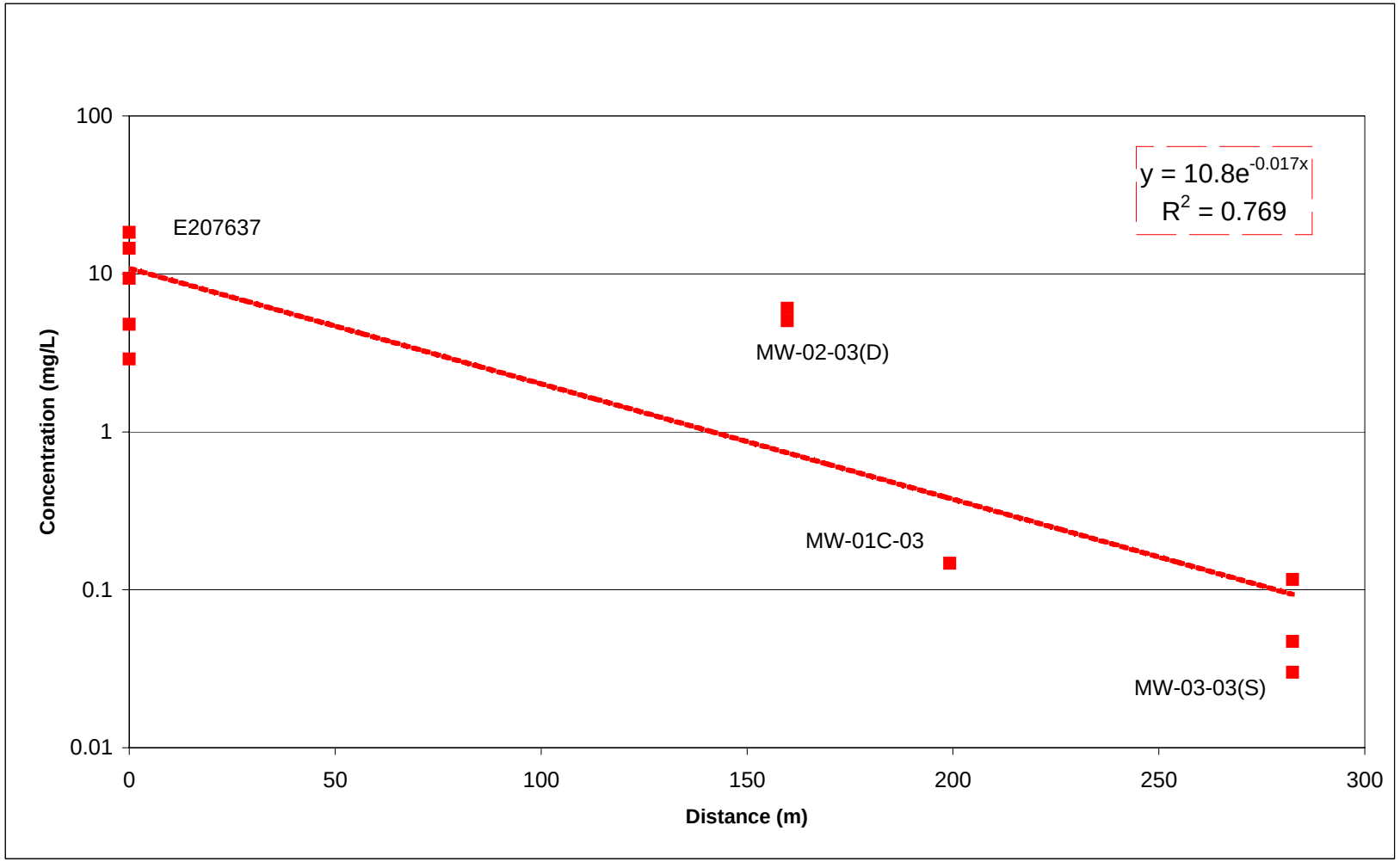


Figure 3.4

IRON CONCENTRATIONS ALONG FLOWPATH
ATTENUATION ZONE EVALUATION
CENTRAL LANDFILL, SALMO, B.C.
District of Central Kootenay

017275-06(14)GN-WA-HYD (I:\Hg\14000 to 17999 folders\17275-Can-ex\REPORT 14\FIGS.XLS\FE-CVSX) NOV 25/2004

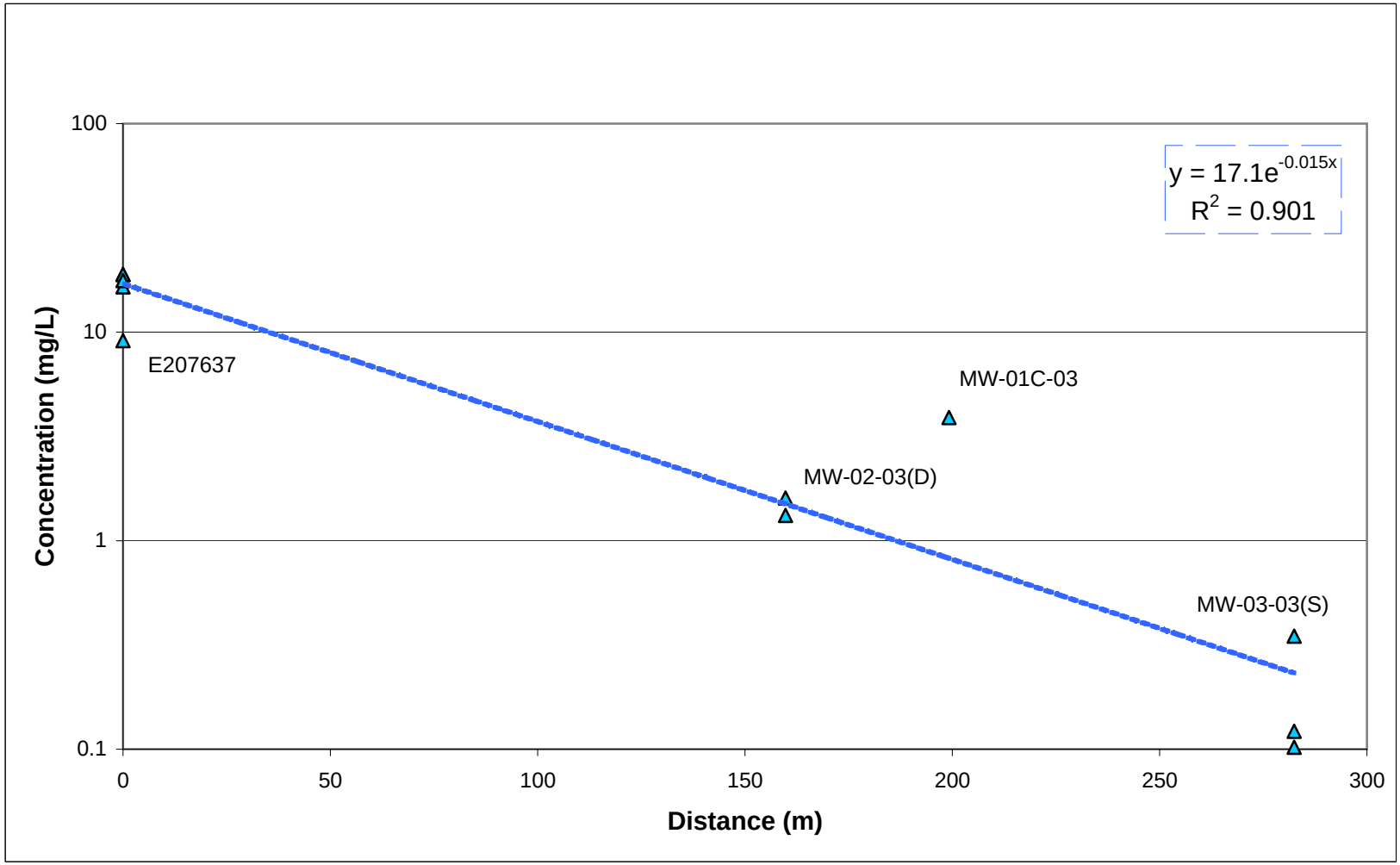


Figure 3.5

MANGANESE CONCENTRATIONS ALONG FLOWPATH
ATTENUATION ZONE EVALUATION
CENTRAL LANDFILL, SALMO, B.C.
District of Central Kootenay

017275-06(14)GN-WA-HYD (I:\Hg\14000 to 17999 folders\17275-Can-ex\REPORT 14\FIGS.XLS\MN-CVSX) NOV 25/2004



ghd.com

The Power of Commitment

Committee Report – For Information

February 19, 2025

Hydrogeology and Hydrology Characterization Report for Ootischenia Landfill

Author:	Heidi Bench, Resource Recovery Projects Advisor
File Reference:	6300-OOT-30
Electoral Area/Municipality:	West Sub-region
Services Impacted	S188

1.0 PURPOSE OF REPORT

The purpose of this report is to present the findings of the Hydrogeology and Hydrology Characterization Report for the Ootischenia Landfill and provide an update of follow-up actions that will be completed.

2.0 BACKGROUND AND UDPATE

The Ootischenia landfill currently operates as a natural attenuation landfill, receiving approximately 21,500 tonnes of waste annually. This tonnage has remained relatively stable over the last 5-year period despite increasing population. The facility also houses three (3) septage ponds which receive an average of approximately 5,000 m^3 of septage annually.

Landfill operations began at the site in 1968 under Permit PR-00501. This historical permit was superseded by Operational Certificate 17126 in 2014. The 2014 Operational Certificate requires that, in addition to an Annual Report, a Five Year Report that includes a detailed Hydrogeological Assessment be submitted to the Director of the Ministry of Environment and Parks (the Ministry) on or before April 30 on the five year anniversary of the last submission. To satisfy this requirement, a hydrogeological assessment was completed by Amec Foster Wheeler Environment & Infrastructure (Amec) in 2015. A follow-up investigation that included the installation and sampling of three new groundwater monitoring wells, was completed by Wood Environment & Infrastructure Solutions (Wood, formerly Amec) in 2017; however due to significant staffing shortages, the subsequent five-year hydrogeology assessment due in 2020 was not completed at that time.

On November 15, 2024, the Ministry issued a non-compliance advisory for Ootischenia landfill noting non-compliance with several reporting requirements in the Operational Certificate. Most of the non-compliance items were related to not meeting historical reporting requirements within the specified timeframes; however all reports noted had been submitted to the Ministry by the time the advisory letter was issued. As noted in the September 27, 2024 committee report presenting the Nakusp Landfill Hydrogeology and Hydrology Characterization Report, the delay in meeting these historic regulatory reporting deadlines was due to significant staffing shortages.

The Five Year Report, which includes the requirement for the hydrogeology assessment, was not identified in the non-compliance advisory; however as this assessment was not completed in 2020, the scope of this assessment was broadened to include all data since the last comprehensive hydrogeology assessment in 2015. This Hydrogeology and Hydrology Characterization Report (HHCR) will be submitted to the Ministry in early 2025 as part of the 2024 Annual and Five Year Report for Ootischenia landfill.

In spring 2024, SLR Consulting (Canada) Ltd. was retained to complete a detailed HHCR in accordance with Section 10.1 of the 2016 *Landfill Criteria for Municipal Solid Waste* (the Landfill Criteria). SLR Staff conducted a site visit with RDCK Staff in May 2024. The HHCR was finalized and submitted to the RDCK at the end of November 2024.

Summary of the 2024 HHCR

The HHCR characterized the physical hydrogeologic and hydrologic setting of the Ootischenia landfill (the site), determined the applicable performance criteria, evaluated the environmental conditions and attenuation capacity of the site, and provided recommendations.

Similar to other RDCK landfills, the compliance criteria referenced in the Operational Certificate for Ootischenia landfill are outdated and are not supported based on the setting and receptors at and in the vicinity of the site. Section 4.1 of the Landfill Criteria states that a Qualified Professional must recommend the appropriate water quality criteria to ensure adequate protection of human health and environment. As the Qualified Professional, SLR evaluated the current and potential future land uses of groundwater and surface water within a one kilometer radius of the site and determined that the following water quality criteria were applicable:

Groundwater: *BC Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards for the protection of Freshwater Aquatic Life and Drinking Water*

Surface Water: *British Columbia Approved and Working Water Quality Guidelines (BC WQG) for Freshwater Aquatic Life, and BC Source Drinking Water Guidelines (SDWG) for the protection of Freshwater Aquatic Life*

To maintain alignment with the landfill's Operational Certificate, SLR also compared groundwater results to the current specified compliance criteria (BC WQG); however they noted that these water quality standards are designed to be protective of surface water, not groundwater.

The HHCR identified that groundwater at the site is impacted by leachate in the immediate vicinity of the landfill, where there appears to be a general trend of slightly increasing leachate potency over time. Water quality improves with distance from the landfill, indicating that natural attenuation is occurring within the site; however down-gradient water quality concerns persist in groundwater samples collected from the northernmost wells at the site.

While there were many groundwater samples noted as non-compliant, the majority of these were due to the application of the BC WQG, which SLR noted is not supported for assessing groundwater compliance at this site. The primary contaminants of concern near the site boundary are copper, nickel, selenium, and uranium, which were in exceedance of the BC WQG, but have not exceeded the BC CSR criteria in any samples collected from site boundary wells since 2019. Lithium is also present in exceedance of BC CSR Drinking Water criteria in several wells along the site boundary. The degree to which these contaminants are related to the landfill, as opposed to

naturally occurring background conditions, is currently difficult to infer as there are no up-gradient wells to assess background groundwater quality in the overburden aquifer. SLR also noted that several of the down-gradient wells appear to be periodically impacted by non-landfill sources, such as contaminated runoff from nearby roadways.

The November 15, 2024 non-compliance advisory from the Ministry noted copper and zinc concentrations in exceedance of the BC WQG in groundwater samples collected from two monitoring wells (MW1-95 and MW17-03) along the east site boundary in 2023 and 2024. In the HHCR, SLR states that water quality exceedances at these two locations likely reflect naturally-occurring bedrock aquifer conditions. Additionally, concentrations of all metals parameters in all samples collected at these locations were well below the BC CSR criteria, which SLR states is the appropriate criteria for assessing groundwater compliance, not the BC WQG.

Surface water locations were usually dry or contained insufficient water to collect comprehensive surface water samples, which supports the conceptualization that Cai Creek is a "losing" stream in which surface water, when present, recharges groundwater that flows beneath the creek, eventually discharging into the Columbia River. From 2015 to 2023, one zinc and one copper exceedance were identified in surface water samples collected from upstream of the landfill. The surface water location downstream of the landfill was dry during all events; therefore no landfill impacts to surface water were identified.

To better understand the extent of landfill impacts to groundwater at the site and assess compliance at the site boundary to ensure the landfill maintains compliance with the Operational Certificate requirements, SLR recommended the following:

1) Request from the Ministry Director to update the applicable groundwater compliance standards for the landfill to BC CSR criteria as part of the next Operational Certificate amendment.

2) To aid in delineation and source identification of groundwater quality impacts, hire a drilling contractor to conduct the following:
    a. Re-drill or deepen dry monitoring wells MW17-01 and MW17-02. If this is not possible, these wells should be decommissioned in accordance with provincial requirements and removed from the EMP.
    b. Install a new monitoring well in the unconfined sand aquifer south (up-gradient) of the landfill to establish background groundwater conditions.
    c. Install a monitoring well in the unconfined sand aquifer west (cross-gradient) of the landfill to confirm water quality compliance to the west.
    d. Install at least one monitoring well in the unconfined sand aquifer northwest (down-gradient) of the landfill to confirm water quality compliance. Due to steep slopes between existing wells and the northwest site boundary, these would need to be off-site, north of Cai Creek.
    e. Install at least one monitoring well in the bedrock aquifer northwest (down-gradient) of the landfill to confirm water quality compliance within the bedrock aquifer (ideally nested with one of the other downgradient wells to allow for assessment of vertical flow gradient).

3) Once new wells installations are complete, re-survey all wells at the site using the top of pipe elevation.

4) Consider the following modifications to the environmental monitoring program (EMP):
    a. Add dissolved organic carbon (DOC) analysis biannually for groundwater and surface water samples as this is a useful indicator parameter for contaminant sources that contain large quantities of organic matter, such as landfills and septage treatment facilities.
    b. Add escherichia coli (e. coli) and fecal coliforms analysis biannually for groundwater samples as these are compliance parameters for septage. Depending on the initial year of testing results, the number of wells and frequency of sampling for these parameters could be reduced.
    c. Add annual analysis of petroleum hydrocarbon parameters at source well MW7-05. If detected, expand to other wells in future years.
    d. Formally add monitoring well MW20-1, the on-site water supply well, and any newly installed wells to the EMP.
    e. Ensure that routine groundwater elevation monitoring is conducted at all wells in a single day prior to sampling.

3.0 NEXT STEPS AND TIMELINE

Staff plan to address the recommendations from the HHCR as follows:

1) Request to update the applicable groundwater compliance standards for the landfill to BC CSR criteria as part of the next Operational Certificate amendment

Staff plan to request this update as a part of the next Operational Certificate amendment for this site. This is planned for once the License of Occupation expansion is completed, and an interim fill plan (currently out for bid) and a septage strategy have been developed, as these will impact future site use and permitting.

2) To aid in delineation and source identification of groundwater quality impacts, hire a drilling contractor to install up to six (6) monitoring wells at the site

Staff included a budget of $200,000 in the Draft RDCK Financial Plan in Account 60000 of the S188 West Resource Recovery for this drilling and well installation program to be completed in 2025. This cost will include soil sampling and analysis, the development of all newly installed wells, and hydraulic conductivity testing at select wells. The new wells will be added to the EMP for bi-annual monitoring and sampling starting in 2026, which is estimated to result in an increase of costs for sampling and laboratory analysis of approximately $8,000 per year. A more precise estimate will be calculated upon completion of this program and added to the proposed budget for S188 West Resource Recovery Service in 2026.

3) Once new well installations are complete, re-survey all wells at the site using the top of pipe elevation

This survey will be conducted in-house by the GIS and CAD Tech once the new wells have been established.

4) Consider modifications to the EMP

As part of the 2025 EMP contract, Masse Environmental Consultants (Masse) will update and streamline inconsistencies in the RDCK's landfill EMPs. The above recommendations will be taken into account in this process.

In addition to the above follow-up to SLR's recommendations, Staff plan to submit the 2024 HHCR to the Ministry as part of the 2024 Annual and Five Year Report for Ootischenia landfill before the deadline of April 30, 2025.

Respectfully submitted,
Heidi Bench – Resource Recovery Projects Advisor

CONCURRENCE

Resource Recovery Manager – Amy Wilson
General Manager of Environmental Services – Uli Wolf
Corporate Administrative Officer – Stuart Horn

ATTACHMENTS:
Attachment A – Hydrogeology and Hydrology Characterization Report for Ootischenia Landfill

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4

Prepared by:

SLR Consulting (Canada) Ltd.

107 - 1726 Dolphin Avenue, Kelowna, BC V1Y 9R9

SLR Project No.: 219.030089.00001

Client Reference No: OPR302-100

November 29, 2024

Revision: 0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
0	November 29, 2024	Devin Hannan	Benjamin Foulger	Erin Robson

Statement of Limitations

This report has been prepared by SLR Consulting (Canada) Ltd. (SLR) for the Regional District of Central Kootenay (Client) in accordance with the scope of work and all other terms and conditions of the agreement between such parties. SLR acknowledges and agrees that the Client may provide this report to government agencies, interest holders, and/or Indigenous communities as part of project planning or regulatory approval processes. Copying or distribution of this report, in whole or in part, for any other purpose other than as aforementioned is not permitted without the prior written consent of SLR.

Any findings, conclusions, recommendations, or designs provided in this report are based on conditions and criteria that existed at the time work was completed and the assumptions and qualifications set forth herein.

This report may contain data or information provided by third party sources on which SLR is entitled to rely without verification and SLR does not warranty the accuracy of any such data or information.

Nothing in this report constitutes a legal opinion nor does SLR make any representation as to compliance with any laws, rules, regulations, or policies established by federal, provincial territorial, or local government bodies, other than as specifically set forth in this report. Revisions to legislative or regulatory standards referred to in this report may be expected over time and, as a result, modifications to the findings, conclusions, or recommendations may be necessary.

Executive Summary

SLR completed a Hydrogeology and Hydrology Characterization Report for the Ootischenia Landfill (the "site") in accordance with the reporting requirements described in the site's Operational Certificate (OC) and Section 10.1 of *Landfill Criteria for Municipal Solid Waste*. This report focuses on the period since the previous five-year hydrogeology report completed by Amec Foster Wheeler (2016) and includes data from 2015 through 2023.

The site operates as a natural attenuation landfill using the area fill method of landfilling. The site receives approximately 21,000 tonnes of waste each year, of which 18,100 tonnes are landfilled and 2,900 tonnes are diverted. The site also has three septage ponds which receive an average of approximately 4,985 m^3 of septage per year.

Site topography slopes in a northwesterly direction towards Cai Creek, an ephemeral tributary of the Columbia River located approximately 50 m north of the site boundary. As site soils are conducive to infiltration, surface water runoff volumes are generally low, and no formal stormwater management system has been implemented at the site.

Upon infiltration, water travels vertically through a thick (45+ m) unsaturated zone consisting of fine to coarse sands with occasional cobbles and seams of trace to some gravel and/or silt. Eventually, the infiltrated water reaches saturated conditions within an unconfined sand aquifer. Groundwater flows in a northwesterly direction at a rate of up to 1.3 m/day. As nearby Cai Creek is often dry downstream of the site, groundwater likely flows underneath Cai Creek and eventually discharges directly to the Columbia River located to the west/northwest of the site.

The current site monitoring network consists of ten groundwater monitoring wells and two surface water stations. Eight of the wells are screened within the deep, unconfined sand aquifer underlying the site, and the remaining two wells are screened within bedrock. The two surface water monitoring stations are located in Cai Creek both upstream and downstream of the site.

Water quality results are currently compared to BC Water Quality Guidelines (WQG), per the OC. SLR notes that the BC WQG are designed to be protective of surface water receiving environments, which is appropriate for comparison of water quality data collected at the two surface water sampling locations. However, the use of BC WQG for comparison to groundwater chemistry results is not supported by the site setting and groundwater receptors of concern.

Sampling results at 'source well' MW7-05 continue to confirm the production of leachate and associated water quality impairment in the immediate vicinity of the landfill, as evidenced by water quality criteria exceedances and/or relatively high levels of ammonia, total organic carbon, chloride, sodium, calcium, cadmium, copper, manganese, nickel, selenium, and uranium. There appears to be a general trend towards increasing leachate potency in recent years, with 2022/2023 sampling results including historically high concentrations of some leachate indicators.

Despite poor water quality at the landfill, downgradient sampling results generally indicate improvement in water quality, suggesting that natural attenuation is occurring. Nonetheless, there remain some water quality concerns near the site's northern (downgradient) boundary, including persistently elevated levels and often repeat water quality exceedances of copper, nickel, selenium, and uranium. Based on the current monitoring network, it is not known to what degree elevated levels and exceedances of these parameters persist beyond the site boundary.

The degree of landfill-related impacts at the site is occasionally difficult to infer, as there is no upgradient well to assess 'background' conditions in the overburden aquifer, and no cross-gradient well to the west.

In addition, several downgradient wells appear to be periodically impacted from non-landfill sources, such as contaminated runoff emanating from offsite, and several others have become permanently dry.

The following is recommended:

- The Environmental Monitoring Plan (EMP) sampling regimen should continue to be performed while the landfill is in operation. Consideration should be given to adopting the following EMP refinements:
  - Adding dissolved organic carbon (DOC) to the biannual Schedule A parameter listing for both groundwater monitoring wells and surface water monitoring stations.
  - Adding microbiological analysis to the biannual Schedule A parameter listing for groundwater monitoring wells. Depending on the results of the initial year of testing, future recommendations may consider decreasing the number of wells and/or frequency of microbiological sampling.
  - Adding petroleum hydrocarbon constituents, including HEPH/LEPH, VPHs, PAHs, and fuel VOCs to the annual Schedule B parameter listing for source well MW7-05. Depending on the results of the initial year of testing, future recommendations may consider expanding the number of wells and/or frequency of petroleum hydrocarbon sampling.
  - Formally recognizing MW20-1 as a part of the EMP sampling program.
  - Sampling the on-site water supply well under the biannual Schedule A regimen.
  - Water quality results must continue to be compared to BC Water Quality Guidelines (WQG), unless RDCK wishes to amend the Operational Certificate. Site groundwater quality results should also be evaluated relative to the more applicable BC Contaminated Sites Regulation Drinking Water (DW) and Aquatic Life (Freshwater) (AW) criteria.
- Monitoring well top of pipe measuring point elevations should be surveyed and adopted as reference elevations (as opposed to the current top of cap measurements).
- Groundwater levels should be collected during a single day, as opposed to over multiple days.
- Dry wells MW17-01 and MW17-02 should be re-drilled/deepened by a drilling contractor to re-establish their intended function within the EMP. If this is not feasible, and the wells continue to remain dry, they should be decommissioned in accordance with provincial requirements and removed from the EMP.
- Site monitoring has indicated exceedances of water quality criteria near the downgradient (northwestern) limit of the site boundary, although it has not been determined with the current monitoring well network if such exceedances are the result of landfill impacts and/or potentially other sources. To further differentiate landfill impacts, and determine where water quality compliance is achieved, the following is recommended:
  - A monitoring well be installed in the unconfined sand aquifer south (upgradient) of the landfill to establish background conditions.
  - A monitoring well be installed in the unconfined sand aquifer west (cross-gradient) of the landfill to confirm water quality compliance to the west.

- At least one monitoring well be installed in the unconfined sand aquifer northwest (downgradient) beyond the site boundary to confirm water quality compliance. The monitoring well(s) should be located north of the Cai Creek valley.
- Consideration should be given to installing at least one monitoring well in the bedrock aquifer northwest (downgradient) of the landfill to confirm water quality compliance within the bedrock aquifer. Pairing this bedrock monitoring well with an overburden monitoring well would also allow for the assessment of vertical flow gradients between these units.

Table of Contents

Statement of Limitations ..... **ii**
Executive Summary ..... **iii**
Table of Contents ..... **vi**
1.0 Introduction **1**
2.0 Site Background **1**
2.1 Location 1
2.2 Operations 1
2.3 Environmental Monitoring Plan 2
2.4 Previous Environmental Reports 3
2.5 Site Visit 4
3.0 Land and Water Use **4**
3.1 Land Use 4
3.2 Groundwater Use 4
3.3 Surface Water Use 5
4.0 Physical Setting **6**
4.1 Climate 6
4.2 Topography 6
4.3 Drainage 6
4.4 Geology 7
4.4.1 Bedrock 7
4.4.2 Overburden 7
4.5 Hydrogeology 7
4.5.1 Aquifers 7
4.5.2 Hydraulic Conductivity 8
4.5.3 Groundwater Levels and Flow 8
4.5.4 Groundwater Velocity 9
5.0 Water Quality **10**
5.1 Regulatory Criteria 10
5.1.1 BC Water Quality Guidelines 10
5.1.2 BC Contaminated Sites Regulation 10
5.1.3 Health Canada 11

5.2 Groundwater Quality 11
5.2.1 Leachate Indicator Parameters 12
5.2.2 Source Well 13
5.2.3 Downgradient Monitoring Wells 14
5.2.4 Bedrock Wells 15
5.3 Surface Water Quality 15
5.3.1 Upstream Surface Water (SW1-08) 15
5.3.2 Downstream Surface Water (SW2-08) 15
5.4 Water Quality Criteria Exceedances 16
6.0 Conceptual Model, Impact Assessment & Attenuative Capacity 18
7.0 Environmental Monitoring Plan 19
8.0 Conclusions 19
9.0 Recommendations 20
10.0 Closure 22
11.0 References 23

Tables in Text

Table A: Monitoring Network Summary 2
Table B: Water Well Summary 4
Table C: Water Quality Criteria Exceedances Summary (2015 – 2023) 16

Appended Tables

Table 1: Groundwater Elevations
Table 2: Field Parameters
Table 3: General Parameters in Groundwater
Table 4: Carbon in Groundwater
Table 5: Petroleum Hydrocarbons in Groundwater
Table 6: Volatile Organic Compounds in Groundwater
Table 7: Polycyclic Aromatic Hydrocarbons in Groundwater
Table 8: Inorganics in Groundwater
Table 9: Metals in Groundwater
Table 10: Field Parameters in Surface Water
Table 11: General Parameters in Surface Water

Table 12: Carbon in Surface Water
Table 13: Petroleum Hydrocarbons in Surface Water
Table 14: Inorganics in Surface Water
Table 15: Metals (Total) in Surface Water

Appended Figures

Figure 1: Site Location
Figure 2: Site Plan
Figure 3: Land and Water Use
Figure 4: Topography and Drainage
Figure 5: Bedrock Geology
Figure 6: Surficial Geology
Figure 7: Cross Section A-A’
Figure 8: Cross Section B-B’
Figure 9: Groundwater Hydrographs
Figure 10: Inferred Groundwater Contour Plan and Groundwater Flow Direction – May 10, 2022
Figure 11: Inferred Groundwater Contour Plan and Groundwater Flow Direction – Oct. 24, 2022

Appendices

Appendix A **Operational Certificate**
Appendix B **Environmental Monitoring Plan**
Appendix C **Borehole Logs**
Appendix D **Site Photographs**
Appendix E **Parameter Concentrations Over Time**

1.0 Introduction

SLR Consulting (Canada) Ltd. (SLR) was retained by the Regional District of Central Kootenay (RDCK) to complete this Hydrogeology and Hydrology Characterization Report (HHCR) for the Ootischenia Landfill, located southeast of Castlegar, BC (the "site" – Figure 1).

The purpose of the HHCR is to meet the reporting requirements described in the site's Operational Certificate (OC), which requires a detailed hydrogeological assessment every five years. This report focuses on the period since the previous five-year hydrogeology report completed by Amec Foster Wheeler (2016) and includes data from 2015 through 2023 (the "reporting period").

This HHCR has been prepared in general accordance with Section 10.1 Hydrogeology and Hydrology Characterization Report of the BC Ministry of Environment and Climate Change Strategy (ENV) document *Landfill Criteria for Municipal Solid Waste* (ENV, 2016). This report includes the following main sections: Site Background; Land and Water Use; Physical Setting; Water Quality; Conceptual Model, Impact Assessment, and Attenuative Capacity; Environmental Monitoring Plan; Conclusions; and Recommendations.

2.0 Site Background

2.1 Location

The site is associated with civic address 671 Columbia Road.

At the closest site boundary, the site is located approximately 315 m southeast of the municipal boundary of Castlegar, BC (Figure 1). The site footprint is irregular in shape, covering approximately 41.8 hectares (ha) (Figure 2).

2.2 Operations

Site landfill operations began in 1968 under Permit PR-00501. This historical Permit was eventually cancelled in accordance with Section 24(10) of the *Environmental Management Act* and superseded by OC 17126 on December 15, 2014 (Appendix A).

The site operates as a natural attenuation landfill using the area fill method of landfilling. The site receives approximately 29,177 tonnes of waste each year, of which 21,386 tonnes are landfilled and 7,791 tonnes are diverted or re-purposed (RDCK, 2019 – 2022, and Masse Environmental, 2024). The site also has three septage ponds that receive an average of approximately 4,135 m^3 of septage per year (RDCK, 2019 – 2022). Landfill closure is anticipated to occur in 2047, with an expected cumulative waste volume of 1,152,608 m^3 (RDCK, 2024).

Authorized wastes include municipal solid waste and septage from septic tanks. Temporary storage of recyclable materials is also permitted. Under certain conditions outlined in the OC, the site may receive waste asbestos. Animal carcasses or mortalities from agricultural operations may also be allowed, subject to certain exceptions and/or special authorizations.

Soil that contains contaminants in concentrations less than hazardous waste as defined in the Hazardous Waste Regulation under the *Environmental Management Act* may be disposed at the landfill, including through monofilling, co-disposal, and use as daily or intermediate cover material.

The OC also indicates the site is authorized to operate a treatment area for contaminated soils. A bioremediation cell was constructed in 2013 and decommissioned in 2020 (RDCK, 2020).

The facility accepted hydrocarbon contaminated soil below Hazardous Waste limits, but above Contaminated Sites Regulation (CSR) Industrial Lands (IL) limits in the lined cell (RDCK, 2019). Soils were treated to levels below CSR Commercial Land (CL) soil quality standards for the parameters of concern (RDCK, 2019). Following treatment, the soils were used as landfill cover material (RDCK, 2019). Upon decommissioning, the liner was removed and soils in the cell were tested as acceptable for use as cover in the landfill (RDCK, 2020). Subsequently, the landfill only accepted soils proven to be uncontaminated soil or waste soil, as described in Bylaw #600-01-06 (RDCK, 2020).

Prohibited wastes include hazardous wastes, biomedical wastes, bulk liquids and semi-solid wastes, waste oils, vehicle hulks, and automobile batteries.

2.3 Environmental Monitoring Plan

Environmental monitoring at the site is governed by an Environmental Monitoring Plan (EMP), developed in 2016/2017 by Amec Foster Wheeler (Appendix B).

The current site monitoring network includes ten groundwater monitoring wells (Figure 2); though MW14-03 has been dry since construction and is therefore not included in the EMP. Historically, the site had an additional four monitoring wells (MW2-95, MW3-95, MW4-05 and MW5-05); however, these wells were either destroyed or inactivated by 2009. It is also noted that MW20-1 was added to the monitoring well network after the EMP was developed. Seven of the nine current groundwater monitoring locations are screened in an unconfined sand aquifer (MW6-05, MW7-05, MW14-01, MW14-02, MW17-01, MW17-02, and MW20-1), whereas the remaining two are screened in underlying bedrock (MW1-95 and MW17-03). A summary of monitoring well construction details is tabled below. Borehole logs are provided in Appendix C.

The monitoring network also includes two surface water stations, SW1-08 and SW2-08, located within Cai Creek just north of the site boundary (Figure 2). The general SW1-08 and SW2-08 locations have also been referred to as SW-1 and SW-2, respectively, in previous reporting.

Table A: Monitoring Network Summary

ID	Matrix	EMP Purpose	Year Est.	Ground Elevation (masl)[2]	Depth (mbgs)[1]	Screened Interval (mbgs)[1]	Primary Screened Material
Current Monitoring Network							
MW1-95	Groundwater	Background Monitoring	1995	490.35	67.1	64.0 – 67.1	Bedrock
MW6-05	Groundwater	Downgradient Monitoring	2005	477..03	63.1	60.1 – 63.1	Silty Sand
MW7-05	Groundwater	Leachate/Source Monitoring	2005	486.27	77.4	60.1 – 63.1	Silty Sand
MW14-01	Groundwater	Downgradient Monitoring	2014	474.48	71.6	68.6 – 71.6	Fine to Med Sand
MW14-02	Groundwater	Downgradient Monitoring	2014	472.89	65.5	57.9 – 59.4	Fine to Med Sand
MW14-03	*See Note 3*	*See Note 3*	2014	N/A	35.1	33.5 – 35.1	Fine Sand
MW17-01	Groundwater	Downgradient Monitoring	2017	474.43	51.5	49.0 – 51.5	Fine Sand

ID	Matrix	EMP Purpose	Year Est.	Ground Elevation (masl)[2]	Depth (mbgs)[1]	Screened Interval (mbgs)[1]	Primary Screened Material
MW17-02	Groundwater	Downgradient Monitoring	2017	473.73	49.1	46.1 – 49.1	Fine Sand
MW17-03	Groundwater	Downgradient Monitoring	2017	471.47	59.4	56.1 – 59.1	Bedrock
MW20-1	Groundwater	Downgradient Monitoring	2020	470.78	59.8	56.8 – 59.8	Fine to Med Sand
SW1-08	Surface Water	Upstream Monitoring	2008	N/A	-	-	-
SW2-08	Surface Water	Downstream Monitoring	2008	N/A	-	-	-

Notes:

[1] mbgs = metres below ground surface.

[2] masl = metres above sea level. Elevation based on survey data provided by RDCK in September 2024. [3] MW14-03 remains accessible but was dry upon construction and is therefore not included in the EMP.

The EMP requires the monitoring wells and surface water stations to undergo water quality sampling on a biannual basis during spring (April or May) and fall (October or November). Although not explicitly stated in the EMP, the groundwater wells also undergo water level monitoring and headspace gas monitoring, and the surface water stations undergo flow rate monitoring.

Each biannual event includes measurement of specific field parameters and laboratory analysis of general chemistry, nutrients, and metals parameters. Laboratory analysis of volatile organic compounds (VOCs) occurs during the October / November event.

SLR understands that monitoring is currently undertaken by Masse Environmental Consultants Ltd. on behalf of RDCK, with laboratory analysis conducted by ALS Canada Ltd.

2.4 Previous Environmental Reports

RDCK supplied SLR with the following documents for consideration in the development of this current report:

- *Hydrogeological Assessment of Ootischenia Aquifer, Ootischenia Improvement District, Castlegar, B.C.* (Piteau Associates Engineering Ltd, 1998)
- *Design and Operations Plan, Ootischenia Landfill Site, Regional District of Central Kootenay, Castlegar, British Columbia* (CRA, 2009)
- *Five Year Hydrogeology Review, Ootischenia Landfill, Castlegar, BC* (Amec Foster Wheeler Environment & Infrastructure, 2016)
- *Ootischenia Landfill Castlegar, British Columbia* (DMT Geosciences Ltd., 2017)
- *Follow-up Work Regarding Hydrogeological Recommendations for Ootischenia Landfill, Castlegar, BC* (Wood, 2018)
- *Ootischenia Landfill 2019 Annual Operations and Monitoring Report* (RDCK, 2019)
- *Ootischenia Landfill 2020 Annual Operations and Monitoring Report* (RDCK, 2020)

- *Ootischenia Landfill 2021 Annual Operations and Monitoring Report* (RDCK, 2021)
- *Ootischenia Landfill 2022 Annual Operations and Monitoring Report* (RDCK, 2022)
- *Annual Environmental Monitoring Program Ootischenia Landfill* (Masse Environmental, 2024) [describes 2023 environmental monitoring].

In addition to the above reports, RDCK supplied SLR with a .csv flat-file database of water quality results from 2006 through 2023, although, as mentioned previously, this current report focuses on the period since the previous five-year hydrogeology report conducted by (Amec Foster Wheeler, 2016) and includes data from 2015 through 2023.

2.5 Site Visit

Prior to undertaking this report, SLR was given a tour of the site by RDCK representatives on May 2, 2024. The purpose of this site visit was to further acquaint SLR with the site's physical setting, infrastructure, operations, and monitoring network.

SLR staff made general notes and took photos of key features; however, no environmental monitoring activities took place. Site photos are provided in Appendix D.

3.0 Land and Water Use

3.1 Land Use

The majority of site land use is zoned as heavy industrial (M3), with the northern tip zoned as residential (R1A) (Figure 3). Surrounding land use is zoned as residential to the north (R1A) and southeast (R2I), and open space (OS) to the north/northeast, east, south/southeast, and west.

3.2 Groundwater Use

There are 16 water well records mapped within a one-kilometre radius of the landfill boundary (iMapBC, 2024) (Figure 3).

Four water well records are mapped on-site: WTN 121104 supplies the site washroom and is used for hand washing and toilet flushing (not drinking water); WTN 26939 is an older well that does not have a use listed and is no longer active; and WTN 113240 and 113237 are inferred to be monitoring wells MW17-03 and MW17-02 respectively.

Five water supply wells are located within one-kilometre north / northwest, and potentially downgradient, of the site. One of these wells, WTN 124984, was installed in 2022 and lies within 500 m northwest of the site, potentially downgradient of the site. Well details are summarized in Table B and well records are included in Appendix C.

Table B: Water Well Summary

WTN	Year Drilled	Drill Method	Use	Depth (mbgs)[1]	Screen/Open Interval (mbgs)	Screened Primary Lithology	Static Water Level (mbgs)
36104	1976	Cable	Domestic	75.6	69.2 – 72.3	Coarse Gravel	44.8
5056	1950	N/A	N/A	85.4	N/A	Silt[2]	N/A
36645	1977	Cable Tool	N/A	19.5	18.0 – 19.5	Silty Sand[2]	>12.8
35658	1976	N/A	N/A	111.0	N/A	Sandy Silt[2]	N/A

WTN	Year Drilled	Drill Method	Use	Depth (mbgs)[1]	Screen/Open Interval (mbgs)	Screened Primary Lithology	Static Water Level (mbgs)
124984	2022	Dual Rotary	Domestic	22.9	21.7 – 22.9	Sand Gravel	3.0
113240	Inferred to be MW17-03 – see Table A						
113237	Inferred to be MW17-02 – see Table A						
26939	1972	Cable Tool	N/A	16.5	N/A	Med to Coarse Sand	>13.4
121104	2020	Air Rotary	Water Supply	106.7	105.2 – 106.7	Bedrock	63.6
93229	2007	Air Rotary	Domestic	151.8	39.2 – 151.8	Bedrock	60.7
93226	2007	Air Rotary	Domestic	71.7	36.6 – 71.7	Bedrock	N/A
93228	2007	Air Rotary	Domestic	77.7	29.0 – 77.7	Bedrock	N/A
118342	2017	Air Rotary	Domestic	97.6	35.7 – 97.6	Bedrock	28.3
27110	1972	Cable Tool	N/A	13.7	N/A	Bedrock[2]	'Dry'
27111	1972	Cable Tool	N/A	18.3	N/A	Bedrock[2]	N/A
90311	N/A	Air Rotary	Domestic	78.7	22.9 – 78.7	Granite	21.3

Notes:

[1] mbgs = metres below ground surface.

[2] Screened lithology assumed based on well depth and geology at end of hole (EOH).

3.3 Surface Water Use

There are seven surface water points of diversion (PODs) mapped within a one-kilometre radius of the landfill boundary (iMapBC, 2024). All PODs are located south, or upgradient, of the landfill (Figure 3).

In summary:

- PD28106, located approximately 420 m south/southeast of the landfill boundary, is associated with Popoff Spring and is permitted under license number C069602 to divert 308.37 m^3/year of water for irrigation purposes and 2.273 m^3/day for domestic purposes.
- PD78867, located approximately 495 m south of the landfill boundary, is associated with Columbia Spring and is permitted under license C130644 to divert 2.273 m^3/day for domestic purposes.
- PD78868, located approximately 520 m south of the landfill boundary, is associated with Columbia Spring and is also permitted under license C130644 to divert 2.273 m^3/day for domestic purposes.
- PD78866, located approximately 730 m south of the landfill boundary, is associated with Columbia Spring and is also permitted under license C130644 to divert 2.273 m^3/day for domestic purposes.
- PD28108, located approximately 780 m south of the landfill boundary, is associated with Popoff Spring and is permitted under license numbers C130987 and C128642 to divert 1,233.48 m^3/year and 2,158.59 m^3/year, respectively, for irrigation purposes. C128642 also permits 4.546 m^3/day for domestic purposes.

- PD28104, located approximately 820 m south of the landfill boundary, is associated with Popoff Spring and is permitted under license numbers C130987 and C128642 to divert 1,233.48 m^3/year and 2,158.59 m^3/year, respectively, for irrigation purposes. C128642 also permits 4.546 m^3/day for domestic purposes. Although the permitting details of this POD appear identical to PD28108, the two PODs appear to relate to different locations of Popoff Creek.
- PD28111, located approximately 870 m south of the landfill boundary, is associated with Dana Spring and is permitted under license C060007 to divert 2.273 m^3/day for domestic purposes.

4.0 Physical Setting

4.1 Climate

Climate station “Castlegar A” (ID 1141455) is located north of the site at West Kootenay Regional Airport (‘Castlegar Airport’). Based on Government of Canada climate normals data for the period of 1981 to 2010, the average annual temperature in Castlegar is 8.7°C, with an average daily maximum of 28.2°C (August) and an average daily minimum of -4.2 °C (December). Mean annual precipitation is 751 mm, with 564 mm of rain and 201 cm of snowfall.

4.2 Topography

Regional topography consists of a series of terraces within the Selkirk Mountain range. The terraces represent former floodplain levels of the historic Columbia River, formed as a result of glacial melt and erosional processes (CRA, 2009). The terrace benches occur in a roughly north-south manner, and are staggered at elevations of approximately 580, 550, 480, 435, and 420 metres above sea level (masl) (Piteau, 1998), with the Columbia River water level at approximately +/- 417 masl. The site appears most closely associated with the 480 masl feature.

On-site ground elevation slopes to the northwest, ranging from approximately 540 masl along the site’s southern border to 435 masl in the site’s northwestern corner (Figure 4). Surface grade within the active landfilling area ranges from approximately 500 masl in the southeast to 478 masl in the west.

4.3 Drainage

The site lies within the Columbia River watershed. The Columbia River itself lies approximately 240 m west of the site at its closest point. Hydrometric station “Columbia River at Birchbank” (08NE049), located over 10 km downstream of the site, drains an area of 87,400 km^2 and has an average daily flow of over 2,000 m^3/s (WSC, 2024). Typically, the largest flows at this station occur during the summer, with the month of July recording the largest average flow of 4,030 m^3/s. The lowest flows occur during the early spring, with the month of April recording the smallest average flow of 1,040 m^3/s.

Most of the site also lies within the Cai Creek subwatershed. Cai Creek itself is located approximately 50 m north of the site boundary. Inactive hydrometric station “Cai Creek at Brilliant” (08NE094), located about 500 m northeast of the site, drains an area of 2.85 km^2 and, during the period of 1964 to 1967, had periodic flow measurements ranging from 0.000 to 0.002 m^3/s. Cai Creek surface water stations SW1-08 and SW2-08, located north of the site, are typically dry, although upstream SW1-08 has had measured flow rates reaching 0.007 m^3/s during spring events. Based on these observations, and the inferred position of the water table likely 40+ m below the streambed (Section 4.5.3), Cai Creek is considered a ‘losing’ ephemeral stream,



flowing only in response to run-off events. As site soils are conducive to infiltration, surface water runoff volumes are generally low, and no formal stormwater management system has been implemented at the site (CRA, 2009).

4.4 Geology

4.4.1 Bedrock

Regional bedrock geology mapping indicates the site is underlain by granodioritic intrusive rocks to the north ("Greenwood, Wallace Creek Plutons, Kinnaird Gneiss") and paragneiss metamorphic rocks to the south ("Trail Gneiss") (Figure 5).

Site borehole logs indicate depth to bedrock ranges from 29 to 105 mbgs. Previous bedrock mapping suggested the bedrock surface sloped in a northwesterly manner from >420 masl in the southeast to 390 masl in the northwest (AMEC, 2009). However, the relatively new (2020) addition of WTN 121104, which has a bedrock depth of 105 mbgs – over 48 m deeper than nearby bedrock contacts – is suggestive that a relatively steep bedrock crevasse exists in the northeast of the site.

4.4.2 Overburden

Regional surficial geology mapping indicates that shallow native soils within most of the site and its surrounds are part of the Gillis and Glenlily Associations (Figure 6). Gillis and Glenlily soils share similar characteristics; both occur on flat, terraced glaciofluvial deposits, and are typically coarse-grained and drain rapidly (Jungen, 1980).

Site cross-sections have been prepared to illustrate overburden geology in the vicinity of the site (Figure 7 and Figure 8). The sections were developed based on the borehole logs from prior subsurface investigations (Appendix C). Native overburden materials in the vicinity of the landfill generally consist of fine to coarse sands with occasional cobbles and seams of trace to some gravel and/or silt. These materials occur from ground surface down to bedrock.

4.5 Hydrogeology

4.5.1 Aquifers

According to provincial mapping, the majority of the site is underlain by regional Aquifer 501 "Castlegar Overburden" (iMapBC, 2024). This aquifer, which spans 46.5 km^2, is described as a mixed unconfined and confined glaciofluvial sand and gravel deposit of moderate productivity and high to moderate vulnerability (Lengyel et al. 2023a). At least 163 wells draw water from this aquifer, with the depth of most wells exceeding 30 mbgs (Lengyel et al. 2023a). Water use includes domestic, commercial/industrial, and production (Lengyel et al. 2023a). The site monitoring wells are inferred to be screened within Aquifer 501.

The extreme northern perimeter of the site is underlain by regional Aquifer 510 (iMapBC). This aquifer, which spans 6.6 km^2, is described as a confined glaciofluvial sand and gravel deposit of moderate productivity and vulnerability (ENV, 2002). At least 22 wells draw water from this aquifer, with the median well depth at 58.4 mbgs (ENV, 2002). Water use includes domestic and production (ENV, 2002).

Regional Aquifer 1283 "Brilliant Bedrock" underlies Aquifer 501 and Aquifer 510 in the vicinity of the site (iMapBC, 2024). This aquifer, which spans 53.1 km^2, is described as a fractured crystalline rock of overall moderate productivity and low vulnerability (Lengyel et al. 2023b). At least 33 wells draw water from this aquifer, with the average depth to bedrock in the aquifer

being 52.6 mbgs (Lengyel et al. 2023b). Water use includes domestic and water supply (Lengyel et al. 2023b).

4.5.2 Hydraulic Conductivity

Previous reporting indicates hydraulic response testing yielded overburden hydraulic conductivities ranging from approximately 1 x 10^{-4} to 2 x 10^{-4} m/s (reported average of 1.8 x 10^{4} m/s) and bedrock hydraulic conductivities ranging from 1 x 10^{-7} to 2 x 10^{-6} m/s (CRA, 2009).

The available reporting does not have details on which wells were tested or testing methodology and analysis. Nonetheless, based on comparison to literature values, the overburden results are within the expected range for fine to coarse sand material and the bedrock results appear reasonable for fractured rock (Heath, 1983).

4.5.3 Groundwater Levels and Flow

Regionally, groundwater recharge is likely to occur mostly from precipitation; this water infiltrates through the overburden to the unconfined sand aquifer, with the majority of flow ultimately discharging as baseflow to the Columbia River. Some authors have also claimed that Aquifer 501 may also receive recharge from adjacent mountains via the underlying bedrock aquifer (Lengyel et al. 2023a).

Groundwater levels measured from 2016 to 2023 are provided in Table 1, groundwater elevation hydrographs are illustrated on Figure 9, and groundwater elevation contour plots are illustrated on Figure 10 and Figure 11.

Overburden Wells

The following trends are noted for the eight overburden wells:

- Location MW14-03, installed to approximately 35 mbgs, has been dry since installation in 2014. MW17-01 and MW17-02, installed between approximately 49 to 51 mbgs, have been dry since 2019.
- The average of measured depth to water in overburden ranged from approximately 49 metres below top of reference (mbtor) (MW20-01) to 58 mbtor (MW7-05).
- Groundwater levels generally ranged between 435 masl and 421 masl (Figure 9). There was a trend towards declining groundwater elevations beginning in 2018; however, this trend ‘flattened’ from 2020 onwards.
- Groundwater elevation lows were generally recorded in spring whereas highs are generally recorded in fall (Figure 9).
- Hydraulic gradients between wells were generally consistent event to event (Figures 9 to 11).
- May 2023 and October 2023 measurements at MW14-02 appear anomalous and are considered spurious. As a result, the most recent 2023 dataset was not used in the production of groundwater elevation plots (see bullet below).
- Overburden aquifer groundwater elevation contour plots are provided for May 2022 (Figure 10) and October 2022 (Figure 11) monitoring events. In both instances, groundwater is inferred to flow in a northwesterly direction.

Bedrock Wells

The following trends are noted for the two bedrock wells:

- The average of measured depth to water in bedrock ranged from 37 mbgs (MW1-95) to 47 mbgs (MW17-03).
- Groundwater levels generally ranged between 457 masl and 424 masl (Figure 9). There was a trend towards declining groundwater elevations beginning in 2017; however this trend flattened from 2021 onwards.
- In contrast to the overburden trend, bedrock groundwater elevation lows were generally recorded in fall whereas highs were generally recorded in spring (Figure 9). In addition, the range of seasonal water level fluctuation was narrower in the bedrock.
- Groundwater elevations at bedrock well MW1-95 were typically 25 m or more higher than those observed in overburden wells (Figure 9).
- Groundwater elevations at bedrock well MW17-03 were on average only 2.6 m greater than those observed at the closest overburden well, MW14-01, located about 100 m to the southwest.
- Vertical gradients between the overburden and bedrock could not be determined due the lateral distance and the differences in surface and bedrock elevations between the wells in the two completion zones.
- Bedrock groundwater elevation contour plots could not be constructed without a third bedrock well to establish a two-dimensional plane. Nonetheless, if it is assumed, based on topography that the horizontal flow direction of the bedrock aquifer is similar to that in the overburden (i.e. northwesterly), then it is likely that neither MW1-95 nor MW17-03, which are located along the extreme eastern flank of the site, are within the landfill groundwater plume footprint.

4.5.4 Groundwater Velocity

Average linear groundwater velocity for the saturated groundwater system is estimated via Darcy's Law using the following equation:

$$V = K\, i / n$$

Where:

V = average linear groundwater velocity

K = hydraulic conductivity

i = hydraulic gradient (dh/dl)

n = effective porosity

For the site, the input parameters include the geometric mean of site hydraulic conductivity ($K = 1.8 \times 10^{-4}$ m/s), the average hydraulic gradient between MW7-05 and downgradient MW20-1 for the period of 2020 through 2023 (0.02 m/m), and an assumed effective porosity for sand (n = 0.25), resulting in an average linear groundwater velocity of 1.5×10^{-5} m/s, or 1.3 m/day, or approximately 500 m/year.

This result is considered somewhat conservative as the porosity of sand can range from 0.25 to 0.35 (Heath, 1983, and Freeze and Cherry, 1979), so choosing an effective porosity at the low end of this range will serve to increase velocity.

5.0 Water Quality

5.1 Regulatory Criteria

The regulatory criteria described in this report is considered current to October 18, 2024.

5.1.1 BC Water Quality Guidelines

According to the Operational Certificate (Appendix A):

> *"The Operational Certificate holder must take appropriate measures to ensure that ground water and surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines or other appropriate criteria as may be specified by the Director at or beyond the landfill property boundary."*

In alignment with the OC, and to maintain consistency with previous site reporting (Section 2.4), this report compares site water quality results to British Columbia Approved and Working Water Quality Guidelines (BC WQG) for freshwater aquatic life (BC WQG AWF).

Like previous authors (Amec Foster Wheeler, 2016 and Masse, 2024), SLR notes that the BC WQG are designed to be protective of surface water receiving environments, which is appropriate for comparison of water quality data collected at the two surface water sampling locations (SW1-08 and SW2-08). However, the use of BC WQG for comparison to groundwater chemistry results is not supported by the site setting and groundwater receptors of concern.

5.1.2 BC Contaminated Sites Regulation

Evaluating site water quality under the BC Contaminated Sites Regulation (CSR) (ENV, 2024a) and the *Environmental Management Act* (EMA) (ENV, 2024b) has been discussed and suggested in site reporting as early as 2016 (Amec Foster Wheeler). SLR agrees that the applicability of the BC CSR standards to site water quality deserves further consideration.

Schedule 3.2 of the CSR includes four numerical standards for substances in water:
1) Drinking Water; 2) Aquatic Life; 3) Irrigation; and 4) Livestock.

A brief discussion of each with regards to their applicability to the site is provided below:

Drinking Water (BC CSR DW)

Drinking Water Use applies where groundwater or surface water at or within 500 m of a site is currently used for drinking water. If the groundwater flow direction has been reliably determined, nearby current uses may be limited to include drinking water wells located 100 m upgradient and 500 m cross-gradient and downgradient of the site property boundary or outer extent of the groundwater contamination source where it extends beyond the property boundary.

Five water supply wells are located to the north / northwest of the site within 1,000 m of the site (Figure 3). The closest of these is WTN 124984, located less than 300 m downgradient of the site boundary. In addition, there is an on-site supply well WTN 121104; however, RDCK has confirmed that this well is only used for hand washing and toilet flushing.

It has not been confirmed whether shallow groundwater discharging from the site is entirely captured by the Cai Creek streambed and diverted west towards the Columbia River, or whether underflow exists that may travel further north. As such, DW standards are included in this assessment for comparison to site groundwater quality results.

Aquatic Life (BC CSR AW)

Aquatic Life Water Use applies to all groundwater located within 500 m of an aquatic receiving environment unless it can be demonstrated that the groundwater does not flow to that receiving environment.

The nearest freshwater surface water receptor is Cai Creek, an ephemeral “losing” stream that lies within 50 m of the site’s northern border. Cai Creek drains towards the Columbia River, which lies approximately 240 m west of the site at its closest point. As such, AW standards are included in this assessment for comparison to site groundwater quality results.

Irrigation (BC CSR IW) and Livestock (BC CSR LW)

Irrigation or Livestock Water Use applies where the groundwater or surface water at or within 500 m of a site is currently used for irrigation or livestock watering. If the groundwater flow direction has been reliably determined, nearby current uses may be limited to include irrigation and livestock watering wells or surface water intakes located within 100 m upgradient and 500 m cross gradient or downgradient of the site property boundary or outer extent of the groundwater contamination source where it extends beyond the property boundary.

As indicated in Section 3.0 and Figure 3, surrounding land use is zoned as residential to the north and southeast, and “open space” to the north/northeast, east, south/southeast, and west. Because no agricultural lands are present within 500 m, IW and LW standards are not included in this assessment for comparison to site groundwater quality results.

5.1.3 Health Canada

The Health Canada Guidelines for Drinking Water Quality (GCDWG) (Health Canada, 2024) are considered applicable to the downgradient water supply wells. However, sampling of these water supply wells is not within the scope of the current EMP. It is SLR’s understanding that the on-site water supply well is not used as a source of potable water. Should the on-site water supply well ever be used as a source of potable water, GCDWG would apply at this well at the point of consumption.

5.2 Groundwater Quality

Groundwater quality results for the reporting period of 2015 to 2023 are presented in the following tables:

- Table 2: Field Parameters in Groundwater
- Table 3: General Parameters in Groundwater
- Table 4: Carbon in Groundwater
- Table 5: Petroleum Hydrocarbons in Groundwater
- Table 6: Volatile Organic Compounds (VOCs) in Groundwater
- Table 7: Inorganics in Groundwater
- Table 8: Metals in Groundwater

Concentration over time plots for select parameters are included in Appendix E.

Typically, an HHCR evaluates site groundwater quality trends from the approach of: 1) establishing a subset of leachate indicator parameters and associated near-source water quality; 2) characterizing upgradient (background) water quality; and 3) evaluating landfill impacts by examining the concentration of leachate indicator parameters at downgradient wells directly compared to both source and background water quality over time. However, for this HHCR, no upgradient overburden monitoring well exists.

As such, a direct evaluation of landfill impacts on water quality is not possible, leading to the addition of an upgradient monitoring well being a key recommendation in this report (Section 9.0). Nonetheless, a relative evaluation of incremental landfill impacts on downgradient water quality may still be inferred.

5.2.1 Leachate Indicator Parameters

Leachate monitoring is required to establish site-specific leachate chemistry and to identify indicator parameters for evaluation of impacts surrounding the landfill. Monitoring well MW7-05, is located within the landfill footprint and frequently displayed the largest concentrations of landfill indicators. Although not screened within the landfill waste itself, MW7-05 has been used to identify leachate impacts as a de facto 'source' well (RDCK 2019 – 2022, Masse, 2024).

Parameters previously identified as potential indicators of leachate impact have included alkalinity, ammonia, chloride, sodium, total organic carbon (TOC), cadmium, calcium, chromium, copper, iron, manganese, selenium, uranium, and zinc. Concentration over time plots for these parameters are included in Appendix E.

Chloride, sodium, cadmium, copper, manganese, selenium and **uranium** are selected as leachate impact indicators in this HHCR. These parameters have been chosen based on sampling results at source well MW7-05, prevalence of water quality exceedances, and consideration of general characteristics described in the BC Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills (ENV, 2024c), including: the selection of parameters that are commonly present in municipal solid waste leachate; resist decomposition; and are present at concentrations well above laboratory detection limits.

Ammonia, chromium, iron and zinc, exhibited elevated concentrations in one or more downgradient monitoring wells during the reporting period; however, they typically had extended periods of relatively lower concentrations at source well MW7-05, and are therefore not a focus of leachate assessment in this report.

Nickel concentrations have been increasing at MW7-05 since 2020; however, the presence of elevated nickel concentrations at certain downgradient wells but not at others may suggest a non-landfill (perhaps naturally-occurring) phenomenon. As with other parameters, the potential addition of an upgradient monitoring well could help refine the assessment of nickel trends.

In addition, while lithium was not identified as a leachate indicator in the previous HHCR (Amec Foster Wheeler, 2016), it is notable that elevated concentrations of this parameter were found in source well MW7-05 as well as several downgradient wells. However, source well concentrations during the reporting period have always been lower than at least one downgradient well (and often several more). This makes it difficult to confidently ascribe the presence of lithium to landfill contamination as opposed to background conditions, particularly given the absence of an upgradient overburden well that would further contextualize the data.

Lastly, microbiological parameters are not part of the sampling regimen at the site, although the presence of septage beds could suggest the potential for bacteriological contamination of groundwater. This matter is discussed later in the report.



5.2.2 Source Well

Leachate indicator trends at source well MW7-05 were reviewed with respect to concentrations over time (Appendix E). The following is noted:

- Chloride and sodium concentrations exhibit similar behaviour. Gradual fluctuations between roughly consistent upper and lower bounds occurred from 2015 through 2020, whereafter a general trend towards increasing concentrations continued through spring of 2023.
- Cadmium concentrations displayed large seasonal fluctuations from 2015 through 2017, followed by a period of relatively low but slightly increasing concentrations from 2018 through 2020, followed by a more rapid trend of increase through 2021, with concentrations then peaking in 2022/2023.
- Copper concentrations exhibited gradual fluctuation between a roughly consistent upper and lower bound from 2016 through 2019, whereafter an accelerating trend towards increasing concentrations continued through 2023.
- Manganese concentrations displayed large (occasionally seasonal) fluctuations from 2015 through 2017, followed by a period of relatively low concentrations from 2018 through 2021, ending with a period of high concentrations from fall 2022 through 2023. It is notable that iron, a parameter often paired with manganese in the context of redox sensitivity, did not consistently follow the manganese concentration trends observed at the site, and remained consistently low (often below detection limits).
- Selenium concentrations have irregularly fluctuated within a roughly consistent upper and lower bound. There is no clear trend towards long-term increase or decrease, although the most recent 2022 – 2023 data did not display the large ‘spikes’ in concentration common in several earlier years.
- Uranium concentrations steadily rose from 2015 through 2016, followed by a period of relatively low concentrations from 2017 through 2019, whereafter a general (albeit greatly fluctuating) trend towards increasing concentrations continued through 2023.

Many parameters shared a distinct period of relatively low and consistent concentration that occurred from roughly +/- 2018 through +/- 2020. There is no obvious reason for such an occurrence, although there may be some correlation between a decline in larger precipitation events and lower concentrations (see Figure 9), with a decrease in moisture surplus potentially resulting in reduced leachate production.

The aforementioned period of low concentration was followed by a trend towards general increase, with 2022/2023 sampling results including historically high concentrations of some leachate indicators.

5.2.3 Downgradient Monitoring Wells

Downgradient overburden water quality is specifically examined at monitoring wells MW6-05, MW14-02, and MW20-1. MW6-05 is approximately 50 m downgradient of the nearest waste deposition, while MW14-02 and MW20-1 are both approximately 100 m further downgradient.

Monitoring wells MW14-03, MW17-01 and MW17-02, although positioned downgradient, were not monitored or dry for most or all of the reporting period and are therefore not considered.

Although positioned north of the landfill, the role of MW14-01 as a downgradient monitor has been questioned owing to the unusual chemistry of its water quality, including its different major ion composition and its unique “sodium-chloride-sulphate” type water compared to the “calcium-bicarbonate-sulphate” type water prevalent at the other monitoring wells (Amec Foster Wheeler, 2016).

Previous reporting has suggested that the unique water quality at MW14-01 could be a result of its screen position deep below the water table, and/or different geological conditions surrounding the screen, although “the dominance of sodium, chloride and sulphate at MW14-1 may also reflect landfill impacts at this location” (Amec Foster Wheeler, 2016).

While SLR does not dispute that water quality at MW14-01 may, in part, reflect some measure of landfill impact, it is also possible that the occasional high levels or “spikes” of certain parameters – particularly ammonia, chloride, and sodium – have occurred as result of surface water runoff contaminating the aquifer, noting that MW14-1 is the closest overburden well to Columbia Road. Given its unique baseline chemistry, and its possible subjection to sources of contamination other than the landfill, MW14-01 is considered poorly suited for inclusion in a discussion of site-wide water quality trends.

Leachate indicator trends at downgradient monitoring wells MW6-05, MW14-02, and MW20-1 were reviewed with respect to concentrations over time (Appendix E). Given that MW20-1 was installed in May 2020, the period of 2020 – 2023 is of focus. The following is noted:

- Leachate indicator concentrations were typically lower in the downgradient wells than in the source well, with selenium being an exception.
- Leachate indicator concentrations in downgradient wells have typically been increasing since 2022, with selenium again being an exception. This overall increasing trend is generally concordant with trends observed at source well MW7-05.
- MW6-05 frequently had lower leachate indicator concentrations than MW14-02 and occasionally also MW20-1, despite these latter two wells being further downgradient from the landfill. The reason(s) for such a result is not certain but could be the result of a discrete contaminant pulse travelling through the system, preferential flowpaths short-circuiting contaminant transport (noting that the screened material at MW14-02 and MW20-1 is coarser than that at MW6-05), biogeochemical processes, changes to operations or waste composition, or external sources of water quality impact.
- The magnitude of concentration fluctuations was often greater in MW14-02 and MW20-1 than MW6-05, with MW14-02 in particular exhibiting “spikes” in chloride, sodium, copper, and selenium that were muted or absent in MW6-05. The reason for this behaviour may relate to the proximity of MW14-02 and MW20-1 to the Cai Creek drainage corridor, and the possibility that contaminated runoff entered the aquifer through ‘losing’ conditions in the stream. However, leachate indicator concentrations at SW1-08 were typically less than those observed in MW14-02 and MW20-1.



5.2.4 Bedrock Wells

Although groundwater flow direction within the bedrock could not be ascertained with the two well locations available, if it is assumed that the horizontal flow direction of the bedrock aquifer is consistent with that in the overburden (i.e. northwesterly), then it is possible that bedrock wells MW1-95 and MW17-03, which are located along the eastern flank of the site, are outside of the contaminating plume footprint of the landfill. Under these circumstances, leachate impacts would not be expected. Nonetheless, leachate indicator trends at bedrock monitoring wells MW1-95 and MW17-03 are reviewed with respect to concentrations over time (Appendix E).

In summary, leachate indicator concentrations were generally lower in bedrock than overburden, and both bedrock wells shared similar concentrations and temporal trendlines for most leachate indicators. These results would tend to support a conceptualization that the bedrock monitoring wells were not significantly impacted by the landfill leachate plume, and, by extension, any water quality exceedances at these wells can be attributed to natural background conditions or sources of contamination other than the landfill.

5.3 Surface Water Quality

Surface water quality results for the reporting period of 2015 to 2023 are presented in the following tables:

- Table 10: Field Parameters in Surface Water
- Table 11: General Parameters in Surface Water
- Table 12: Carbon in Surface Water
- Table 13: Petroleum Hydrocarbons in Surface Water
- Table 14: Inorganics in Surface Water
- Table 15: Metals (Total) in Surface Water

Concentration over time plots for select parameters are included in Appendix E.

5.3.1 Upstream Surface Water (SW1-08)

Cai Creek upstream surface water station SW1-08 was sampled during six events within the reporting period and was dry the remaining ten events. All ‘wet’ events occurred during the spring (April or May), with the last wet sampling event being April 2023.

Surface water concentrations of chloride, sodium, cadmium, copper, manganese, and selenium were typically lower than those measured in groundwater, with cadmium and copper being occasionally higher than a few downgradient wells (noting that total metals concentrations in surface water could be biased high relative to dissolved concentrations in groundwater). Furthermore, there were comparatively few water quality exceedances at SW1-08 relative to site groundwater wells (see below). As such, it appears that SW1-08 was not significantly impacted by landfilling activities, which is to be expected given its upstream location.

5.3.2 Downstream Surface Water (SW2-08)

Cai Creek downstream surface water station SW-08 was observed as dry during the reporting period. Although these dry occurrences negate discussion of downstream water quality, they do support the conceptualization of Cai Creek as a ‘losing’ stream that recharges surface water into the groundwater system (Section 4.3).

5.4 Water Quality Criteria Exceedances

Water quality results for the reporting period of 2015 to 2023 are presented in appended Tables 2 through Table 15. Water quality criteria exceedances for a given monitoring location, sampling event, and parameter are flagged via cell formatting unique to each applicable criterion.

A tally of exceedances at each monitoring location is summarized below (Table C). Of note:

- The majority of criteria exceedances occurred at source well MW7-05 (115), followed by MW6-05 (92), MW1-95 (61), MW14-01 (61), MW14-02 (57), MW20-1 (38), MW17-02 (28), MW17-03 (24), MW17-01 (11), and SW1-08 (7). However, these exceedance tallies should be viewed with the following caveats:
  - Water quality exceedances at MW1-95 and MW17-03 likely reflected naturally-occurring bedrock aquifer conditions.
  - Even though an upgradient monitoring well does not exist to characterize 'background' water quality for the unconfined sand aquifer, it is strongly speculated that certain parameter exceedances may relate to naturally-occurring conditions (for example, the 24 CSR DW exceedances of lithium).
  - Certain water quality results at MW14-01, MW14-02, MW17-02, and MW20-1 may have been influenced by contaminated runoff entering the Cai Creek drainage corridor and infiltrating to the overburden aquifer.
  - The number of exceedances accumulated at each well will in part be dependent on the length of its operational life, noting that not all wells have been sampled the full length of the reporting period.
- The majority of exceedances related to BC WQG. Furthermore, most parameters that had exceedances were non-compliant exclusively with respect to BC WQG, including: pH, temperature, dissolved oxygen, total ammonia (as N), nitrate (as N), sulphate, arsenic, cadmium, chromium, copper, nickel, and zinc. As mentioned previously, the BC WQG are designed to be protective of surface water, as opposed to groundwater, receiving environments.
- There were several parameter exceedances of BC CSR DW at multiple wells, including lithium (24 total exceedances among 5 wells), selenium (four total exceedances among three wells), and uranium (seven total exceedances among two wells). There were also two BC CSR DW exceedances for sulphide (as H_2S) at MW14-01 and one BC CSR DW exceedance of 1,2-cis-dichloroethylene at MW17-02.
- There were single BC CSR AW exceedances of selenium at MW7-05 and MW17-02, and two BC CSR AW exceedances of sulphide (as H_2S) at MW14-01.

Table C: Water Quality Criteria Exceedances Summary (2015 – 2023)

Parameter	Criteria Exceeded	Monitoring Well [Number of Exceedances]
pH (Field) (pH Lab not considered given field results)	BC WQG AWF, Long-Term BC WQG AWF, Short-Term	MW14-01 [6] MW17-03 [1] MW1-95 [1] MW20-1 [1] MW6-05 [1] MW7-05 [2] SW1-08 [1]
Temperature (Field)	BC WQG AWF, Long-Term BC WQG AWF, Short-Term	MW14-01 [3] MW14-02 [5], MW17-01 [2] MW17-02 [2] MW17-03 [4] MW1-95 [2] MW6-05 [9] MW7-05 [9] SW1-08 [3]

Parameter	Criteria Exceeded	Monitoring Well [Number of Exceedances]
Dissolved Oxygen (Field)	BC WQG AWF, Long-Term	MW14-01 [2] MW17-03 [2] MW1-95 [2] MW20-1 [2] MW6-05 [1] MW7-05 [2]
Dissolved Oxygen (Field)	BC WQG AWF, Short-Term	MW14-01 [2] MW20-1 [2] MW7-05 [2]
dichloroethylene, 1,2-cis-	BC CSR DW	MW17-02 [1]
Total Ammonia (as N)	BC WQG (Approved) AWF, Long-Term	MW14-01 [4] MW14-02 [1] MW6-05 [1]
Nitrate (as N)	BC WQG AWF, Long-Term	MW17-01 [1] MW17-02 [2] MW7-05 [1]
Sulphate	BC WQG AWF, Long-Term	MW14-01 [1]
Sulphide (as H_2S)	BC WQG (Working) AWF, Long-Term	MW14-01 [4] MW14-02 [3] MW1-95 [3] MW6-05 [3] MW7-05 [1]
	BC CSR DW BC CSR AW	MW14-01 [2]
Arsenic	BC WQG (Approved) AWF, Long-Term	MW14-01 [6]
Cadmium	BC WQG (Approved) AWF, Long-Term	MW7-05 [4]
Chromium (III+VI)	BC WQG (Working) AWF, Long-Term	MW14-01 [1] MW17-01 [1] MW6-05 [2]
Copper	BC WQG (Approved) AWF, Long-Term	MW14-01 [1] MW14-02[12] MW17-03 [9] MW1-95 [18] MW20-1 [10] MW6-05 [12] MW7-05 [16] SW1-08 [1]
	BC WQG (Approved) AWF, Short-Term	MW14-02 [6] MW17-03 [3] MW1-95 [15] MW20-1 [3] MW6-05 [7] MW7-05 [8] SW1-08 [1]
Lithium	BC CSR DW	MW14-01 [5] MW17-01 [5] MW17-02 [4] MW20-1 [6] MW7-05 [4]
Nickel	BC WQG (Approved) AWF, Long-Term	MW14-01 [8] MW14-02 [1] MW17-02 [1] MW20-1 [7] MW6-05 [2] MW7-05 [7]
	BC WQG (Approved) AWF, Short-Term	MW14-01 [2] MW20-1 [3] MW6-05 [2] MW7-05 [4]
Selenium	BC WQG (Approved) AWF, Long-Term BC WQG (Approved) AWF, Short-Term	MW14-02 [12] MW17-02[2] MW6-05 [15] MW7-05 [11]
	BC CSR DW	MW14-02 [1] MW17-02 [2] MW7-05 [1]
	BC CSR AW	MW17-02 [1], MW7-05 [1]
Uranium	BC WQG (Working) AWF, Long-Term	MW14-02 [2] MW17-02 [4] MW20-1 [3] MW6-05 [5] MW7-05 [13]
	BC CSR DW	MW17-02 [4] MW7-05 [3]
Vanadium	BC CSR DW	MW14-01 [1]
Zinc	BC WQG (Approved) AWF, Long-Term	MW14-01 [4] MW14-02 [3] MW1-95 [2] MW6-05 [5] MW7-05 [4] SW1-08 [1]
	BC WQG (Approved) AWF, Short-Term	MW6-05 [1]

6.0 Conceptual Model, Impact Assessment & Attenuative Capacity

A conceptual hydrogeologic model synthesizes physiographic, geologic, hydraulic, and geochemical information into a wholistic description of general system behaviour. The following text describes a conceptual model for the site:

The site is situated on a terrace within the Selkirk Mountain range, approximately 240 m east of the Columbia River. Topography slopes in a northwesterly direction towards Cai Creek, an ephemeral tributary of the Columbia River, located approximately 50 m north of the site boundary. Surface water runoff flows in accordance with topography, although most moisture surplus is expected to infiltrate given the relatively high permeability of surficial soils.

Upon infiltration, water travels vertically through a thick (45+ m) unsaturated zone consisting of fine to coarse sands with occasional cobbles and seams of trace to some gravel and/or silt. Eventually, the infiltrated water reaches saturated conditions within an unconfined sand aquifer. Groundwater then flows in a northwesterly direction at a rate of up to 1.3 m/day. As nearby Cai Creek is often dry downstream of the site, groundwater likely flows underneath Cai Creek and eventually discharges directly to the Columbia River located to the west/northwest of the site.

During transport from infiltration to eventual discharge, the chemistry of natural groundwater originating at the site may change as a result of physiochemical processes such as mixing, weathering, adsorption, desorption, precipitation, dissolution, ion exchange, reduction, and oxidation. Infiltration water that has encountered landfill waste may extract dissolved or suspended solids to become leachate.

The quantity and quality of such leachate may change over time due to varying climatic conditions, evolving waste composition, changes to landfilling practices, and the presence of aerobic versus anaerobic conditions. While leachate may undergo similar physical processes as natural groundwater, it is subject to more complex chemical and biological processes owing to its unique inorganic and organic composition.

As a leachate plume is transported within the groundwater flow system over time and space, it may undergo natural attenuation processes that will lessen its impact to receiving environments, including dilution, dispersion, adsorption, chemical reactions and biological degradation. There may also be preferential flowpaths within the aquifer that result in irregular plume distribution downgradient of the landfill.

A review of the monitoring data allows for the following over-arching statements regarding landfill leachate transport, water quality impacts, and attenuation at the site:

Sampling results at ‘source well’ MW7-05 continue to confirm the production of leachate and associated water quality impairment in the immediate vicinity of the landfill, as evidenced by water quality criteria exceedances and/or relatively high levels of ammonia, total organic carbon, chloride, sodium, calcium, cadmium, copper, manganese, selenium, uranium and potentially nickel. There appears to be a general trend towards increasing leachate potency in recent years, with 2022/2023 sampling results including historically high concentrations of some leachate indicators.

Despite poor water quality at the landfill, downgradient sampling results generally indicate improvement in water quality. Comparison of sampling results between source well MW7-05 and downgradient well MW6-05 (located 50 m north of the closest waste deposit) indicates an average percent reduction in concentration for the following leachate indicators: chloride (31%), sodium (25%), cadmium (87%), copper (54%), manganese (99%), and uranium (51%) [reductions may be greater in instances where a parameter concentration was non-detect at MW6-05].



In a general sense, this broad improvement in water quality suggests that some degree of natural attenuation is occurring within the site. Nonetheless, there remain some water quality concerns with regards to downgradient water quality near the site's northern (downgradient) boundary, including persistently elevated levels and often repeat water quality exceedances of copper, nickel, selenium, and uranium.

7.0 Environmental Monitoring Plan

SLR reviewed the EMP considering the 2015 to 2023 monitoring results.

The following suggestions for current EMP refinement are provided for RDCK consideration:

- The use of BC WQG to evaluate groundwater quality, though commonly referenced in landfill OCs, is not supported by the site setting and groundwater receptors of concern. In SLR's opinion, monitoring well groundwater quality results should be compared to BC CSR DW and BC CSR AW criteria.
- Should BC WQG continue to be used at the site, then the Schedule A parameter listing should include dissolved organic carbon (DOC) for accurate use of the Biotic Ligand Model (BLM) calculation, where applicable.
- Given the presence of the landfill septage beds, and the downgradient water supply wells, microbiological analysis should be included in the Schedule A parameters listing for all monitoring wells.
- Given the past application of hydrocarbon-impacted soils as landfill cover, additional petroleum hydrocarbon constituents, including light and heavy extractable hydrocarbons (HEPH/LEPH), volatile petroleum hydrocarbons (VPHs), polycyclic aromatic hydrocarbons (PAHs) and fuel VOCs should be included in the Schedule B parameter listing for source well MW7-05.
- The EMP should be updated to reflect the addition of MW20-1 to the sampling program.
- On-site well WTN 121104 could be added to the biannual Schedule A sampling regimen for due diligence purposes. Note that the well should be sampled for total (as opposed to dissolved) metals and should also undergo microbiological analysis.

8.0 Conclusions

SLR completed a Hydrogeology and Hydrology Characterization Report for the Ootischenia Landfill in accordance with the reporting requirements described in the site's Operational Certificate and Section 10.1 of *Landfill Criteria for Municipal Solid Waste* (ENV, 2016). The report focused on the monitoring data collected during the period of 2015 through 2023.

The following key conclusions are made:

- Local surface water drainage in the vicinity of the landfill is controlled by northwesterly sloping topography, although most surplus infiltrates into the ground.
- Site overburden geology is characterized by fine to coarse sands with occasional cobbles and seams of trace to some gravel and/or silt. These materials occur from ground surface down to bedrock.
- A saturated sand aquifer is encountered at a depth of 45 mbgs or greater.

- Groundwater flows from the site in a northwesterly direction at rate of up to 1.3 m/day, eventually discharging to the Columbia River, approximately 240 m west of the site at its closest point.
- Water quality results from monitoring well samples are currently compared to BC WQG, per the OC. However, the use of these guidelines is not supported by the site setting and water receptors of concern. In SLR's opinion, the BC CSR DW and AW criteria are more appropriate for comparison to groundwater chemistry results at the site.
- Currently, impacts of leachate migration are best assessed by evaluating the behaviour of site-specific leachate indicators chloride, sodium, cadmium, copper, manganese, selenium, and uranium.
- Sampling results at 'source' well MW7-05 continue to confirm the production of leachate and associated water quality impairment in the immediate vicinity of the landfill. There appears to be a general trend towards increasing leachate potency in recent years, with 2022/2023 sampling results including historically high concentrations of some leachate indicators.
- Despite poor water quality at the landfill, downgradient sampling results generally indicate improvement in water quality, suggesting that natural attenuation is occurring. Nonetheless, there remain some water quality concerns near the site's northern (downgradient) boundary, including persistently elevated levels and often repeat water quality exceedances of copper, nickel, selenium, and uranium. Based on the current monitoring network, it is not known to what degree elevated levels and exceedances of these parameters persist beyond the site boundary.
- The degree of landfill-related impacts at the site is occasionally difficult to infer, as there is no upgradient well to assess 'background' conditions in the overburden aquifer, and no cross-gradient well to the west. In addition, several downgradient wells appear to be periodically impacted from non-landfill sources, such as contaminated runoff emanating from offsite, and several others have become permanently dry.

9.0 Recommendations

Based on the above conclusions, the following is recommended:

- The EMP sampling regimen should continue to be performed while the landfill is in operation. Consideration should be given to adopting the following EMP refinements:
  - Adding dissolved organic carbon (DOC) to the biannual Schedule A parameter listing for both groundwater monitoring wells and surface water monitoring stations.
  - Adding microbiological analysis to the biannual Schedule A parameter listing for groundwater monitoring wells. Depending on the results of the initial year of testing, future recommendations may consider decreasing the number of wells and/or frequency of microbiological sampling.
  - Adding petroleum hydrocarbon constituents, including HEPH/LEPH, VPHs, PAHs, and fuel VOCs to the annual Schedule B parameter listing for source well MW7-05. Depending on the results of the initial year of testing, future recommendations may consider expanding the number of wells and/or frequency of petroleum hydrocarbon sampling.
  - Formally recognizing MW20-1 as a part of the EMP sampling program.

  - Sampling the on-site water supply well under the biannual Schedule A regimen.
  - Water quality results must continue to be compared to BC Water Quality Guidelines (WQG), unless RDCK wishes to amend the Operational Certificate. Site groundwater quality results should also be evaluated relative to the more applicable BC Contaminated Sites Regulation Drinking Water (DW) and Aquatic Life (Freshwater) (AW) criteria.
- Monitoring well top of pipe measuring point elevations should be surveyed and adopted as reference elevations (as opposed to the current top of cap measurements).
- Groundwater levels should be collected during a single day, as opposed to over multiple days.
- Dry wells MW17-01 and MW17-02 should be re-drilled/deepened by a drilling contractor to re-establish their intended function within the EMP. If this is not feasible, and the wells continue to remain dry, they should be decommissioned in accordance with provincial requirements and removed from the EMP.
- Site monitoring has indicated exceedances of water quality criteria near the downgradient (northwestern) limit of the site boundary, although it has not been determined with the current monitoring well network if such exceedances are the result of landfill impacts and/or potentially other sources. To further differentiate landfill impacts, and determine where water quality compliance is achieved, the following is recommended:
  - A monitoring well be installed in the unconfined sand aquifer south (upgradient) of the landfill to establish background conditions.
  - A monitoring well be installed in the unconfined sand aquifer west (cross-gradient) of the landfill to confirm water quality compliance to the west.
  - At least one monitoring well be installed in the unconfined sand aquifer northwest (downgradient) beyond the site boundary to confirm water quality compliance. The monitoring well(s) should be located north of the Cai Creek valley.
  - Consideration should be given to installing at least one monitoring well in the bedrock aquifer northwest (downgradient) of the landfill to confirm water quality compliance within the bedrock aquifer. Pairing this bedrock monitoring well with an overburden monitoring well would also allow for the assessment of vertical flow gradients between these units.

10.0 Closure

SLR trusts this document meets RDCK's current requirements. Should you have any questions, please contact the undersigned.

Regards,

SLR Consulting (Canada) Ltd.



Devin Hannan, P.Eng.
Senior Environmental Engineer

Ben Foulger, P.Ag.
Senior Project Manager

Erin Robson, M.Eng., P.Eng.
Technical Director, Contaminant Hydrogeology

The Association of Professional Engineers and Geoscientists of the Province of British Columbia SLR Consulting (Canada) Ltd. Permit to Practice #1001562

11.0 References

Amec Foster Wheeler Environment & Infrastructure. 2016. Five Year Hydrogeology Review, Ootischenia Landfill, Castlegar, BC. Prepared for RDCK. CE04616. January 2016.

BC Ministry of Environment and Climate Change Strategy (ENV). 2024a. Contaminated Sites Regulation.

BC Ministry of Environment and Climate Change Strategy (ENV). 2024b. *Environmental Management Act*.

BC Ministry of Environment and Climate Change Strategy (ENV). 2024c. BC Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. https://www2.gov.bc.ca/assets/gov/environment/waste-management/garbage/guidelines_environmental_monitoring_municipal_solid_waste_landfills.pdf

BC Ministry of Environment and Climate Change Strategy (ENV). 2016. Hydrogeology and Hydrology Characterization Report, Landfill Criteria for Municipal Solid Waste, British Columbia. (2). June 2016.

BC Ministry of Environment and Climate Change Strategy (ENV). 2002. Aquifer Classification Worksheet. Aquifer Reference Number: 510. March 10, 2002.

Conestoga-Rovers and Associates (CRA). 2009. Design and Operations Plan, Ootischenia Landfill Site, Regional District of Central Kootenay, Castlegar, British Columbia. Prepared for RDCK. Ref No. 19326 (09). Rev No. 2. November 2009.

Freeze, R.A., & Cherry, J.A. 1979. Groundwater. Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Government of British Columbia. 2024. iMapBC https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc .

Health Canada. 2024. Guidelines For Drinking Water Quality. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Heath, R.C. 1983. Basic Ground-Water Hydrology. United States Geological Survey Water-Supply Paper 2220.

Jungen, J.R. 1980. Soil Resources of the Nelson Map Area (82 F). RAB Bulletin 20. Report No. 28. British Columbia Soil Survey. Province of British Columbia, Ministry of Environment, Resource Analysis Branch.

Lengyel, T., Verma, S., and A. Hinnell. 2023a. Aquifer Description for Aquifer 0501. February 2, 2023.

Lengyel, T., Verma, S., and A. Hinnell. 2023b. Aquifer Description for Aquifer 1283. February 2, 2023.

Masse Environmental. 2024. Annual Environmental Monitoring Program, Ootischenia Landfill. Prepared for RDCK. March 29, 2024.

Regional District of Central Kootenay (RDCK). 2024. Ootischenia Landfill. https://www.rdck.ca/EN/main/services/waste-recycling/hours-of-operation/ootischenia-landfill.html. Accessed July 2024.

Regional District of Central Kootenay (RDCK). 2022. Ootischenia Landfill 2022 Annual Operations and Monitoring Report.

Regional District of Central Kootenay (RDCK). 2021. Ootischenia Landfill 2021 Annual Operations & Monitoring Report.

Regional District of Central Kootenay (RDCK). 2020. Ootischenia Landfill 2020 Annual Operations & Monitoring Report.

Regional District of Central Kootenay (RDCK). 2019. Ootischenia Landfill 2019 Annual Operations & Monitoring Report.

Regional District of Central Kootenay (RDCK). 2008. Ootischenia Landfill. Sheet-No. September 2008. Accessed online July 2024 at: https://www.rdck.ca/assets/Services/Waste~and~Recycling/Documents/Ootischenia_Landfill.pdf

Water Survey Canada (WSC). 2024. Real-Time Hydrometric Data Graph for Columbia River at Birchbank (08NE049), BC.

Tables

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024

Table 1: Groundwater Elevations

Well ID:	MW1-95		MW6-05		MW7-05		MW14-01		MW14-02		MW17-01		MW17-02		MW17-03		MW20-1	
Reference Elev (masl):	490.96		477.59		487.20		475.32		473.65		475.41		474.61		472.62		471.79	
Date	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**	**Water Depth (mbtor)**	**Water Elevation (masl)**
4-Jan-2015	36.47	454.49	-	-	57.52	429.68	53.67	421.65	50.08	423.57	-	-	-	-	-	-	-	-
7-Mar-2015	35.80	455.16	-	-	63.92	423.28	51.86	423.46	50.37	423.28	-	-	-	-	-	-	-	-
1-Apr-2015	-	-	50.61	426.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-2015	-	-	50.92	426.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-2015	36.46	454.50	50.67	426.92	57.31	429.89	51.90	423.42	49.26	424.39	-	-	-	-	-	-	-	-
15-Dec-2015	36.85	454.11	56.51	421.08	58.43	428.77	52.74	422.58	50.90	422.75	-	-	-	-	-	-	-	-
3-May-2016	34.22	456.74	51.54	426.05	58.57	428.64	51.13	424.19	49.37	424.28	-	-	-	-	-	-	-	-
3-Nov-2016	36.23	454.73	49.74	427.85	56.20	431.00	51.39	423.93	48.63	425.02	-	-	-	-	-	-	-	-
25-May-2017	33.07	457.89	48.68	428.91	55.37	431.83	48.10	427.22	46.62	427.03	48.22	427.19	47.47	427.14	39.40	433.23	-	-
24-Oct-2017	35.04	455.93	46.02	431.57	51.87	435.34	48.32	427.00	45.42	428.23	48.35	427.06	46.92	427.69	43.80	428.82	-	-
28-May-2018	34.92	456.04	-	-	-	-	-	-	46.65	427.00	-	-	48.86	425.75	40.30	432.32	-	-
29-May-2018	-	-	48.23	429.36	54.79	432.41	48.56	426.76	-	-	48.68	426.73	-	-	-	-	-	-
22-Oct-2018	35.52	455.44	-	-	-	-	-	-	46.26	427.39	-	-	47.75	426.86	45.40	427.22	-	-
23-Oct-2018	-	-	-	-	-	-	49.16	426.16	-	-	49.19	426.218	-	-	-	-	-	-
24-Oct-2018	-	-	47.03	430.56	53.06	434.14	-	-	-	-	-	-	-	-	-	-	-	-
7-May-2019	35.55	455.41	50.40	427.19	57.15	430.05	51.60	423.71	49.05	424.6	51.66	423.74	Dry	Dry	45.89	426.73	-	-
29-Oct-2019	36.78	454.19	51.34	426.25	58.05	429.16	52.68	422.64	49.98	423.7	Dry	Dry	Dry	Dry	48.80	423.82	-	-
27-May-2020	37.91	453.06	53.28	424.31	60.45	426.75	53.60	421.71	51.34	422.3	Dry	Dry	Dry	Dry	48.55	424.07	49.07	422.72
27-Oct-2020	41.65	449.31	52.08	425.51	58.98	428.22	52.91	422.41	50.41	423.2	Dry	Dry	Dry	Dry	48.77	423.86	48.02	423.77
25-May-2021	39.72	451.24	53.46	424.13	61.72	425.49	53.76	421.56	51.49	422.2	Dry	Dry	Dry	Dry	48.70	423.92	49.23	422.56
25-Oct-2021	40.70	450.26	53.31	424.27	60.47	426.74	53.97	421.34	51.50	422.1	Dry	Dry	Dry	Dry	49.04	423.58	49.14	422.65
10-May-2022	39.30	451.67	54.21	423.38	61.68	425.53	54.19	421.12	52.04	421.6	Dry	Dry	Dry	Dry	48.64	423.98	49.86	421.92
24-Oct-2022	40.17	450.80	52.35	425.23	59.32	427.89	53.06	422.25	50.61	423.0	Dry	Dry	Dry	Dry	48.75	423.88	48.28	423.51
1-May-2023	39.55	451.41	54.18	423.41	61.66	425.54	54.26	421.06	59.54	414.1	Dry	Dry	Dry	Dry	48.33	424.29	49.87	421.92
1-Oct-2023	40.44	450.52	53.13	424.46	60.13	427.07	53.83	421.49	43.00	430.6	Dry	Dry	Dry	Dry	48.93	423.69	49.02	422.77

Notes:
-mbtor is metres below top of reference elevation.
-masl is metres above sea level.
-Water level measurement was taken from top of pipe, but reference elevation was surveyed to top of cap, so data expected to be accurate within 0.05 m.

Table 2: Field Parameters in Groundwater

				Field					
				pH (field)	temp (field)	EC (field)	TDS (field)	ORP (field)	DO (field)	turbidity (field)
				pH	deg C	µS/cm	mg/L	mV	mg/L	NTU
			BC CSR AWF	ns	ns	ns	ns	ns	ns	ns
			BC CSR DW	ns	ns	ns	ns	ns	ns	ns
			BC WQG (Approved) AWF, Long-term	6.5-9	10	ns	ns	ns	>=8	bkgd+2
			BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	>=5	bkgd+5
Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name						
Locations	MW14-01	68.60 - 71.60	2015-Apr-01	20150401_E303871	-	7.64	909	619	19.2	-	-
			2015-Jul-03	20150703_E303871	-	12.85	778	506	249.3	-	-
			2015-Sep-16	20150916_E303871	-	11.76	621	955	69.4	-	-
			2015-Dec-15	20151215_E303871	-	7.09	522	340	187.7	-	-
			2016-May-03	MW14-01_20160503	9.83	9.9	311	-	179.4	-	11.6
			2016-Nov-02	20161102_E303871	9.52	9.2	261.6	-	-47	-	6.24
			2017-May-24	20170524_E303871	9.15	9.3	231.4	-	2.4	-	13.1
			2017-Oct-23	20171023_E303871	8	9.2	229.2	-	0.7	-	-
			2018-May-29	20180529_E303871	9.11	10.4	232.4	-	-62.6	-	-
			2018-Oct-23	20181023_E303871	8.91	9.2	217.6	-	-147.8	-	-
			2019-May-06	20190506_E303871	9.28	9.7	212.3	-	-66.8	-	-
			2019-Oct-29	20191029_E303871	8.15	8.1	236.6	-	-145.8	-	-
			2020-May-27	20200527_E303871	7.39	9.7	231.5	-	-32.1	-	-
			2020-Oct-26	20201026_E303871	9.28	9.1	280.7	-	-109.3	-	-
			2021-May-25	20200525_E303871	7.85	9.8	295.2	-	-89.9	-	-
			2021-Oct-25	20211025_E303871	8.49	9.4	603	-	-	-	-
			2022-May-10	20220510_E303871	8.04	9.3	355	-	-116.9	-	-
			2022-Oct-24	20221024_E303871	7.3	9.1	363.1	-	-142	-	-
			2023-May-24	20230524_E303871	7.58	9.5	387.8	-	-155.9	3.01	4.3
			2023-Oct-25	MW14-01	7.91	8.9	415.2	-	-113.9	3.99	6.3
	MW14-02	57.90 - 59.40	2015-Apr-01	20150401_E303870	-	7.71	404	264	144.2	-	-
			2015-Jul-03	20150703_E303870	-	13.52	425	276	350	-	-
			2015-Sep-16	20150916_E303870	-	11.71	285	437	4	-	-
			2015-Dec-15	20151215_E303870	-	7.65	415	270	164.6	-	-
			2016-May-03	MW14-02_20160503	7.83	11.2	328.3	-	150.3	-	4.34
			2016-Nov-02	20161102_E303870	7.62	9.3	307.4	-	76.3	-	3.29
			2017-May-24	20170524_E303870	7.67	9.9	307.1	-	12	-	2.95
			2017-Oct-23	20171023_E303870	8.1	9.2	278.3	-	42.1	-	-
			2018-May-28	20180528_E303870	8.06	10	287.7	-	-6.2	-	-
			2018-Oct-22	20181022_E303870	8.14	9.7	274.7	-	10.5	-	-
			2019-May-06	20190506_E303870	8.29	10.2	286.6	-	-40.3	-	-
			2019-Oct-28	20191028_E303870	7.24	9	346.9	-	75.6	-	-
			2020-May-26	20200526_E303870	6.57	10.1	290.7	-	65.4	-	-
			2020-Oct-26	20201026_E303870	8.97	9.1	297.4	-	-11.7	-	-
			2021-May-25	20200525_E303870	7.54	9.6	275.7	-	70	-	-
			2021-Oct-25	20211025_E303870	7.94	9	475	-	-	-	-
			2022-May-10	20220510_E303870	7.06	8.9	821	-	107.6	-	-
			2022-Oct-24	20221024_E303870	7.13	8.6	373.5	-	106.1	-	-
			2023-Oct-24	20231024_E303870	7.75	8.6	418.3	-	74.5	11.94	120
	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	7.28	9.5	699	-	58.5	-	48.3
			2017-Oct-23	20171023_E309167	7.02	9.1	663	-	70.2	-	-
			2018-May-29	20180529_E309167	7.3	10.6	735	-	34.4	-	-
			2018-Oct-23	20181023_E309167	7.69	8.9	541	-	39.2	-	-
			2019-May-06	20190506_E309167	8.38	10.7	690	-	-2.4	-	-
	MW17-02	46.00 - 49.10	2017-May-24	20170524_E309168	6.96	10.1	921	-	73.7	-	< 738
			2017-Oct-24	20171024_E309168	7.06	9.7	772	-	86.5	-	-
			2018-May-28	20180528_E309168	7.21	10.6	895	-	43	-	-
			2018-Oct-22	20181022_E309168	7.2	9.8	1062	-	41	-	-
	MW17-03	56.00 - 59.10	2017-May-25	20170525_E309169	7.73	10.2	308.2	-	20.1	-	16.8
			2017-Oct-23	20171023_E309169	7.51	9.4	300.8	-	70.9	-	-
			2018-May-28	20180528_E309169	8.15	10.6	292.2	-	-23.8	-	-
			2018-Oct-22	20181022_E309169	7.88	9.7	295.6	-	13.4	-	-
			2019-May-06	20190506_E309169	7.67	10.3	300.7	-	-6.1	-	-
			2019-Oct-28	20191028_E309169	7.14	9.4	312.2	-	71.8	-	-
			2020-May-26	20200526_E309169	6.36	10.2	292.7	-	99	-	-
			2020-Oct-26	20201026_E309169	8.74	9.4	288.4	-	-12.9	-	-
			2021-May-25	20200525_E309169	7.35	9.8	290.7	-	96.7	-	-
			2021-Oct-25	20211025_E309169	7.84	9.6	501	-	-	-	-
			2022-May-10	20220510_E309169	7.57	9.7	296	-	93.4	-	-
			2022-Oct-24	20221024_E309169	7.33	9.5	298.5	-	81.3	-	-
			2023-May-24	20230524_E309169	7.5	10	299.5	-	50.3	6.38	3.9
			2023-Oct-24	MW17-03	7.98	9.7	300.1	-	47.7	5.16	3.4
	MW1-95	64.10 - 67.10	2015-Apr-01	20150401_E232086	-	8.06	390	254	269.2	-	-
			2015-Jul-03	20150703_E232086	-	12.96	381	248	265.9	-	-
			2015-Sep-16	20150916_E232086	-	11.4	383	248	74.7	-	-
			2015-Dec-15	20151215_E232086	-	7.63	376	244	130.2	-	-
			2016-May-03	MW1-95_20160503	7.75	9.5	286.5	-	214	-	5.74
			2016-Nov-02	20161102_E232086	7.42	9.2	282.6	-	75.8	-	4.07
			2017-May-24	20170524_E232086	7.43	9.2	282.5	-	31.6	-	2.79
			2017-Oct-24	20171024_E232086	7.55	8.8	279.4	-	59.5	-	-
			2018-May-28	20180528_E232086	7.56	9.5	285.4	-	50.7	-	-
			2018-Oct-22	20181022_E232086	8.21	8.9	281.9	-	26.7	-	-
			2019-May-06	20190506_E232086	7.82	9.4	285.9	-	-12.4	-	-
			2019-Oct-28	20191028_E232086	7.15	8.7	293.6	-	71.9	-	-
			2020-May-26	20200526_E232086	6.38	9.6	277.2	-	84.6	-	-
			2020-Oct-26	20201026_E232086	8.74	9.1	273.2	-	0.6	-	-
			2021-May-25	20200525_E232086	7.29	9.5	285.3	-	74.7	-	-
			2021-Oct-25	20211025_E232086	7.81	9.1	489	-	-	-	-
			2022-May-10	20220510_E232086	7.79	9.3	288	-	104.2	-	-
			2022-Oct-24	20221024_E232086	7.31	9.1	288.3	-	67.9	-	-
			2023-May-24	20230524_E232086	7.63	9.4	288	-	65.4	7.85	7.2
			2023-Oct-24	MW1-95	8.24	9	285.8	-	49.7	7.86	4.7
	MW20-1	56.80 - 59.81	2020-May-27	20200527_E323191	6.59	9.5	247.2	-	88.5	-	-
			2020-Oct-26	20201026_E323191	9.5	8.5	292.3	-	-54.1	-	-
			2021-May-26	20200526_E323191	7.6	9.4	257.1	-	61.9	-	-
			2021-Oct-25	20211025_E323191	7.77	8.8	700	-	-	-	-
			2022-May-10	20220510_E323191	7.45	9	379.8	-	73.4	-	-
			2022-Oct-27	20221027_E323191	7.3	8.7	292	-	58.1	-	-
			2023-May-24	20230524_E323191	7.31	9.6	407.4	-	20	4.95	6.7
			2023-Oct-25	MW20-01	7.72	8.8	486.7	-	67.5	4.14	5.1
	MW3-95	49.40 - 52.50	2018-May-28	20180528_E232088	7.24	12.3	750	-	-102.4	-	-
	MW6-05	60.10 - 63.10	2015-Apr-01	20150401_E253791	-	8	434	281	213	-	-
			2015-Jul-03	20150703_E253791	-	13.87	417	271	199.1	-	-
			2015-Sep-16	20150916_E253791	-	11	273	271	60	-	-
			2015-Dec-15	20151215_E253791	-	8.63	373	242	83.4	-	-
			2016-Apr-05	MW06-05_20160504	7.68	10.3	308.1	-	157.8	-	5.04
			2016-Nov-03	20161103_E253791	7.47	9.7	316.7	-	67	-	3.26
			2017-May-25	20170525_E253791	7.79	10.4	288.3	-	29.7	-	5.87
			2017-Oct-24	20171024_E253791	7.59	10.3	280.4	-	50.6	-	-
			2018-May-29	20180529_E253791	8.06	11.3	279.9	-	4.3	-	-
			2018-Oct-24	20181024_E253791	8.2	10.2	284.3	-	13.4	-	-
			2019-Jul-05	20190507_E253791	8	10.7	279.5	-	-6.7	-	-
			2019-Oct-29	20191029_E253791	7.19	8.7	293.3	-	67	-	-
			2020-May-27	20200527_E253791	6.66	10.2	289.5	-	75.7	-	-
			2020-Oct-26	20201026_E253791	10.02	8.7	256.8	-	-61	-	-
			2021-May-26	20200526_E253791	7.44	9.3	260.9	-	75.8	-	-
			2021-Oct-26	20211026_E253791	7.72	8.9	711	-	-	-	-
			2022-May-11	20220511_E253791	7.56	8.8	423.8	-	63.5	-	-
			2022-Oct-27	20221027_E253791	7.17	8.5	351.5	-	90	-	-
			2023-May-25	20230525_E253791	7.58	9.6	320.1	-	49.7	8.3	5
			2023-Oct-31	MW06-05	8.11	8.5	390	-	32.1	5.42	4.2

Table 2: Field Parameters in Groundwater

				Field					
				pH (field)	temp (field)	EC (field)	TDS (field)	ORP (field)	DO (field)	turbidity (field)
				pH	deg C	µS/cm	mg/L	mV	mg/L	NTU
			BC CSR AWF	ns	ns	ns	ns	ns	ns	ns
			BC CSR DW	ns	ns	ns	ns	ns	ns	ns
			BC WQG (Approved) AWF, Long-term	6.5-9	10	ns	ns	ns	>=8	bkgd+2
			BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	>=5	bkgd+5
Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name						
Locations	MW7-05	60.10 - 63.10	2015-Apr-01	20150401_RDOOTG01	-	8.12	889	568	171	-	-
			2015-Jul-03	20150703_RDOOTG01	-	14.4	397	258	94.4	-	-
			2015-Sep-16	20150916_RDOOTG01	-	11.43	390	252	142.4	-	-
			2015-Dec-15	20151215_RDOOTG01	-	8.15	416	271	50.6	-	-
			2016-Apr-05	MW07-05_20160504	7.6	10.8	443.7	-	158.1	-	10.89
			2016-Nov-03	20161103_RD00TG01	7.2	9.9	486.1	-	70.8	-	6.31
			2017-May-25	20170525_RDOOTG01	7.63	10.7	402.5	-	44.7	-	8.63
			2017-Oct-24	20171024_RDOOTG01	7.29	10.7	420.3	-	59.5	-	-
			2018-May-30	20180530_RD00TG01	7.84	10.8	277.8	-	43.2	-	-
			2018-Oct-24	20181024_RD00TG01	8.03	10.5	285.9	-	3.2	-	-
			2019-Jul-05	20190507_RD00TG01	8.05	10.6	276.5	-	-14.9	-	-
			2019-Oct-29	20191029_RDOOTG01	7.35	9.6	265.1	-	61.3	-	-
			2020-May-27	20200527_RD00TG01	6.3	10	441.9	-	81.9	-	-
			2020-Oct-26	20201026_RD00TG01	9.09	9.3	295.2	-	-41.9	-	-
			2021-May-26	20200526_RD00TG01	7.19	9.8	665	-	50.6	-	-
			2021-Oct-26	20211026_RDOOTG01	7.43	9.5	727	-	-	-	-
			2022-May-11	20220511_RDOOTG01	7.21	9.8	455.7	-	57.4	-	-
			2022-Oct-27	20221027_RDOOTG01	6.65	9.5	799	-	104.2	-	-
			2023-May-25	20230525_RDOOTG01	6.96	10.3	786	-	18.5	3.16	3.8
			2023-Oct-31	MW07-05	7.61	10	599	-	46.4	3.09	2.2

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µS/cm	microsiemens per centimetre
deg C	degree Celsius
mg/L	milligram per litre
mV	millivolts
NTU	nephelometric turbidity unit
pH	potential of hydrogen
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term

Table 3: General Parameters in Groundwater

	General Parameters							
	alkalinity (carbonate)	alkalinity (hydroxide)	alkalinity (bicarbonate)	alkalinity (P)	alkalinity (total as CaCO3)	electrical conductivity (lab)	total dissolved solids	turbidity (lab)
	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	NTU
BC CSR AWF	ns	ns	ns	ns	ns	ns	ns	ns
BC CSR DW	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	>=20	ns	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name								
Locations	MW14-01	68.60 - 71.60	2015-Apr-01	20150401_E303871	< 0.5	< 0.5	111	< 0.5	91.1	1010	-	518
			2015-Jul-03	20150703_E303871	53.6	< 0.5	57.8	44.7	137	813	-	522
			2015-Sep-16	20150916_E303871	48.1	< 0.5	66.1	40.1	134	647	-	518
			2015-Dec-15	20151215_E303871	< 0.5	< 0.5	155	< 0.5	127	547	-	<
			2016-May-03	MW14-01_20160503	-	-	-	-	115	437	296	7.29
			2016-Nov-02	20161102_E303871	-	-	-	-	91.1	367	-	3.23
			2017-May-24	20170524_E303871	-	-	-	-	73.8	331	-	10.6
			2017-Oct-23	20171023_E303871	-	-	-	-	88	324	-	15.2
			2018-May-29	20180529_E303871	-	-	-	-	90.8	322	-	19.5
			2018-Oct-23	20181023_E303871	-	-	-	-	93.7	306	-	7
			2019-May-06	20190506_E303871	-	-	-	-	94.9	297	-	5
			2019-Oct-29	20191029_E303871	4.2	< 1	106	-	110	333	-	3.37
			2020-May-27	20200527_E303871	-	-	-	-	121	332	-	3.28
				20200527_E303871DUP	-	-	-	-	121	336	-	-
			2020-Oct-26	20201026_E303871	-	-	-	-	167	413	-	4.3
				20201026_E303871DUP	-	-	-	-	162	415	-	-
			2021-May-25	20200525_E303871	-	-	-	-	166	427	-	2.66
			2021-Oct-25	20211025_E303871	< 1	< 1	203	< 1	203	492	-	5.52
			2021-Oct-26	20211026_E303871DUP	< 1	< 1	202	< 1	202	491	-	-
			2022-May-10	20220510_E303871	-	-	-	-	198	488	-	4.68
			2022-Oct-24	20221024_E303871	-	-	-	-	212	483	-	4.4
				20221024_E303871DUP	-	-	-	-	201	487	-	-
			2023-May-24	20230524_E303871	-	-	-	-	221	507	-	-
			2023-Oct-25	20231025_E303871	-	-	-	-	251	581	-	-
				20231025_E303871DUP	-	-	-	-	253	581	-	-
	MW14-02	57.90 - 59.40	2015-Apr-01	20150401_E303870	< 0.5	< 0.5	164	< 0.5	135	433	-	265
			2015-Jul-03	20150703_E303870	< 0.5	< 0.5	183	< 0.5	150	445	-	270
			2015-Sep-16	20150916_E303870	< 0.5	< 0.5	203	< 0.5	166	444	-	266
			2015-Dec-15	20151215_E303870	< 0.5	< 0.5	183	< 0.5	150	451	-	<
			2016-May-03	MW14-02_20160503	-	-	-	-	162	457	271	3.44
			2016-Nov-02	20161102_E303870	-	-	-	-	159	426	-	2.48
			2017-May-24	20170524_E303870	-	-	-	-	155	415	-	1.61
			2017-Oct-23	20171023_E303870	-	-	-	-	148	388	-	30
			2018-May-28	20180528_E303870	-	-	-	-	136	378	-	6.28
			2018-Oct-22	20181022_E303870	-	-	-	-	142	378	-	6.4
			2019-May-06	20190506_E303870	-	-	-	-	147	396	-	11.7
			2019-Oct-28	20191028_E303870	< 1	< 1	191	-	191	479	-	4.45
			2020-May-26	20200526_E303870	-	-	-	-	178	407	-	2.4
			2020-Oct-26	20201026_E303870	-	-	-	-	180	439	-	6.7
			2021-May-25	20200525_E303870	-	-	-	-	149	398	-	4.22
			2021-Oct-25	20211025_E303870	< 1	< 1	147	< 1	147	384	-	5.57
			2022-May-10	20220510_E303870	-	-	-	-	360	1060	-	5.2
			2022-Oct-24	20221024_E303870	-	-	-	-	196	509	-	6
			2023-Oct-24	20231024_E303870	-	-	-	-	229	594	-	-
	MW14-03	33.50 - 35.10	2015-Apr-01	20150401_E303872	-	-	-	-	-	-	-	<
			2015-Jul-03	20150703_E303872	-	-	-	-	-	-	-	<
			2015-Sep-16	20150916_E303872	-	-	-	-	-	-	-	<
			2015-Dec-15	20151215_E303872	-	-	-	-	-	-	-	<
	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	-	-	-	-	477	923	-	40.6
			2017-Oct-23	20171023_E309167	-	-	-	-	427	811	-	32
			2018-May-29	20180529_E309167	-	-	-	-	503	929	-	13.1
			2018-Oct-23	20181023_E309167	-	-	-	-	419	746	-	26
			2019-May-06	20190506_E309167	-	-	-	-	486	936	-	24.2
	MW17-02	46.00 - 49.10	2017-May-24	20170524_E309168	-	-	-	-	575	1230	-	373
			2017-Oct-24	20171024_E309168	-	-	-	-	519	958	-	29.9
			2018-May-28	20180528_E309168	-	-	-	-	615	1130	-	17.1
			2018-Oct-22	20181022_E309168	-	-	-	-	654	1430	-	23
	MW17-03	56.00 - 59.10	2017-May-25	20170525_E309169	-	-	-	-	148	423	-	16.5
			2017-Oct-23	20171023_E309169	-	-	-	-	158	412	-	22.4
			2018-May-28	20180528_E309169	-	-	-	-	163	396	-	22
			2018-Oct-22	20181022_E309169	-	-	-	-	159	417	-	11
			2019-May-06	20190506_E309169	-	-	-	-	160	414	-	16.4
			2019-Oct-28	20191028_E309169	< 1	< 1	158	-	158	424	-	4.92
			2020-May-26	20200526_E309169	-	-	-	-	165	410	-	14.6
			2020-Oct-26	20201026_E309169	-	-	-	-	155	423	-	7.4
			2021-May-25	20200525_E309169	-	-	-	-	148	420	-	254
			2021-Oct-25	20211025_E309169	< 1	< 1	144	< 1	144	410	-	8.33
			2022-May-10	20220510_E309169	-	-	-	-	148	411	-	11
			2022-Oct-24	20221024_E309169	-	-	-	-	136	396	-	6.1
			2023-May-24	20230524_E309169	-	-	-	-	146	391	-	-
			2023-Oct-24	20231024_E309169	-	-	-	-	147	415	-	-
	MW1-95	64.10 - 67.10	2015-Apr-01	20150401_E232086	< 0.5	< 0.5	177	< 0.5	145	394	-	261
			2015-Jul-03	20150703_E232086	< 0.5	< 0.5	189	< 0.5	155	404	-	263
			2015-Sep-16	20150916_E232086	< 0.5	< 0.5	177	< 0.5	145	398	-	261
				20150916_E232086DUP	< 0.5	< 0.5	182	< 0.5	149	397	-	-
			2015-Dec-15	20151215_E232086	< 0.5	< 0.5	173	< 0.5	142	397	-	<
				20151215_E232086DUP	< 0.5	< 0.5	174	< 0.5	143	402	-	-
			2016-May-03	MW1-95_20160503	-	-	-	-	156	413	251	5.26
			2016-Nov-02	20161102_E232086	-	-	-	-	156	394	-	3.28
			2017-May-24	20170524_E232086	-	-	-	-	152	393	-	1.06
			2017-Oct-24	20171024_E232086	-	-	-	-	159	388	-	4.97
			2018-May-28	20180528_E232086	-	-	-	-	138	368	-	7.29
			2018-Oct-22	20181022_E232086	-	-	-	-	159	399	-	3.8
			2019-May-06	20190506_E232086	-	-	-	-	158	405	-	4.07
			2019-Oct-28	20191028_E232086	< 1	< 1	166	-	166	411	-	2.07
			2020-May-26	20200526_E232086	-	-	-	-	170	397	-	5.32
			2020-Oct-26	20201026_E232086	-	-	-	-	159	399	-	7.4
			2021-May-25	20200525_E232086	-	-	-	-	153	413	-	3.77
			2021-Oct-25	20211025_E232086	< 1	< 1	155	< 1	155	400	-	8.75
			2022-May-10	20220510_E232086	-	-	-	-	154	401	-	5.36
			2022-Oct-24	20221024_E232086	-	-	-	-	147	387	-	6.4
			2023-May-24	20230524_E232086	-	-	-	-	151	382	-	-
			2023-Oct-24	20231024_E232086	-	-	-	-	159	403	-	-
	MW20-1	56.80 - 59.81	2020-May-27	20200527_E323191	-	-	-	-	164	350	-	4.51
			2020-Oct-26	20201026_E323191	-	-	-	-	202	437	-	4
			2021-May-26	20200526_E323191	-	-	-	-	157	374	-	0.68
				20200526_E323191DUP	-	-	-	-	158	372	-	-
			2021-Oct-25	20211025_E323191	< 1	< 1	274	< 1	274	570	-	3.3
			2022-May-10	20220510_E323191	-	-	-	-	237	519	-	8.44
			2022-Oct-27	20221027_E323191	-	-	-	-	192	398	-	5.5
			2023-May-24	20230524_E323191	-	-	-	-	223	494	-	-
				20230524_E323191DUP	-	-	-	-	226	495	-	-
			2023-Oct-25	20231025_E323191	-	-	-	-	327	676	-	-
	MW3-95	49.40 - 52.50	2018-May-28	20180528_E232088	-	-	-	-	439	818	-	< 1000

Table 3: General Parameters in Groundwater

	General Parameters							
	alkalinity (carbonate)	alkalinity (hydroxide)	alkalinity (bicarbonate)	alkalinity (P)	alkalinity (total as CaCO3)	electrical conductivity (lab)	total dissolved solids	turbidity (lab)
	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	NTU
BC CSR AWF	ns	ns	ns	ns	ns	ns	ns	ns
BC CSR DW	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	>=20	ns	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name								
Locations	MW6-05	60.10 - 63.10	2015-Apr-01	20150401_E253791	< 0.5	< 0.5	170	< 0.5	139	438	-	275
				20150401_E253791DUP	< 0.5	< 0.5	172	< 0.5	141	437	-	-
			2015-Jul-03	20150703_E253791	< 0.5	< 0.5	183	< 0.5	150	452	-	281
				20150703_E253791DUP	< 0.5	< 0.5	182	< 0.5	149	452	-	-
			2015-Sep-16	20150916_E253791	< 0.5	< 0.5	184	< 0.5	151	434	-	280
			2015-Dec-15	20151215_E253791	< 0.5	< 0.5	165	< 0.5	135	393	-	<
			2016-Apr-05	MW06-05_20160504	-	-	-	-	159	425	264	3.45
			2016-Nov-03	20161103_E253791	-	-	-	-	162	438	-	2.02
			2017-May-25	20170525_E253791	-	-	-	-	139	398	-	4.25
				20170525_E253791DUP	-	-	-	-	147	394	-	4.15
			2017-Oct-24	20171024_E253791	-	-	-	-	146	378	-	9.62
			2018-May-29	20180529_E253791	-	-	-	-	142	374	-	13.9
			2018-Oct-24	20181024_E253791	-	-	-	-	143	388	-	2.9
			2019-Jul-05	20190507_E253791	-	-	-	-	144	382	-	7.54
			2019-Oct-29	20191029_E253791	< 1	< 1	160	-	160	406	-	2.01
			2020-May-27	20200527_E253791	-	-	-	-	177	410	-	4.74
			2020-Oct-26	20201026_E253791	-	-	-	-	138	378	-	5.9
			2021-May-26	20200526_E253791	-	-	-	-	125	377	-	5.21
			2021-Oct-26	20211026_E253791	< 1	< 1	251	< 1	251	575	-	8.08
			2022-May-11	20220511_E253791	-	-	-	-	234	584	-	2.65
				20220511_E253791DUP	-	-	-	-	235	586	-	-
			2022-Oct-27	20221027_E253791	-	-	-	-	191	479	-	2.9
			2023-May-25	20230525_E253791	-	-	-	-	150	428	-	-
			2023-Oct-31	20231031_E253791	-	-	-	-	229	547	-	-
	MW7-05	60.10 - 63.10	2015-Apr-01	20150401_RDOOTG01	< 0.5	< 0.5	165	< 0.5	135	398	-	780
			2015-Jul-03	20150703_RDOOTG01	< 0.5	< 0.5	218	< 0.5	179	479	-	786
			2015-Sep-16	20150916_RDOOTG01	< 0.5	< 0.5	188	< 0.5	154	431	-	790
			2015-Dec-15	20151215_RDOOTG01	< 0.5	< 0.5	187	< 0.5	153	444	-	<
			2016-Apr-05	MW07-05_20160504	-	-	-	-	258	610	363	5.35
			2016-Nov-03	20161103_RD00TG01	-	-	-	-	313	662	-	3.79
				20161103_RD00TG01DUP	-	-	-	-	306	654	-	4.23
			2017-May-25	20170525_RDOOTG01	-	-	-	-	220	553	-	5.12
			2017-Oct-24	20171024_RDOOTG01	-	-	-	-	234	528	-	20.8
				20171024_E309168DUP	-	-	-	-	505	923	-	-
			2018-May-29	20180529_E309167DUP	-	-	-	-	507	946	-	-
			2018-May-30	20180530_RD00TG01	-	-	-	-	147	382	-	13.2
			2018-Oct-23	20181023_E303871DUP	-	-	-	-	94.9	305	-	-
			2018-Oct-24	20181024_RD00TG01	-	-	-	-	151	384	-	6.4
			2019-Jul-05	20190507_RD00TG01	-	-	-	-	142	383	-	10.66
				20190507_E253791DUP	-	-	-	-	145	377	-	-
			2019-Oct-29	20191029_RDOOTG01	< 1	< 1	131	-	131	361	-	5.1
				20191029_RDOOTG01DUP	< 1	< 1	131	-	131	362	-	-
			2020-May-27	20200527_RD00TG01	-	-	-	-	266	620	-	3.98
			2020-Oct-26	20201026_RD00TG01	-	-	-	-	178	443	-	2.5
			2021-May-26	20200526_RD00TG01	-	-	-	-	303	773	-	0.5
			2021-Oct-26	20211026_RDOOTG01	< 1	< 1	238	< 1	238	589	-	7.24
			2022-May-11	20220511_RDOOTG01	-	-	-	-	256	614	-	2.74
			2022-Oct-27	20221027_RDOOTG01	-	-	-	-	480	1060	-	3.2
			2023-May-25	20230525_RDOOTG01	-	-	-	-	396	930	-	-
			2023-Oct-31	20231031_RD00TG01	-	-	-	-	316	810	-	-

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µS/cm	microsiemens per centimetre
mg/L	milligram per litre
NTU	nephelometric turbidity unit
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 4: Carbon in Groundwater

	Carbon	
	total organic carbon	total inorganic carbon
	mg/L	mg/L
BC CSR AWF	ns	ns
BC CSR DW	ns	ns
BC WQG (Approved) AWF, Long-term	See notes	ns
BC WQG (Approved) AWF, Short-term	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name		
Locations	MW14-01	68.60 - 71.60	2015-Apr-01	20150401_E303871	4.06	22
			2015-Jul-03	20150703_E303871	3.23	18
			2015-Sep-16	20150916_E303871	2.7	23.7
			2015-Dec-15	20151215_E303871	3.52	21.7
			2016-May-03	MW14-01_20160503	2.34	21.8
			2016-Nov-02	20161102_E303871	3.26	16.5
			2017-May-24	20170524_E303871	2.25	17.5
			2017-Oct-23	20171023_E303871	3.7	19.4
			2018-May-29	20180529_E303871	7.34	23.7
			2018-Oct-23	20181023_E303871	2.36	24.8
			2019-May-06	20190506_E303871	1.89	24.6
			2019-Oct-29	20191029_E303871	1.18	26.2
			2020-May-27	20200527_E303871	1.37	26.5
				20200527_E303871DUP	1.4	25.5
			2020-Oct-26	20201026_E303871	1.78	39.5
				20201026_E303871DUP	1.7	39.6
			2021-May-25	20200525_E303871	1.59	42.6
			2021-Oct-25	20211025_E303871	0.77	53.1
			2021-Oct-26	20211026_E303871DUP	0.82	53.9
			2022-May-10	20220510_E303871	1.4	53
			2022-Oct-24	20221024_E303871	1.1	54.4
				20221024_E303871DUP	1.21	53.9
			2023-May-24	20230524_E303871	1.16	56.8
			2023-Oct-25	20231025_E303871	1.66	62.7
				20231025_E303871DUP	1.26	63.7
	MW14-02	57.90 - 59.40	2015-Apr-01	20150401_E303870	< 0.5	33.2
			2015-Jul-03	20150703_E303870	1.86	33.9
			2015-Sep-16	20150916_E303870	0.64	44.6
			2015-Dec-15	20151215_E303870	< 0.5	34.8
			2016-May-03	MW14-02_20160503	1.2	42.2
			2016-Nov-02	20161102_E303870	1.22	38.3
			2017-May-24	20170524_E303870	1.38	36.7
			2017-Oct-23	20171023_E303870	4.59	35
			2018-May-28	20180528_E303870	0.97	35.6
			2018-Oct-22	20181022_E303870	1.55	35.3
			2019-May-06	20190506_E303870	1.42	36.7
			2019-Oct-28	20191028_E303870	1.53	46.7
			2020-May-26	20200526_E303870	1.23	40
			2020-Oct-26	20201026_E303870	1.81	42.9
			2021-May-25	20200525_E303870	1.26	40.1
			2021-Oct-25	20211025_E303870	0.75	39.6
			2022-May-10	20220510_E303870	16	110
			2022-Oct-24	20221024_E303870	1.53	54.8
			2023-Oct-24	20231024_E303870	3.18	57.8
	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	6.44	134
			2017-Oct-23	20171023_E309167	2.78	134
			2018-May-29	20180529_E309167	2.78	158
			2018-Oct-23	20181023_E309167	1.44	106
			2019-May-06	20190506_E309167	2.19	125
	MW17-02	46.00 - 49.10	2017-May-24	20170524_E309168	11	159
			2017-Oct-24	20171024_E309168	2.8	155
			2018-May-28	20180528_E309168	9.14	179
			2018-Oct-22	20181022_E309168	11.1	178
	MW17-03	56.00 - 59.10	2017-May-25	20170525_E309169	3.3	36.6
			2017-Oct-23	20171023_E309169	2.74	37.7
			2018-May-28	20180528_E309169	2.43	39.7
			2018-Oct-22	20181022_E309169	1.48	39.2
			2019-May-06	20190506_E309169	1.59	39.5
			2019-Oct-28	20191028_E309169	0.95	36.8
			2020-May-26	20200526_E309169	1.68	37
			2020-Oct-26	20201026_E309169	1.68	37.3
			2021-May-25	20200525_E309169	2.58	38.9
			2021-Oct-25	20211025_E309169	0.58	39.1
			2022-May-10	20220510_E309169	2.13	35.1
			2022-Oct-24	20221024_E309169	1.21	37.7
			2023-May-24	20230524_E309169	0.94	38.2
			2023-Oct-24	20231024_E309169	1.11	36.2
	MW1-95	64.10 - 67.10	2015-Apr-01	20150401_E232086	< 0.5	-
			2015-Jul-03	20150703_E232086	< 0.5	-
			2015-Sep-16	20150916_E232086	< 0.5	-
				20150916_E232086DUP	< 0.5	-
			2015-Dec-15	20151215_E232086	< 0.5	-
				20151215_E232086DUP	< 0.5	-
			2016-May-03	MW1-95_20160503	1.41	40.2
			2016-Nov-02	20161102_E232086	1.69	39
			2017-May-24	20170524_E232086	1.07	37.3
			2017-Oct-24	20171024_E232086	0.69	38.5
			2018-May-28	20180528_E232086	1.33	33.4
			2018-Oct-22	20181022_E232086	0.75	38.5
			2019-May-06	20190506_E232086	< 0.5	40.3
			2019-Oct-28	20191028_E232086	< 0.5	39.5
			2020-May-26	20200526_E232086	0.93	38.3
			2020-Oct-26	20201026_E232086	0.73	37.4
			2021-May-25	20200525_E232086	0.83	40.8
			2021-Oct-25	20211025_E232086	0.6	42
			2022-May-10	20220510_E232086	0.82	39.6
			2022-Oct-24	20221024_E232086	0.73	40.5
			2023-May-24	20230524_E232086	< 0.5	38.8
			2023-Oct-24	20231024_E232086	< 0.5	39.3

Table 4: Carbon in Groundwater

	Carbon	
	total organic carbon	total inorganic carbon
	mg/L	mg/L
BC CSR AWF	ns	ns
BC CSR DW	ns	ns
BC WQG (Approved) AWF, Long-term	See notes	ns
BC WQG (Approved) AWF, Short-term	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name		
Locations	MW20-1	56.80 - 59.81	2020-May-27	20200527_E323191	1.53	36.3
			2020-Oct-26	20201026_E323191	0.95	48.7
			2021-May-26	20200526_E323191	0.72	42.1
				20200526_E323191DUP	0.96	42.9
			2021-Oct-25	20211025_E323191	1.08	73.5
			2022-May-10	20220510_E323191	2.41	61.9
			2022-Oct-27	20221027_E323191	1.4	47.9
			2023-May-24	20230524_E323191	1.83	66.5
				20230524_E323191DUP	2.14	64.8
			2023-Oct-25	20231025_E323191	1.85	85.2
	MW3-95	49.40 - 52.50	2018-May-28	20180528_E232088	101	149
	MW6-05	60.10 - 63.10	2015-Apr-01	20150401_E253791	1.26	-
				20150401_E253791DUP	0.91	-
			2015-Jul-03	20150703_E253791	1.94	-
				20150703_E253791DUP	2.07	-
			2015-Sep-16	20150916_E253791	0.83	-
			2015-Dec-15	20151215_E253791	< 0.5	-
			2016-Apr-05	MW06-05_20160504	1.74	40.8
			2016-Nov-03	20161103_E253791	1.02	41.2
			2017-May-25	20170525_E253791	0.87	35.4
				20170525_E253791DUP	1.05	35.3
			2017-Oct-24	20171024_E253791	1.67	35
			2018-May-29	20180529_E253791	5.23	36.2
			2018-Oct-24	20181024_E253791	1.13	33.6
			2019-Jul-05	20190507_E253791	1.62	36.2
			2019-Oct-29	20191029_E253791	0.8	38.2
			2020-May-27	20200527_E253791	1.21	40
			2020-Oct-26	20201026_E253791	1.58	34
			2021-May-26	20200526_E253791	1.63	34.3
			2021-Oct-26	20211026_E253791	0.94	67.7
			2022-May-11	20220511_E253791	1.91	62.3
				20220511_E253791DUP	1.88	63.5
			2022-Oct-27	20221027_E253791	1.04	49.2
			2023-May-25	20230525_E253791	0.9	41.4
			2023-Oct-31	20231031_E253791	1.1	57
	MW7-05	60.10 - 63.10	2015-Apr-01	20150401_RDOOTG01	< 0.5	-
			2015-Jul-03	20150703_RDOOTG01	2.06	-
			2015-Sep-16	20150916_RDOOTG01	0.96	-
			2015-Dec-15	20151215_RDOOTG01	1.27	-
			2016-Apr-05	MW07-05_20160504	2.24	67.9
			2016-Nov-03	20161103_RD00TG01	2.33	80.1
				20161103_RD00TG01DUP	1.77	79.6
			2017-May-25	20170525_RDOOTG01	3.61	59.4
			2017-Oct-24	20171024_RDOOTG01	1.82	61.8
				20171024_E309168DUP	3.26	153
			2018-May-29	20180529_E309167DUP	2.74	143
			2018-May-30	20180530_RD00TG01	2.92	34.7
			2018-Oct-23	20181023_E303871DUP	2.71	22.3
			2018-Oct-24	20181024_RD00TG01	1.71	36.9
			2019-Jul-05	20190507_RD00TG01	0.73	35.1
				20190507_E253791DUP	0.79	35.6
			2019-Oct-29	20191029_RDOOTG01	0.81	32
				20191029_RDOOTG01DUP	0.81	32.2
			2020-May-27	20200527_RD00TG01	4.64	65.7
			2020-Oct-26	20201026_RD00TG01	1.5	41.6
			2021-May-26	20200526_RD00TG01	4.2	112
			2021-Oct-26	20211026_RDOOTG01	2.56	66.2
			2022-May-11	20220511_RDOOTG01	2.63	69.7
			2022-Oct-27	20221027_RDOOTG01	6.78	134
			2023-May-25	20230525_RDOOTG01	6.55	127
			2023-Oct-31	20231031_RD00TG01	9.51	83.6

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
mg/L	milligram per litre
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 5: Petroleum Hydrocarbons in Groundwater

	Petroleum Hydrocarbons														
	benzene	toluene	ethylbenzene	xylene (o)	xylene (m & p)	total xylenes	styrene	methyl tert-butyl ether (MTBE)	VH (C6-C10)	VPH (C6-C10)	EPH C10-C19	EPH C19-C32	LEPH	HEPH	F1 (C6-C10 less BTEX)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC CSR AWF	400	5	2000	ns	ns	300	720	34000	15000	1500	5000	ns	500	ns	ns
BC CSR DW	5	60	140	ns	ns	90	800	95	15000	ns	5000	ns	ns	ns	ns
BC WQG (Approved) AWF, Long-term	40	0.5	200	ns	ns	30	ns	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	ns	ns	ns	ns	ns	ns	ns	3400	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	72	ns	ns	ns	ns	ns	ns	ns	ns
Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name															
Locations	MW14-01	68.60 - 71.60	2015-Apr-01	20150401_E303871	< 0.4	< 0.4	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2015-Jul-03	20150703_E303871	< 0.4	< 0.4	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2015-Sep-16	20150916_E303871	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.5	< 4	-	-	-	-	-	-	< 300
			2015-Dec-15	20151215_E303871	< 0.4	0.43	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2016-May-03	MW14-01_20160503	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-	-	-	-
			2017-May-24	20170524_E303871	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-23	20181023_E303871	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-29	20191029_E303871	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_E303871	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
				20201026_E303871DUP	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-25	20211025_E303871	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-26	20211026_E303871DUP	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-24	20221024_E303871	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
				20221024_E303871DUP	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-25	20231025_E303871	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
				20231025_E303871DUP	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW14-02	57.90 - 59.40	2015-Apr-01	20150401_E303870	< 0.4	< 0.4	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2015-Jul-03	20150703_E303870	< 0.4	< 0.4	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2015-Sep-16	20150916_E303870	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.5	< 4	-	-	-	-	-	-	< 300
			2015-Dec-15	20151215_E303870	< 0.4	< 0.4	< 0.4	-	< 0.4	-	< 0.5	-	-	-	-	-	-	-	< 300
			2016-May-03	MW14-02_20160503	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-	-	-	-
			2017-May-24	20170524_E303870	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-22	20181022_E303870	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-28	20191028_E303870	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_E303870	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-25	20211025_E303870	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-24	20221024_E303870	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-24	20231024_E303870	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	290	< 250	290	-
			2018-May-29	20180529_E309167	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-23	20181023_E309167	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW17-02	46.00 - 49.10	2017-May-24	20170524_E309168	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-22	20181022_E309168	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	1.63	-	-	-	-	-	-	-
	MW17-03	56.00 - 59.10	2017-May-25	20170525_E309169	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-22	20181022_E309169	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-28	20191028_E309169	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_E309169	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-25	20211025_E309169	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-24	20221024_E309169	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-24	20231024_E309169	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW1-95	64.10 - 67.10	2016-May-03	MW1-95_20160503	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-	-	-	-
			2017-May-24	20170524_E232086	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-22	20181022_E232086	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-28	20191028_E232086	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_E232086	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-25	20211025_E232086	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-24	20221024_E232086	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-24	20231024_E232086	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-

Table 5: Petroleum Hydrocarbons in Groundwater

	Petroleum Hydrocarbons														
	benzene	toluene	ethylbenzene	xylene (o)	xylene (m & p)	total xylenes	styrene	methyl tert-butyl ether (MTBE)	VH (C6-C10)	VPH (C6-C10)	EPH C10-C19	EPH C19-C32	LEPH	HEPH	F1 (C6-C10 less BTEX)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC CSR AWF	400	5	2000	ns	ns	300	720	34000	15000	1500	5000	ns	500	ns	ns
BC CSR DW	5	60	140	ns	ns	90	800	95	15000	ns	5000	ns	ns	ns	ns
BC WQG (Approved) AWF, Long-term	40	0.5	200	ns	ns	30	ns	ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	ns	ns	ns	ns	ns	ns	ns	3400	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	72	ns	ns	ns	ns	ns	ns	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name															
Locations	MW20-1	56.80 - 59.81	2020-Oct-26	20201026_E323191	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-25	20211025_E323191	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-27	20221027_E323191	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-25	20231025_E323191	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW3-95	49.40 - 52.50	2018-May-28	20180528_E232088	< 0.5	1290	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 1000	< 250	< 250	-	-	-
	MW6-05	60.10 - 63.10	2016-Apr-05	MW06-05_20160504	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-	-	-	-
			2017-May-25	20170525_E253791	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
				20170525_E253791DUP	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-24	20181024_E253791	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-29	20191029_E253791	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_E253791	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-26	20211026_E253791	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-27	20221027_E253791	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-31	20231031_E253791	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
	MW7-05	60.10 - 63.10	2016-Apr-05	MW07-05_20160504	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-	-	-	-
			2017-May-25	20170525_RDOOTG01	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250	-	-	-
			2018-Oct-23	20181023_E303871DUP	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2018-Oct-24	20181024_RD00TG01	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2019-Oct-29	20191029_RDOOTG01	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
				20191029_RDOOTG01DUP	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2020-Oct-26	20201026_RD00TG01	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	-	-	-	-	-	-
			2021-Oct-26	20211026_RDOOTG01	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2022-Oct-27	20221027_RDOOTG01	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-
			2023-Oct-31	20231031_RD00TG01	< 0.5	< 0.4	< 0.5	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	-	-	-	-	-	-	-

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µg/L	microgram per litre
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BTEX	benzene, toluene, ethylbenzene, and total xylenes
EPH C10-C19	EPHw10-19 - extractable petroleum hydrocarbons (C10-C19)
F1 (C6-C10 less BTEX)	Canadian Council of Ministers of the Environment Petroleum Hydrocarbon Fraction 1, including C6 to C10 hydrocarbons, excluding BTEX
HEPH	HEPHw - heavy extractable petroleum hydrocarbons in water; EPHw19-32 minus PAH compounds: benz(a)anthracene, benzo(a)pyrene, fluoranthene and pyrene
LEPH	LEPHw – light extractable petroleum hydrocarbons in water; EPHw10-19 minus PAH compounds: acenaphthene, acridine, anthracene, fluorene, naphthalene and phenanthrene
VH (C6-C10)	VHw6-10 – volatile hydrocarbons in water (C6-C10)
VPH (C6-C10)	VPH – volatile petroleum hydrocarbons

Table 6: Volatile Organic Compounds in Groundwater

| | | |

Table 7: Polycyclic Aromatic Hydrocarbons in Groundwater

	Polycyclic Aromatic Hydrocarbons (PAHs)																		
	anthracene	acenaphthylene	acridine	benzo(a)anthracene	benzo(a)pyrene	acenaphthene	dibenz(a,h)anthracene	fluorene	quinoline	phenanthrene	naphthalene	benzo(g,h,i)perylene	benzo(b)fluoranthene	pyrene	fluoranthene	chrysene	indeno(1,2,3-cd)pyrene	benzo(k)fluoranthene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC CSR AWF	1	ns	0.5	1	0.1	60	ns	120	34	3	10	ns	ns	0.2	2	1	ns	ns
BC CSR DW	1000	ns	ns	0.07	0.01	250	0.01	150	0.05	ns	80	ns	0.07	100	150	7	ns	ns
BC WQG (Approved) AWF, Long-term	0.1	ns	0.05	0.1	0.01	6	ns	12	ns	0.3	1	ns	ns	0.02	0.2	ns	ns	ns
BC WQG (Approved) AWF, Short-term	0.1	ns	0.05	0.1	ns	ns	ns	12	ns	ns	1	ns	ns	0.02	0.2	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns	50	ns	ns	ns	ns	ns	ns	ns	ns	ns
Locations	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005	< 0.05	< 0.005	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µg/L	microgram per litre
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 8: Inorganics in Groundwater

	Field / Lab General					Inorganics																								
	pH (field)	temp (field)	EC (field)	pH (lab)	dissolved hardness as CaCO3	total ammonia (as N)	cations total	anions total	COD	dissolved oxygen (lab)	dissolved oxygen (lab)	bromide	chloride ion	fluoride	ion balance	ion balance	cation - anion balance	Kjeldahl nitrogen total	nitrate (as N)	nitrite (as N)	nitrate and nitrite (as N)	dissolved silicon	total silicon	sulphate	sulphide (as S)	sulphide (as H2S)	dissolved sulfur as S	total sulfur as S
	pH	deg C	µS/cm	pH	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	µg/L	mg/L	mg/L	%	NA	%	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L
BC CSR AWF	ns	ns	ns	ns	ns	1.3-19	ns	ns	ns	ns	ns	ns	1500	3.0	ns	ns	ns	ns	400	0.20-2.0	400	ns	ns	3100-4300	ns	20	ns	ns
BC CSR DW	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	250	1.5	ns	ns	ns	ns	10	1	10	ns	ns	500	ns	50	ns	ns
BC WQG (Approved) AWF, Long-term	6.5-9	10	ns	ns	ns	0.1 - 1.9	ns	ns	ns	ns	ns	ns	150	ns	ns	ns	ns	ns	3	0.020-0.20	3	ns	ns	130-220	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	0.68 - 26	ns	ns	ns	ns	ns	ns	600	1.4-2.1	ns	ns	ns	ns	32.8	0.060-0.60	32.8	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	2	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name																												
Locations	MW14-01	68.60 - 71.60	2015-Apr-01	20150401_E303871	-	7.64	909	7.99	63.9	0.14	-	-	30	-	4.4	-	130	-	-	1	-	-	0.021	0.0133	0.034	7210	-	175	-	22.8	64.1	-
			2015-Jul-03	20150703_E303871	-	12.85	778	9.67	28.9	0.16	-	-	20	-	4.11	-	60	-	-	0.99	-	-	< 0.02	< 0.005	< 0.02	32700	-	137	-	105	54.5	-
			2015-Sep-16	20150916_E303871	-	11.76	621	9.55	31.7	0.2	-	-	27	-	2.59	-	34	-	-	1	-	-	0.022	< 0.005	0.022	33200	-	114	-	16.7	41.6	-
			2015-Dec-15	20151215_E303871	-	7.09	522	9.53	31	0.11	-	-	20	-	3.39	-	25	-	-	1	-	-	0.031	< 0.005	0.031	38700	-	107	-	8.9	34.8	-
			2016-May-03	MW14-01_20160503	9.83	9.9	311	9.32	31.3	0.0257	-	-	< 20	-	-	-	18.5	-	-	-	-	0.211	0.043	< 0.001	-	-	-	73.5	< 20	-	-	-
			2016-Nov-02	20161102_E303871	9.52	9.2	261.6	9.16	33.8	< 0.005	-	-	< 20	-	2.1	-	16.1	-	-	-	-	0.169	< 0.005	< 0.001	-	-	-	67.1	< 20	-	-	-
			2017-May-24	20170524_E303871	9.15	9.3	231.4	8.58	46.9	0.0084	3.01	3.14	< 20	-	2.6	-	16	-	-	-	-2.1	0.168	0.0105	< 0.001	-	-	-	58.3	< 18	-	-	-
			2017-Oct-23	20171023_E303871	8	9.2	229.2	8.22	74.3	0.0089	3.2	3.34	109	-	3.9	-	16.7	-	-	-	-2.2	-	< 0.005	< 0.001	-	-	-	53.5	-	-	-	-
			2018-May-29	20180529_E303871	9.11	10.4	232.4	8.13	95.6	0.0058	3.07	3.28	38	-	3.7	-	15	-	-	-	-3.5	-	< 0.005	< 0.001	-	30200	-	50.3	-	-	16.3	-
			2018-Oct-23	20181023_E303871	8.91	9.2	217.6	8.29	110	< 0.005	3.08	3.13	< 20	-	2.6	< 50	13	0.033	-	-	-0.8	-	< 0.005	< 0.001	-	28900	-	42.8	-	-	14.3	-
			2019-May-06	20190506_E303871	9.28	9.7	212.3	8.41	106	0.0104	2.74	3.05	< 20	-	2	< 50	12.2	0.039	-	-	-5.3	-	< 0.005	< 0.001	-	28500	-	38.5	-	-	13	-
			2019-Oct-29	20191029_E303871	8.15	8.1	236.6	8.31	129	0.0134	3.17	3.41	< 20	-	3.1	< 50	13	0.036	-	-	-3.7	-	0.0086	0.001	-	29800	-	40.7	-	-	13.9	-
			2020-May-27	20200527_E303871	7.39	9.7	231.5	8.31	142	0.0071	3.32	3.58	< 20	13.2	-	< 50	14	0.04	-	-	3.77	0.092	< 0.005	< 0.001	-	26400	-	36.7	-	-	11.9	-
				20200527_E303871DUP	-	-	-	8.31	142	0.0069	3.34	3.58	< 20	-	-	< 50	14.1	0.036	-	-	3.47	0.104	< 0.005	< 0.001	-	27200	-	36.8	-	-	11.8	-
			2020-Oct-26	20201026_E303871	9.28	9.1	280.7	8.35	209	0.188	4.69	4.49	< 20	4.57	-	< 50	14.5	0.049	-	-	2.18	-	0.0152	< 0.001	-	24200	-	35.2	-	-	11.5	-
				20201026_E303871DUP	-	-	-	8.36	192	0.197	4.34	4.37	< 20	-	-	< 50	14.4	0.053	-	-	0.344	-	0.0149	0.0012	-	24700	-	35.2	-	-	11.2	-
			2021-May-25	20200525_E303871	7.85	9.8	295.2	8.3	189	0.065	4.25	4.48	< 20	5.24	-	< 50	14.6	0.049	-	-	2.63	-	0.0146	< 0.001	-	25000	-	35.7	-	-	11.7	-
			2021-Oct-25	20211025_E303871	8.49	9.4	603	8.2	219	0.0181	4.88	5.37	< 20	-	-	< 50	16.9	0.048	90.9	-	4.78	-	< 0.005	< 0.001	-	24000	-	40.1	-	-	13	-
			2021-Oct-26	20211026_E303871DUP	-	-	-	8.22	230	0.0244	5.09	5.34	< 20	-	-	< 50	16.8	0.045	95.3	-	2.4	-	< 0.005	< 0.001	-	23600	-	39.9	-	-	12.8	-
			2022-May-10	20220510_E303871	8.04	9.3	355	8.31	210	0.0111	4.63	5.14	< 10	2.58	-	< 50	15.5	0.044	-	-	5.22	-	< 0.005	< 0.001	-	23400	-	35.6	-	-	13.2	-
			2022-Oct-24	20221024_E303871	7.3	9.1	363.1	8.18	245	0.0217	5.39	5.46	< 10	2.66	-	< 50	17.7	0.064	98.7	-	-0.64	-	< 0.005	< 0.001	-	19100	-	34.7	-	-	11.3	-
				20221024_E303871DUP	-	-	-	8.16	244	0.0219	5.39	5.24	< 10	-	-	< 50	17.7	0.062	103	-	1.41	-	< 0.005	< 0.001	-	19000	-	34.8	-	-	11.3	-
			2023-May-24	20230524_E303871	7.58	9.5	387.8	8.44	249	0.0118	5.49	5.72	< 10	-	-	< 50	18.3	0.06	96	-	-2.05	-	< 0.005	< 0.001	-	25100	-	37.8	-	-	12.7	-
			2023-Oct-25	20231025_E303871	-	-	-	8.14	291	0.0161	6.36	6.36	< 10	-	-	< 50	19.4	0.053	100	-	< 0.01	-	< 0.005	< 0.001	-	23200	-	38	-	-	13.1	-
				20231025_E303871DUP	-	-	-	8.16	284	0.0152	6.22	6.4	< 10	-	-	< 50	19.4	0.053	97.2	-	-1.43	-	< 0.005	< 0.001	-	22500	-	38	-	-	12.9	-
	MW14-02	57.90 - 59.40	2015-Apr-01	20150401_E303870	-	7.71	404	8.15	198	0.024	-	-	< 10	-	9.54	-	23	-	-	1	-	-	0.081	0.0797	0.16	8510	-	43.2	-	< 5	13.7	-
			2015-Jul-03	20150703_E303870	-	13.52	425	8.2	203	0.078	-	-	11	-	3.7	-	22	-	-	1	-	-	0.315	< 0.005	0.315	9740	-	40.8	-	7.3	16	-
			2015-Sep-16	20150916_E303870	-	11.71	285	8.12	210	0.022	-	-	17	-	9.84	-	10	-	-	1.1	-	-	0.313	< 0.005	0.313	9800	-	43.5	-	5.4	16.7	-
			2015-Dec-15	20151215_E303870	-	7.65	415	8.15	228	0.028	-	-	23	-	7.96	-	12	-	-	1.2	-	-	0.392	0.0066	0.398	9820	-	50.8	-	8.2	23.1	-
			2016-May-03	MW14-02_20160503	7.83	11.2	328.3	8	239	< 0.005	-	-	< 20	-	-	-	15.4	-	-	-	-	0.081	0.292	0.0011	-	-	-	49.4	< 20	-	-	-
			2016-Nov-02	20161102_E303870	7.62	9.3	307.4	7.93	219	< 0.005	-	-	< 20	-	10.2	-	18.1	-	-	-	-	0.079	0.498	< 0.001	-	-	-	44.7	< 20	-	-	-
			2017-May-24	20170524_E303870	7.67	9.9	307.1	8.16	169	< 0.005	3.86	4.42	< 20	-	10.1	-	14.2	-	-	-	-6.7	0.069	0.484	< 0.001	-	-	-	42.7	< 18	-	-	-
			2017-Oct-23	20171023_E303870	8.1	9.2	278.3	8.17	169	0.0057	3.86	4.25	< 20	-	4.3	-	16.3	-	-	-	-4.7	-	0.401	0.0023	-	-	-	38.7	-	-	-	-
			2018-May-28	20180528_E303870	8.06	10	287.7	8.14	172	< 0.005	3.93	4.01	< 20	-	12	-	16.9	-	-	-	-1	-	0.227	0.0014	-	8470	-	38.9	-	-	12.5	-
			2018-Oct-22	20181022_E303870	8.14	9.7	274.7	8.04	169	0.0073	3.88	4.06	< 20	-	9	< 50	13	0.143	-	-	-2.2	-	0.474	0.0024	-	8510	-	39.2	-	-	12.7	-
			2019-May-06	20190506_E303870	8.29	10.2	286.6	8.07	168	0.0129	3.82	4.16	< 20	-	5.7	< 50	12.9	0.152	-	-	-4.3	-	0.449	0.0031	-	8590	-	39.4	-	-	13.8	-
			2019-Oct-28	20191028_E303870	7.24	9	346.9	7.79	214	< 0.005	4.8	5.1	< 20	-	6.8	< 50	15.3	0.155	-	-	-3.1	-	0.224	0.0054	-	9190	-	40.1	-	-	14.4	-
			2020-May-26	20200526_E303870	6.57	10.1	290.7	8.16	196	0.0054	4.39	4.68	< 20	10.3	-	< 50	12.2	0.141	-	-	3.2	0.097	0.0822	0.0035	-	8050	-	36.6	-	-	11.7	-
			2020-Oct-26	20201026_E303870	8.97	9.1	297.4	8.06	222	0.165	5.04	4.86	< 20	7.38	-	< 50	11.3	0.16	-	-	1.82	-	0.321	0.0053	-	8750	-	43.4	-	-	14.8	-
			2021-May-25	20200525_E303870	7.54	9.6	275.7	8.23	177	0.0099	3.96	4.19	< 20	14.7	-	< 50	11.2	0.172	-	-	2.82	-	0.348	< 0.001	-	8530	-	41.6	-	-	13.8	-
			2021-Oct-25	20211025_E303870	7.94	9	475	7.77	177	< 0.005	3.93	4.13	< 20	-	-	< 50	12.9	0.169	95.2	-	2.48	-	0.252	0.0028	-	8470	-	38.6	-	-	13.2	-
			2022-May-10	20220510_E303870	7.06	8.9	821	7.4	502	0.009	11.3	11.1	52	4.7	-	621	104	0.108	-	-	0.893	-	0.236	< 0.005	-	10900	-	45.2	-	-	16.5	-
			2022-Oct-24	20221024_E303870	7.13	8.6	373.5	7.98	257	0.0051	5.52	5.47	< 10	9.01	-	< 50	19.9	0.096	101	-	0.45	-	0.238	< 0.001	-	9240	-	46.8	-	-	16	-
			2023-Oct-24	20231024_E303870	7.75	8.6	418.3	7.9	269	0.0197	6.44	6.4	18	-	-	< 50	28.9	0.104	101	-	0.31	-	0.328	0.0016	-	9390	-	46.9	-	-	16.2	-
	MW17-01	49.00 - 51.30	2017-May-24	20170524_E309167	7.28	9.5	699	7.71	473	< 0.005	10.8	10.9	< 20	-	11.6	-	18.6	-	-	-	-0.4	0.191	1.19	< 0.005	-	-	-	35.1	< 18	-	-	-
			2017-Oct-23	20171023_E309167	7.02	9.1	663	7.71	467	< 0.005	10.6	9.51	< 20	-	6.4	-	12.2	-	-	-	5.5	-	0.912	< 0.005	-	-	-	27.1	-	-	-	-
			2018-May-29	20180529_E309167	7.3	10.6	735	7.7	522	< 0.005	11.2	11.4	< 20	-	9.4	-	13.4	-	-	-	-0.8	-	4.74	< 0.005	-	12300	-	29.8	-	-	10.5	-
			2018-Oct-23	20181023_E309167	7.69	8.9	541	7.7	382	< 0.005	8.45	8.76	< 20	-	8.4	< 250	2.6	< 0.1	-	-	-1.8	-	1.2	< 0.005	-	10900	-	11.4	-	-	4.57	-
			2019-May-06	20190506_E309167	8.38	10.7	690	7.57	486	0.0051	10.4	10.8	< 20	-	6.4	< 250	10.9	< 0.1	-	-	-1.8	-	2.27	< 0.005	-	12700	-	29.8	-	-	11.8	-
	MW17-02	46.00 - 49.10	2017-May-24	20170524_E309168	6.96	10.1	921	7.52	661	< 0.005	14.7	14.4	34	-	9	-	49.4	-	-	-	1.2	0.487	5.95	< 0.005	-	-	-	51.6	< 18	-	-	-
			2017-Oct-24	20171024_E309168	7.06	9.7	772	7.55	557	< 0.005	12.3	11.7	28	-	6.5	-	2.5	-	-	-	2.8	-	1.21	< 0.005	-	-	-	54.5	-	-	-	-
			2018-May-28	20180528_E309168	7.21	10.6	895	7.6	607	< 0.005	14.1	14.3	24	-	7.5	-	12.3	-	-	-	-0.7	-	7.3	< 0.005	-	13100	-	54.1	-	-	18.7	-
			2018-Oct-22	20181022_E309168	7.2	9.8	1062	7.44	722	< 0.005	16.6	16.6	33	-	5.4	500	89.2	< 0.1	-	-	0.1	-	2.8	< 0.005	-	12900	-	38.4	-	-	14.5	-
	MW17-03	56.00 - 59.10	2017-May-25	20170525_E309169	7.73	10.2	308.2	8.2	199	< 0.005	4.31	4.41	< 20	-	3.7	-	1.69	-	-	-	-1.2	0.105	< 0.005	< 0.001	-	-	-	67.4	< 18	-	-	-
			2017-Oct-23	20171023_E309169	7.51	9.4	300.8	8.11	199	< 0.005	4.32	4.65	< 20	-	1.6	-	2.26	-	-	-	-3.6	-	< 0.005	< 0.001	-	-	-	68.9	-	-	-	-
			2018-May-28	20180528_E309169	8.15	10.6	292.2	8.4	195	< 0.005	4.12	4.47	< 20	-	4.4	-	1.81	-	-	-	-4.1	-	< 0.005	< 0.001	-	9300	-	55.6	-	-	18.5	-
			2018-Oct-22	20181022_E309169	7.88	9.7	295.6	8.04	194	< 0.005	4.21	4.55	< 20	-	3	< 50	1.83	0.298	-	-	-3.9	-	0.0095	< 0.001	-	8460	-	62.6	-	-	21	-
			2019-May-06	20190506_E309169	7.67	10.3	300.7	7.95	193	0.012	4.14	4.51	< 20	-	3.8	< 50	1.25	0.287	-	-	-4.2	-	0.0069	0.0011	-	9120	-	60.9	-	-	20.6	-
			2019-Oct-28	20191028_E309169	7.14	9.4	312.2	7.74	198	< 0.005	4.28	4.64	< 20	-	3.1	< 50	1.33	0.353	-	-	-4	-	0.008	< 0.001	-	8770	-	68.1	-	-	23.8	-
			2020-May-26	20200526_E309169	6.36	10.2	292.7	8.06	204	< 0.005	4.41	4.77	< 20	18.4	-	< 50	1.19	0.322	-	-	3.92	0.097	< 0.005	< 0.001	-	8080	-	68.5	-	-	23.6	-
			2020-Oct-26	20201026_E309169	8.74	9.4	288.4	8.02	223	0.0944	4.83	4.66	< 20	4.99	-	< 50	1.71	0.368	-	-	1.79	-	0.0094	< 0.001	-	8240	-	72	-	-	25.1	-
			2021-May-25	20200525_E309169	7.35	9.8	290.7	8.24	190	0.0064	4.11	4.46	21	9.36	-	< 50	1.42	0.337	-	-	4.08	-	0.023	< 0.001	-	8450	-	69.3	-	-	23.4	-
			2021-Oct-25	20211025_E309169	7.84	9.6	501	7.81	195	< 0.005	4.23	4.45	< 20	-	-	< 50	2.58	0.35	95	-	2.53	-	0.0188	< 0.001	-	8570	-	70.9	-	-	24.4	-
			2022-May-10	20220510_E309169	7.57	9.7	296	8.16	194	< 0.005	4.16	4.31	10	4.77	-	< 50	1.27	0.305	-	-	1.77	-	< 0.005	0.0012	-	8820	-	62.4	-	-	22	-
			2022-Oct-24	20221024_E309169	7.33	9.5	298.5	8.08	198	< 0.005	4.29	4.28	< 10	4.24	-	< 50	1.45	0.367	100	-	0.12	-	< 0.005	< 0.001	-	8050	-	71.9	-	-	24.2	-
			2023-May-24	20230524_E309169	7.5	10	299.5	8.32	194	< 0.005	4.17	4.37	< 10	-	-	< 50	1.67	0.311	95.4	-	-2.34	-	0.107	< 0.001	-	9500	-	66.3	-	-	22.3	-
			2023-Oct-24	20231024_E309169	-	-	-	7.98	198	< 0.005	4.3	4.45	< 10	-	-	< 50	2.64	0.354	96.6	-	-1.71	-	0.0184	0.0032	-	8720	-	68.3	-	-	23.5	-

Table 8: Inorganics in Groundwater

	Field / Lab General					Inorganics																							
	pH (field)	temp (field)	EC (field)	pH (lab)	dissolved hardness as CaCO3	total ammonia (as N)	cations total	anions total	COD	dissolved oxygen (lab)	dissolved oxygen (lab)	bromide	chloride ion	fluoride	ion balance	ion balance	cation - anion balance	Kjeldahl nitrogen total	nitrate (as N)	nitrite (as N)	nitrate and nitrite (as N)	dissolved silicon	total silicon	sulphate	sulphide (as S)	sulphide (as H2S)	dissolved sulfur as S	total sulfur as S
	pH	deg C	µS/cm	pH	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	µg/L	mg/L	mg/L	%	NA	%	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L
BC CSR AWF	ns	ns	ns	ns	ns	1.3-19	ns	ns	ns	ns	ns	ns	1500	3.0	ns	ns	ns	ns	400	0.20-2.0	400	ns	ns	3100-4300	ns	20	ns	ns
BC CSR DW	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	250	1.5	ns	ns	ns	ns	10	1	10	ns	ns	500	ns	50	ns	ns
BC WQG (Approved) AWF, Long-term	6.5-9	10	ns	ns	ns	0.1 - 1.9	ns	ns	ns	ns	ns	ns	150	ns	ns	ns	ns	ns	3	0.020-0.20	3	ns	ns	130-220	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	0.68 - 26	ns	ns	ns	ns	ns	ns	600	1.4-2.1	ns	ns	ns	ns	32.8	0.060-0.60	32.8	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	2	ns	ns

Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name																										
Locations			2015-Apr-01	20150401_E232086	-	8.06	390	8.14	195	0.013	-	-	< 10	-	6.62	-	1	-	-	1	-	-	0.047	< 0.005	0.044	10900	-	56.3	-	-	17.2	-
			2015-Jul-03	20150703_E232086	-	12.96	381	8.22	198	0.01	-	-	< 10	-	5.24	-	0.73	-	-	0.99	-	-	0.045	< 0.005	0.045	11700	-	57.4	-	< 5	19.7	-
			2015-Sep-16	20150916_E232086	-	11.4	383	7.99	200	0.026	-	-	12	-	6.67	-	1.6	-	-	1	-	-	0.073	< 0.005	0.073	11200	-	54.8	-	5.3	14.7	-
				20150916_E232086DUP	-	-	-	8.18	195	0.022	-	-	10	-	-	-	1.1	-	-	1	-	-	0.07	< 0.005	0.07	11300	-	56	-	7.4	20	-
			2015-Dec-15	20151215_E232086	-	7.63	376	8.13	214	0.031	-	-	< 10	-	4.62	-	1.2	-	-	1.1	-	-	0.125	< 0.005	0.126	12600	-	58.1	-	5.8	23.5	-
				20151215_E232086DUP	-	-	-	8.16	210	0.014	-	-	< 10	-	-	-	0.86	-	-	1.1	-	-	0.13	< 0.005	0.13	12400	-	53.3	-	< 5	19.1	-
			2016-May-03	MW1-95_20160503	7.75	9.5	286.5	7.95	225	< 0.005	-	-	< 20	-	-	-	0.79	-	-	-	-	0.082	0.137	< 0.001	-	-	-	57.8	< 20	-	-	-
			2016-Nov-02	20161102_E232086	7.42	9.2	282.6	7.87	211	< 0.005	-	-	< 20	-	4.4	-	0.7	-	-	-	-	< 0.05	0.101	< 0.001	-	-	-	56.9	< 20	-	-	-
			2017-May-24	20170524_E232086	7.43	9.2	282.5	8.08	196	< 0.005	4.22	4.21	< 20	-	4.6	-	0.62	-	-	-	0.1	< 0.05	0.0716	< 0.001	-	-	-	55.2	< 18	-	-	-
			2017-Oct-24	20171024_E232086	7.55	8.8	279.4	8.23	191	< 0.005	4.13	4.4	< 20	-	4.8	-	0.7	-	-	-	-3.2	-	0.0672	< 0.001	-	-	-	57.9	-	-	-	-
			2018-May-28	20180528_E232086	7.56	9.5	285.4	8.15	195	< 0.005	4.19	3.97	< 20	-	5.3	-	0.86	-	-	-	2.7	-	0.0487	< 0.001	-	10700	-	57	-	-	18	-
			2018-Oct-22	20181022_E232086	8.21	8.9	281.9	8	189	< 0.005	4.09	4.4	< 20	-	4.5	< 50	0.76	0.465	-	-	-3.7	-	0.0388	< 0.001	-	10600	-	56.3	-	-	18.2	-
			2019-May-06	20190506_E232086	7.82	9.4	285.9	7.98	183	< 0.005	3.95	4.36	< 20	-	4.1	< 50	0.74	0.474	-	-	-4.9	-	0.0397	< 0.001	-	10900	-	55.8	-	-	18.6	-
			2019-Oct-28	20191028_E232086	7.15	8.7	293.6	7.7	195	< 0.005	4.22	4.53	< 20	-	4.7	< 50	0.76	0.498	-	-	-3.5	-	0.0295	< 0.001	-	11500	-	56.5	-	-	18.5	-
			2020-May-26	20200526_E232086	6.38	9.6	277.2	8.07	194	< 0.005	4.18	4.63	< 20	35.5	-	< 50	0.78	0.441	-	-	5.11	0.103	0.0326	< 0.001	-	10400	-	56.7	-	-	19.1	-
			2020-Oct-26	20201026_E232086	8.74	9.1	273.2	8.02	218	0.0065	4.67	4.41	< 20	8.27	-	< 50	0.82	0.479	-	-	2.86	-	0.0281	< 0.001	-	11100	-	57.2	-	-	19.5	-
			2021-May-25	20200525_E232086	7.29	9.5	285.3	8.23	190	< 0.005	4.17	4.37	< 20	9.79	-	< 50	2.98	0.482	-	-	2.34	-	0.0364	< 0.001	-	10700	-	57.7	-	-	18.5	-
			2021-Oct-25	20211025_E232086	7.81	9.1	489	7.78	194	< 0.005	4.21	4.35	< 20	-	-	< 50	1.46	0.481	96.8	-	1.64	-	0.0312	< 0.001	-	11200	-	57	-	-	19.3	-
			2022-May-10	20220510_E232086	7.79	9.3	288	8.11	166	< 0.005	3.58	4.27	< 10	6.75	-	< 50	1.28	0.474	-	-	8.79	-	0.031	< 0.001	-	11100	-	54.1	-	-	20.8	-
			2022-Oct-24	20221024_E232086	7.31	9.1	288.3	8.02	196	0.0057	4.24	4.16	< 10	6.56	-	< 50	1.21	0.46	102	-	0.95	-	0.0185	< 0.001	-	10900	-	56	-	-	18.8	-
			2023-May-24	20230524_E232086	7.63	9.4	288	8.28	186	< 0.005	4.02	4.26	< 10	-	-	< 50	1.16	0.486	94.4	-	-2.9	-	0.0254	< 0.001	-	11800	-	56.8	-	-	18.8	-
			2023-Oct-24	20231024_E232086	-	-	-	7.94	191	< 0.005	4.13	4.36	< 10	-	-	< 50	1.16	0.467	94.7	-	-2.71	-	0.0185	< 0.001	-	11500	-	54.2	-	-	18.4	-
	MW1-95	64.10 - 67.10	2020-May-27	20200527_E323191	6.59	9.5	247.2	8.17	181	< 0.005	3.89	4.06	< 20	88.3	-	< 50	9.6	0.156	-	-	2.14	0.072	0.177	0.0019	-	8220	-	23.7	-	-	7.65	-
			2020-Oct-26	20201026_E323191	9.5	8.5	292.3	8.1	236	0.0551	5.04	4.86	< 20	8.7	-	< 50	8.43	0.158	-	-	1.82	-	0.148	< 0.001	-	9410	-	26.7	-	-	9.53	-
			2021-May-26	20200526_E323191	7.6	9.4	257.1	8.26	177	< 0.005	3.82	3.94	< 20	11.34	-	< 50	7.78	0.153	-	-	1.55	-	0.179	< 0.001	-	9150	-	26.9	-	-	8.83	-
				20200526_E323191DUP	-	-	-	8.2	176	0.0053	3.8	3.96	< 20	-	-	< 50	7.8	0.155	-	-	2.06	-	0.18	< 0.001	-	9150	-	26.9	-	-	8.76	-
			2021-Oct-25	20211025_E323191	7.77	8.8	700	7.66	287	< 0.005	6.08	6.4	< 20	-	-	< 50	12	0.123	95	-	2.56	-	< 0.005	< 0.001	-	10200	-	27.9	-	-	9.6	-
			2022-May-10	20220510_E323191	7.45	9	379.8	7.97	258	< 0.005	5.46	5.62	12	5.74	-	< 50	11.7	0.11	-	-	1.44	-	0.103	0.0018	-	9860	-	25.9	-	-	9.04	-
			2022-Oct-27	20221027_E323191	7.3	8.7	292	7.82	209	< 0.005	4.41	4.67	< 10	7.58	-	< 50	6.94	0.107	94.4	-	-2.86	-	0.137	0.0027	-	10300	-	29.9	-	-	10.1	-
			2023-May-24	20230524_E323191	7.31	9.6	407.4	7.98	279	< 0.005	5.89	5.5	< 10	-	-	< 50	16.7	0.107	107	-	3.42	-	0.0379	< 0.001	-	11400	-	27.3	-	-	9.53	-
				20230524_E323191DUP	-	-	-	7.97	278	< 0.005	5.87	5.58	< 10	-	-	< 50	17	0.11	105	-	2.53	-	0.0384	< 0.001	-	11200	-	27.8	-	-	9.33	-
			2023-Oct-25	20231025_E323191	-	-	-	7.89	368	< 0.005	7.76	7.36	< 10	-	-	< 250	12.8	< 0.1	105	-	2.64	-	< 0.025	< 0.005	-	11600	-	22.3	-	-	10.1	-
	MW3-95	49.40 - 52.50	2018-May-28	20180528_E232088	7.24	12.3	750	8.29	403	21.7	10.7	9.77	313	-	2.7	-	13	-	-	-	4.3	-	< 0.025	0.0348	-	13700	27000	30.5	-	-	14.4	11.4
	MW6-05	60.10 - 63.10	2015-Apr-01	20150401_E253791	-	8	434	8.05	202	0.025	-	-	28	-	9.26	-	21	-	-	1	-	-	0.785	< 0.005	0.785	8470	-	41.7	-	-	14.7	-
				20150401_E253791DUP	-	-	-	8.1	195	0.017	-	-	29	-	-	-	21	-	-	1	-	-	0.788	< 0.005	0.788	8210	-	42.4	-	-	12.3	-
			2015-Jul-03	20150703_E253791	-	13.87	417	8.05	209	0.016	-	-	< 10	-	5.65	-	21	-	-	1	-	-	1.12	< 0.005	1.12	9620	-	42.4	-	12.3	16.8	-
				20150703_E253791DUP	-	-	-	7.99	211	0.011	-	-	< 10	-	-	-	20	-	-	1	-	-	1.11	< 0.005	1.11	9510	-	43.1	-	9.3	18.2	-
			2015-Sep-16	20150916_E253791	-	11	273	8.09	205	0.026	-	-	< 10	-	9.25	-	12	-	-	1	-	-	0.266	< 0.005	0.266	8850	-	47.4	-	< 5	13.5	-
			2015-Dec-15	20151215_E253791	-	8.63	373	8.11	198	0.031	-	-	< 10	-	6.5	-	11	-	-	1.1	-	-	0.53	< 0.005	0.53	9680	-	40.3	-	6.6	13.6	-
			2016-Apr-05	MW06-05_20160504	7.68	10.3	308.1	7.94	233	< 0.005	-	-	< 20	-	-	-	12.9	-	-	-	-	0.086	0.599	< 0.001	-	-	-	46.6	< 20	-	-	-
			2016-Nov-03	20161103_E253791	7.47	9.7	316.7	7.83	220	< 0.005	-	-	< 20	-	7	-	16	-	-	-	-	0.06	0.318	< 0.001	-	-	-	47.7	< 20	-	-	-
			2017-May-25	20170525_E253791	7.79	10.4	288.3	8.14	171	< 0.005	3.81	3.93	< 20	-	9.9	-	12.8	-	-	-	-1.6	0.065	0.411	< 0.001	-	-	-	37	< 18	-	-	-
				20170525_E253791DUP	-	-	-	8.12	176	< 0.005	3.93	4.09	< 20	-	-	-	12.8	-	-	-	-2	0.061	0.41	< 0.001	-	-	-	36.9	< 18	-	-	-
			2017-Oct-24	20171024_E253791	7.59	10.3	280.4	8.22	172	< 0.005	3.87	4.12	< 20	-	10.7	-	14.9	-	-	-	-3.1	-	0.416	< 0.001	-	-	-	35.9	-	-	-	-
			2018-May-29	20180529_E253791	8.06	11.3	279.9	8.34	166	< 0.005	3.7	4	< 20	-	6.2	-	12.6	-	-	-	-3.9	-	0.451	< 0.001	-	7810	-	36.8	-	-	12	-
			2018-Oct-24	20181024_E253791	8.2	10.2	284.3	8.2	180	< 0.005	4.02	4.13	< 20	-	8.3	< 50	14	0.185	-	-	-1.4	-	0.393	0.0012	-	8680	-	40.7	-	-	14.7	-
			2019-Jul-05	20190507_E253791	8	10.7	279.5	8.03	163	< 0.005	3.67	3.98	< 20	-	9.3	< 50	8.57	0.177	-	-	-4.1	-	0.155	0.0012	-	7990	-	40.9	-	-	13.9	-
			2019-Oct-29	20191029_E253791	7.19	8.7	293.3	7.71	180	< 0.005	4	4.35	< 20	-	6.3	< 50	9.79	0.199	-	-	-4.1	-	0.653	0.003	-	8270	-	39.6	-	-	13.6	-
			2020-May-27	20200527_E253791	6.66	10.2	289.5	8.17	201	< 0.005	4.42	4.7	< 20	54.8	-	< 50	11.1	0.14	-	-	3.07	0.121	0.137	0.0016	-	7530	-	39.7	-	-	13.5	-
			2020-Oct-26	20201026_E253791	10.02	8.7	256.8	8.09	192	0.181	4.25	3.96	116	13.87	-	< 50	15.1	0.16	-	-	3.53	-	0.24	< 0.001	-	8030	-	36.2	-	-	12.6	-
			2021-May-26	20200526_E253791	7.44	9.3	260.9	8.19	162	< 0.005	3.6	3.85	< 20	13.9	-	< 50	20.6	0.167	-	-	3.36	-	0.236	< 0.001	-	7800	-	35.7	-	-	12	-
			2021-Oct-26	20211026_E253791	7.72	8.9	711	7.64	282	< 0.005	6.09	6.45	< 20	-	-	< 50	20.7	0.145	94.4	-	2.87	-	0.0776	0.0027	-	8590	-	40.4	-	-	13.3	-
			2022-May-11	20220511_E253791	7.56	8.8	423.8	8.1	266	< 0.005	5.82	6.31	< 10	7.48	-	< 50	22.4	0.152	-	-	4.04	-	0.158	< 0.001	-	8120	-	47.4	-	-	16.1	-
				20220511_E253791DUP	-	-	-	8.1	278	< 0.005	6.07	6.32	< 10	-	-	< 50	22.1	0.15	-	-	2.02	-	0.164	< 0.001	-	7960	-	47.1	-	-	14.9	-
			2022-Oct-27	20221027_E253791	7.17	8.5	351.5	7.87	216	< 0.005	4.82	5.4	< 10	8.78	-	< 50	18.2	0.131	89.2	-	-5.68	-	0.222	0.0028	-	8280	-	50.2	-	-	16.9	-
			2023-May-25	20230525_E253791	7.58	9.6	320.1	8.26	196	< 0.005	4.46	4.63	< 10	-	-	< 50	19.4	0.162	96.3	-	-1.87	-	0.184	0.0053	-	8680	-	50.9	-	-	16.7	-
			2023-Oct-31	20231031_E253791	-	-	-	7.67	256	< 0.005	5.68	6.14	< 10	-	-	< 50	19.2	0.127	92.5	-	-3.89	-	0.0223	< 0.001	-	8300	-	48.8	-	-	15.6	-
	MW7-05	60.10 - 63.10	2015-Apr-01	20150401_RDOOTG01	-	8.12	889	8.12	183	0.01	-	-	< 10	-	3.44	-	10	-	-	1	-	-	0.527	< 0.005	0.527	6440	-	46.6	-	-	17.5	-
			2015-Jul-03	20150703_RDOOTG01	-	14.4	397	8.15	232	0.051	-	-	11	-	5.64	-	16	-	-	1	-	-	0.094	< 0.005	0.094	9220	-	44.7	-	6.7	15.8	-
			2015-Sep-16	20150916_RDOOTG01	-	11.43	390	8.01	207	0.015	-	-	12	-	6.5	-	11	-	-	1.1	-	-	0.179	< 0.005	0.179	8030	-	44.5	-	< 5	12.5	-
			2015-Dec-15	20151215_RDOOTG01	-	8.15	416	7.87	221	0.019	-	-	10	-	4.33	-	12	-	-	1.1	-	-	0.557	< 0.005	0.557	8670	-	46.1	-	< 5	13	-
			2016-Apr-05	MW07-05_20160504	7.6	10.8	443.7	7.73	353	< 0.005	-	-	< 20	-	-	-	15.3	-	-	-	-	0.197	0.0636	< 0.001	-	-	-	48.6	< 20	-	-	-
			2016-Nov-03	20161103_RD00TG01	7.2	9.9	486.1	7.63	373	0.0193	-	-	< 20	-	2.1	-	16.9	-	-	-	-	0.137	0.047	< 0.005	-	-	-	44.7	< 20	-	-	-
				20161103_RD00TG01DUP	-	-	-	7.53	385	0.0212	-	-	< 20	-	-	-	17	-	-	-	-	0.151	0.047	< 0.005	-	-	-	45	< 20	-	-	-
			2017-May-25	20170525_RDOOTG01	7.63	10.7	402.5	8.02	271	< 0.005	5.93	5.82	< 20	-	2.6	-	17.9	-	-	-	1	0.216	0.0555	< 0.001	-	-	-	43.6	< 18	-	-	-
			2017-Oct-24	20171024_RDOOTG01	7.29	10.7	420.3	7.94	268	0.0164	5.85	6.02	< 20	-	2.5	-	14.3	-	-	-	-1.4	-	0.093	< 0.001	-	-	-	45.2	-	-	-	-
				20171024_E309168DUP	-	-	-	7.55	554	< 0.005	12.2	11.3	< 20	-	-	-	< 2.5	-	-	-	4.1	-	1.18	< 0.005	-	-	-	53.1	-	-	-	-
			2018-May-29	20180529_E309167DUP	-	-	-	7.61	533	< 0.005	11.4	11.5	< 20	-	-	-	13.3	-	-	-	-0.2	-	4.74	< 0.005	-	12100	-	29.7	-	-	10.1	-
			2018-May-30	20180530_RD00TG01	7.84	10.8	277.8	8.32	188	< 0.005	4.06	3.98	< 20	-	4.7	-	9.81	-	-	-	1	-	0.182	< 0.001	-	6630	-	36.6	-	-	11.7	-
			2018-Oct-23	20181023_E303871DUP	-	-	-	8.3	105	< 0.005	2.96	3.16	< 20	-	-	< 50	13.1	0.033	-	-	-3.2	-	< 0.005	< 0.001	-	28900	-	42.8	-	-	14.4	-
			2018-Oct-24	20181024_RD00TG01	8.03	10.5	285.9	8.17	181	< 0.005	3.96	4.15	< 20	-	6.1	< 50	9.85	0.193	-	-	-2.4	-	0.538	< 0.001	-	7040	-	38.8	-	-	14	-
			2019-Jul-05	20190507_RD00TG01	8.05	10.6	276.5	8.08	166	0.0061	3.65	4	< 20	-	9.1	< 50	13	0.248	-	-	-4.7	-	0.537	< 0.001	-	7060	-	35.6	-	-	12.1	-
				20190507_E253791DUP	-	-	-	8.02	165	< 0.005	3.7	4	< 20	-	-	< 50	8.58	0.171	-	-	-3.9	-	0.163	< 0.001	-	8050	-	40.9	-	-	13.8	-
			2019-Oct-29	20191029_RDOOTG01	7.35	9.6	265.1	7.75	155	< 0.005	3.41	3.72	< 20	-	9.6	< 50	11.4	0.298	-	-	-4.3	-	0.38	0.0018	-	7010	-	35.8	-	-	12.2	-
				20191029_RDOOTG01DUP	-	-	-	7.75	155	< 0.005	3.43	3.72	< 20	-	-	< 50	11.4	0.298	-	-	-4.1	-	0.38	0.0023	-	6960	-	35.8	-	-	12.7	-
			2020-May-27	20200527_RD00TG01	6.3	10	441.9	7.98	317	< 0.005	6.81	6.97	< 20	13.1	-	111	31.6	0.175	-	-	1.16	0.286	0.0393	0.025	-	8090	-	35.8	-	-	12.1	-
			2020-Oct-26	20201026_RD00TG01	9.09	9.3	295.2	8.02	220	0.128	4.86	4.88	< 20	8.77	-	< 50	14.1	0.316	-	-	0.205	-	0.941	0.0057	-	6450	-	40.7	-	-	13.9	-
			2021-May-26	20200526_RD00TG01	7.19	9.8	665	7.72	463	0.0093	9.92	8.22	21	8.75	-	< 250	47.6	0.173	-	-	9.37	-	0.374	< 0.005	-	9680	-	37.8	-	-	13.4	-
			2021-Oct-26	20211026_RDOOTG01	7.43	9.5	727	7.32	274	0.0103	6.19	6.51	< 20	-	-	< 50	29.9	0.212	95.1	-	2.52	-	0.761	0.0011	-	7260	-	40.6	-	-	14	-
			2022-May-11	20220511_RDOOTG01	7.21	9.8	455.7	8.02	255	0.0062	5.59	6.61	< 10	2.01	-	< 50	22.6	0.135	-	-	8.36	-	0.354	0.0172	-	8540	-	39.7	-	-	14	-
			2022-Oct-27	20221027_RDOOTG01	6.65	9.5	799	7.43	524	0.0207	11.5	12	24	1.98	-	< 250	53	0.106	95.8	-	-2.13	-	1	0.185	-	9880	-	37.6	-	-	13.9	-
			2023-May-25	20230525_RDOOTG01	6.96	10.3	786	7.66	460	0.0231	11.2	10.5	20	-	-	256	63	0.117	107	-	3.22	-	0.282	0.0333	-	12300	-	37.1	-	-	13.5	-
			2023-Oct-31	20231031_RD00TG01	-	-	-	7.34	336	0.045	8.48	8.7	40	-	-	< 250	58	0.121	97.5	-	-1.28	-	0.109	0.0192	-	11500	-	35.2	-	-	12.7	-

Table 8: Inorganics in Groundwater

						Field / Lab General					Inorganics																							
Location Groups	Sample Location	Well Screen Depth (m)	Sample Date	Sample Name		pH (field)	temp (field)	EC (field)	pH (lab)	dissolved hardness as CaCO3	total ammonia (as N)	cations total	anions total	COD	dissolved oxygen (lab)	dissolved oxygen (lab)	bromide	chloride ion	fluoride	ion balance	ion balance	cation - anion balance	Kjeldahl nitrogen total	nitrate (as N)	nitrite (as N)	nitrate and nitrite (as N)	dissolved silicon	total silicon	sulphate	sulphide (as S)	sulphide (as H2S)	dissolved sulfur as S	total sulfur as S
						pH	deg C	µS/cm	pH	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	µg/L	mg/L	mg/L	%	NA	%	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L
					BC CSR AWF	ns	ns	ns	ns	ns	1.3-19	ns	ns	ns	ns	ns	ns	1500	3.0	ns	ns	ns	ns	400	0.20-2.0	400	ns	ns	3100-4300	ns	20	ns	ns
					BC CSR DW	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	250	1.5	ns	ns	ns	ns	10	1	10	ns	ns	500	ns	50	ns	ns
					BC WQG (Approved) AWF, Long-term	6.5-9	10	ns	ns	ns	0.1 - 1.9	ns	ns	ns	ns	ns	ns	150	ns	ns	ns	ns	ns	3	0.020-0.20	3	ns	ns	130-220	ns	ns	ns	ns
					BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	0.68 - 26	ns	ns	ns	ns	ns	ns	600	1.4-2.1	ns	ns	ns	ns	32.8	0.060-0.60	32.8	ns	ns	ns	ns	ns	ns	ns
					BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	2	ns	ns

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
%	percent
µg/L	microgram per litre
µS/cm	microsiemens per centimetre
deg C	degree Celsius
meq/L	milliequivalents per litre
mg/L	milligram per litre
NA	not applicable
pH	potential of hydrogen
Health Canada GCDWQ, AO/Other	Health Canada Guidelines for Canadian Drinking Water Quality, Aesthetic Objectives and Operational Guidelines
Health Canada GCDWQ, MAC	Health Canada Guidelines for Canadian Drinking Water Quality, Maximum Acceptable Concentrations
BC CSR AWF	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life
BC CSR DW	BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water
BC SDWQG - AO	BC Source Drinking Water Quality Guidelines, aesthetic objective
BC SDWQG - MAC	BC Source Drinking Water Quality Guidelines, maximum allowable concentration
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 9: Metals in Groundwater

| | | | | | Field | | Carbon | | Metals | | | | |

Table 9: Metals in Groundwater

| Location Groups | Sample Location | Well Screen Depth (m) | Sample Date | Sample Name | Field | | Carbon | Metals | | |

Supplemental Notes for Tables 2 to 9

BC CSR AWF — BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Freshwater Aquatic Life

ammonia (as N) (T)	cadmium (dissolved) (F)	copper (dissolved) (F)	fluoride (T)	lead (dissolved) (F)
1310µg/L @ pH>=8.5	0.5µg/L @ H<30mg/L	20µg/L @ H<50mg/L	2000µg/L @ H<50mg/L	40µg/L @ H<50mg/L
3700µg/L @ pH=8.0<8.5	1.5µg/L @ H=30<90mg/L	30µg/L @ H=50<75mg/L	3000µg/L @ H>=50mg/L	50µg/L @ H=50<100mg/L
11300µg/L @ pH=7.5<8.0	2.5µg/L @ H=90<150mg/L	40µg/L @ H=75<100mg/L		60µg/L @ H=100<200mg/L
18500µg/L @ pH=7.0<7.5	3.5µg/L @ H=150<210mg/L	50µg/L @ H=100<125mg/L		110µg/L @ H=200<300mg/L
18400µg/L @ pH<7.0	4µg/L @ H>=210mg/L	60µg/L @ H=125<150mg/L		160µg/L @ H>=300mg/L
		70µg/L @ H=150<175mg/L		
		80µg/L @ H=175<200mg/L		
		90µg/L @ H>= 200mg/L		

nickel (dissolved) (F)	nitrite (as N) (F)	silver (dissolved) (F)	sulphate (F)	zinc (dissolved) (F)
250µg/L @ H<60mg/L	200µg/L @ Cl< 2mg/L	0.5µg/L @ H<=100mg/L	1280mg/L @ H<=30mg/L	75µg/L @ H<90mg/L
650µg/L @ H=60<120mg/L	400µg/L @ Cl=2<4mg/L	15µg/L @ H>100mg/L	2180mg/L @ H=31<=75mg/L	150µg/L @ H=90<100mg/L
1100µg/L @ H=120<180mg/L	600µg/L @ Cl=4<6mg/L		3090mg/L @ H=76<=180mg/L	900µg/L @ H=100<200mg/L
1500µg/L @ H>= 180mg/L	800µg/L @ Cl=6<8mg/L		4290mg/L @ H>180mg/L	1650µg/L @ H=200<300mg/L
	1000µg/L @ Cl=8<10mg/L			2400µg/L @ H=300<400mg/L
	2000µg/L @ Cl>=10mg/L			3150µg/L @ H=400<500mg/L

BC CSR DW — BC Contaminated Sites Regulation, Schedule 3.2 Generic Numerical Water Standards, Drinking Water

benzo(b)fluoranthene (T)	Standard for benzo(b+j)fluoranthenes has been applied
dichloropropene, cis-1,3- (T)	Standard for dichloropropene, 1,3- (cis + trans) has been applied
dichloropropene, trans-1,3- (T)	Standard for dichloropropene, 1,3- (cis + trans) has been applied

BC WQG (Approved) AWF, Long-term — BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term

acridine (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, the guideline is 3 µg/L
aluminum (dissolved) (F)	Requires the following equation: WGQ=e{[0.645*ln(DOC)]+[2.255*ln(hardness]+[1.995*pH]+[-0.284*(ln(hardness)*pH)]-9.898}/3
ammonia (as N) (T)	Refer to lookup table in guidelines
anthracene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, the guideline is 4 µg/L
benzo(a)anthracene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, the guideline is 0.1 µg/L
cadmium (dissolved) (F)	Requires the following equation: WGQ=E^(0.736*LN(HARDNESS)-4.943)
copper (dissolved) (F)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved copper.
DO (field) (T)	Dissolved oxygen criteria levels are expressed as minimum rather than maximum values.
fluoranthene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, the guideline is 4 µg/L
lead (dissolved) (F)	Requires the following equation: WGQ=exp(0.514[ln(DOC)] + 0.214[ln(Hardness)] + 0.4354)
manganese (dissolved) (F)	Requires the following equation: WGQ=(0.0044*HARDNESS)+0.605
mercury (dissolved) (F)	0.00125 when MeHg=8.0% of THg, 0.01 when MeHg = 1.0% of THg, 0.02 when MeHg = 0.5% of THg
nickel (dissolved) (F)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved nickel.

nitrite (as N) (F)
20µg/L @ Cl< 2
40µg/L @ Cl=2<4
60µg/L @ Cl=4<6
80µg/L @ Cl=6<8
100µg/L @ Cl=8<10
200µg/L @ Cl>= 10

phosphorus (dissolved) (F)	Guideline applies only to lakes to protect against eutrophication; there is no proposed BC WQG guideline for phosphorus in streams for the protection of aquatic life
pyrene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects is not a factor, there is no guideline

silver (dissolved) (F)	sulphate (F)
0.05µg/L @ H<=100mg/L	128mg/L @ H<= 30mg/L
1.5µg/L @ H>100mg/L	218mg/L @ H=30<=75mg/L
	309mg/L @ H=75<=180mg/L
	429mg/L @ H=180<=240mg/L

temp (field) (T)	Refer to guideline for applicable factors
total organic carbon (T)	The 30-day median shall be within 20% of seasonally-adjusted median background levels as measured historically or at appropriate reference sites. The 30-day median calculation should be based on a min. of 5 weekly samples taken over 30 days
turbidity (field) (T)	Background +2 NTU at any one time over 30 d in clear water; background +5 NTU at any time when background is 8 - 50 NTU; background +10% when background is > 50 NTU
zinc (dissolved) (F)	Requires the following equation: WGQ=exp(0.947[ln(hardness)] - 0.815[pH] + 0.398[ln(DOC)] + 4.625)/2

BC WQG (Approved) AWF, Short-term — BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term

acridine (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, there is no guideline
anthracene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, there is no guideline
benzo(a)anthracene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, there is no guideline
cadmium (dissolved) (F)	Requires the following equation: WGQ=E^(1.03*LN(HARDNESS)-5.274)
copper (dissolved) (F)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved copper.
DO (field) (T)	Instantaneous Minimum - dissolved oxygen criteria levels are expressed as minimum rather than maximum values
fluoranthene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, there is no guideline
fluoride (T)	Requires the following equation: WGQ=-51.73 + 92.57*LOG10(HARDNESS)*0.01
manganese (dissolved) (F)	Requires the following equation: WGQ=(0.01102*HARDNESS)+0.54
nickel (dissolved) (F)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved nickel.

nitrite (as N) (F)
60µg/L @ Cl< 2
120µg/L @ Cl=2<4
180µg/L @ Cl=4<6
240µg/L @ Cl=6<8
300µg/L @ Cl=8<10
600µg/L @ Cl>= 10

phosphorus (dissolved) (F)	Guideline applies only to lakes to protect against eutrophication; there is no proposed BC WQG guideline for phosphorus in streams for the protection of aquatic life
pyrene (T)	Guideline to protect freshwater aquatic life from phototoxic effects. If phototoxic effects are not a factor, there is no guideline

silver (dissolved) (F)
0.1µg/L @ H<= 100mg/L
3µg/L @ H>100mg/L

temp (field) (T)	Refer to guideline for applicable factors
turbidity (field) (T)	Background +8 NTU at any one over a 24 h duration in clear water; background +5 NTU when background is 8 - 50 NTU; background +10% when background is > 50 NTU
zinc (dissolved) (F)	Requires the following equation: WGQ=exp(0.833[ln(hardness)] + 0.240[ln(DOC)] + 0.526)/2

BC WQG (Working) AWF, Long-term — BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

alkalinity (total as CaCO3) (T)	20 mg/L or more as CaCO3, except where natural concentrations are less.
chromium (III+VI) (dissolved) (F)	Guideline is for Cr(VI), speciated results supersede total chromium results

Table 10: Field Parameters in Surface Water

				Field					
				pH (field)	temp (field)	EC (field)	TDS (field)	ORP (field)	turbidity (field)
				pH	deg C	µS/cm	mg/L	mV	NTU
BC WQG (Approved) AWF, Long-term				6.5-9	10	ns	ns	ns	bkgd+2
BC WQG (Approved) AWF, Short-term				6.5-9	10	ns	ns	ns	bkgd+5
Location Groups	Sample Location	Sample Date	Sample Name						
Locations	SW1-08	2015-Apr-01	20150401_RDOOTS02	-	4.92	139	0.087	-	-
		2016-May-03	SW1-08_20160503	8.37	11.9	115.3	-	164.4	0.76
		2017-May-24	20170524_RDOOTS02	8.62	8.1	91.2	-	35.5	-
		2018-May-29	20180529_RD00TS02	8.05	11.4	146.1	-	69.4	-
		2020-May-27	20200527_RD00TS02	6.31	11.3	118.4	-	86.5	-

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µS/cm	microsiemens per centimetre
deg C	degree Celsius
mg/L	milligram per litre
mV	millivolts
NTU	nephelometric turbidity unit
pH	potential of hydrogen
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term

Table 11: General Parameters in Surface Water

				General Parameters							
				alkalinity (carbonate)	alkalinity (hydroxide)	alkalinity (bicarbonate)	alkalinity (P)	alkalinity (total as CaCO3)	electrical conductivity (lab)	total dissolved solids	turbidity (lab)
				mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	NTU
BC WQG (Approved) AWF, Long-term				ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Approved) AWF, Short-term				ns	ns	ns	ns	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term				ns	ns	ns	ns	>=20	ns	ns	ns
Location Groups	Sample Location	Sample Date	Sample Name								
Locations	SW1-08	2015-Apr-01	20150401_RDOOTS02	< 0.5	< 0.5	65.2	< 0.5	53.4	135	-	4.2
		2015-Jul-03	20150703_RDOOTS02	-	-	-	-	-	-	-	<
		2015-Sep-16	20150916_RDOOTS02	-	-	-	-	-	-	-	<
		2015-Dec-15	20151215_RDOOTS02	-	-	-	-	-	-	-	<
		2016-May-03	SW1-08_20160503	-	-	-	-	62.1	157	109	0.23
		2017-May-24	20170524_RDOOTS02	-	-	-	-	54.8	131	-	0.23
		2018-May-29	20180529_RD00TS02	-	-	-	-	60.4	140	-	1.42
		2020-May-27	20200527_RD00TS02	-	-	-	-	68.4	164	-	1.79
		2023-Apr-25	20230425_RD00TS02	-	-	-	-	52.8	137	-	-
	SW2-08	2015-Apr-01	20150401_RDOOTS03	-	-	-	-	-	-	-	<
		2015-Jul-03	20150703_RDOOTS03	-	-	-	-	-	-	-	<
		2015-Sep-16	20150916_RDOOTS03	-	-	-	-	-	-	-	<
		2015-Dec-15	20151215_RDOOTS03	-	-	-	-	-	-	-	<

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µS/cm	microsiemens per centimetre
mg/L	milligram per litre
NTU	nephelometric turbidity unit
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 12: Carbon in Surface Water

	Carbon	
	total organic carbon	total inorganic carbon
	mg/L	mg/L
BC WQG (Approved) AWF, Long-term	See notes	ns
BC WQG (Approved) AWF, Short-term	ns	ns
BC WQG (Working) AWF, Long-term	ns	ns

Location Groups	Sample Location	Sample Date	Sample Name		
Locations	SW1-08	2016-May-03	SW1-08_20160503	2.55	15.3
		2017-May-24	20170524_RDOOTS02	2.63	13.3
		2018-May-29	20180529_RD00TS02	2.9	13.9
		2020-May-27	20200527_RD00TS02	3.1	15.8
		2023-Apr-25	20230425_RD00TS02	4.32	16

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
mg/L	milligram per litre
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term

Table 13: Petroleum Hydrocarbons in Surface Water

		Petroleum Hydrocarbons											
		benzene	toluene	ethylbenzene	xylene (o)	xylene (m & p)	total xylenes	styrene	methyl tert-butyl ether (MTBE)	VH (C6-C10)	VPH (C6-C10)	EPH C10-C19	EPH C19-C32
	RDL	0.5	0.45 - 0.5	0.5	0.5	0.5	0.75	0.5	0.5	100	100	250	250
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	BC WQG (Approved) AWF, Long-term	40	0.5	200	ns	ns	30	ns	ns	ns	ns	ns	ns
	BC WQG (Approved) AWF, Short-term	ns	ns	ns	ns	ns	ns	ns	3400	ns	ns	ns	ns
	BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	72	ns	ns	ns	ns	ns
Location Groups	Sample Location	Sample Date	Sample Name										
Locations	SW1-08	2016-May-03	SW1-08_20160503	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	< 100	-	-	-
		2017-May-24	20170524_RDOOTS02	< 0.5	< 0.45	< 0.5	< 0.5	< 0.5	< 0.75	< 0.5	< 0.5	-	< 100	< 250	< 250

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
µg/L	microgram per litre
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term
EPH C10-C19	EPHw10-19 - extractable petroleum hydrocarbons (C10-C19)
VH (C6-C10)	VHw6-10 – volatile hydrocarbons in water (C6-C10)
VPH (C6-C10)	VPH – volatile petroleum hydrocarbons

Table 14: Inorganics in Surface Water

				Field / Lab General						Inorganics																			
				pH (field)	temp (field)	EC (field)	pH (lab)	disoolved hardness as CaCO3	total hardness as CaCO3	total ammonia (as N)	cations total	anions total	COD	dissolved oxygen (lab)	dissolved oxygen (lab)	bromide	chloride ion	fluoride	ion balance	cation - anion balance	kjeldahl nitrogen total	nitrate (as N)	nitrite (as N)	nitrate and nitrite (as N)	silicon	sulphate	sulphide	sulfur as S
				pH	deg C	µS/cm	pH	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	µg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	mg/L
BC WQG (Approved) AWF, Long-term				6.5-9	10	ns	ns	ns	ns	0.1 - 1.8	ns	ns	ns	ns	ns	ns	150	ns	ns	ns	ns	3	0.020-0.20	3	ns	220	ns	ns
BC WQG (Approved) AWF, Short-term				6.5-9	10	ns	ns	ns	ns	0.68 - 25	ns	ns	ns	ns	ns	ns	600	1.1 - 1.2	ns	ns	ns	32.8	0.060-0.60	32.8	ns	ns	ns	ns
BC WQG (Working) AWF, Long-term				ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Location Groups	**Sample Location**	**Sample Date**	**Sample Name**																										
Locations	SW1-08	2015-Apr-01	20150401_RDOOTS02	-	4.92	139	7.85	-	59.4	0.0082	-	-	< 10	-	12.97	-	1.6	-	-	-	-	< 0.02	< 0.005	< 0.02	7520	10.6	-	3.2
		2016-May-03	SW1-08_20160503	8.37	11.9	115.3	8	67.5	-	< 0.005	-	-	< 20	-	-	-	3.17	-	-	-	0.063	< 0.005	< 0.001	-	-	11.6	< 20	-
		2017-May-24	20170524_RDOOTS02	8.62	8.1	91.2	7.93	58.4	-	< 0.005	1.32	1.31	< 20	-	11.3	-	1.44	-	-	0.5	0.076	< 0.005	< 0.001	-	-	8.34	< 18	-
		2018-May-29	20180529_RD00TS02	8.05	11.4	146.1	7.96	57.1	-	< 0.005	1.34	1.52	< 20	-	5.9	-	3.57	-	-	-6.5	-	< 0.005	< 0.001	-	8580	10.2	-	3.52
		2020-May-27	20200527_RD00TS02	6.31	11.3	118.4	7.93	-	72.9	< 0.005	1.65	1.73	< 20	73.7	-	< 50	3.67	0.104	-	2.37	0.121	< 0.005	< 0.001	-	7830	12.4	-	4.16
		2023-Apr-25	20230425_RD00TS02	-	-	-	7.95	-	58.6	< 0.005	1.33	1.34	12	-	-	< 50	2.08	0.096	99.2	-0.374	-	< 0.005	< 0.001	-	8000	10.8	-	4.36

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
ns	no standard listed
%	percent
µg/L	microgram per litre
µS/cm	microsiemens per centimetre
deg C	degree Celsius
meq/L	milliequivalents per litre
mg/L	milligram per litre
pH	potential of hydrogen
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term

Table 15: Metals (Total) in Surface Water

	Field		Carbon	Metals																																								
	pH (field)	temp (field)	total organic carbon	pH (lab)	dissolved hardness as CaCO3	total hardness as CaCO3	aluminum	antimony	arsenic	barium	beryllium	bismuth	boron	cadmium	calcium	cesium	chromium (III+VI)	cobalt	copper	iron	lead	lithium	magnesium	manganese	mercury	molybdenum	nickel	phosphorus	potassium	rubidium	selenium	silver	sodium	strontium	tellurium	thallium	thorium	tin	titanium	tungsten	uranium	vanadium	zinc	zirconium
RDL							12	0.5	0.5	20	0.1 - 1	0.05 - 1	10 - 100			0.01	0.1 - 1	0.1 - 0.5	1	10 - 30	0.05 - 0.5	1 - 5		0.3 - 1	0.005 - 0.01		0.5 - 1	2 - 50			0.1	0.01 - 0.02			0.2	0.01 - 0.2	0.1	0.1 - 5	0.3 - 10	0.1		5	3 - 5	0.06 - 0.5
	pH	deg C	mg/L	pH	mg/L	mg/L	µg/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	mg/L	µg/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	µg/L
BC WQG (Approved) AWF, Long-term	6.5-9	10	See notes	ns	ns	ns	1.8 - 420	74	5	ns	ns	ns	1200	0.14 - 0.17	ns	ns	ns	4	0.2 - 2.2	ns	1.3 - 3.9	ns	ns	ns	860 - 930	0.00125	7600	0.2 - 1.8	5	ns	ns	2	0.050	ns	ns	ns	ns	ns	ns	ns	ns	ns	1.2 - 23	ns
BC WQG (Approved) AWF, Short-term	6.5-9	10	ns	ns	ns	ns	ns	250	ns	ns	ns	ns	ns	0.33 - 0.42	ns	ns	ns	110	0.8 - 13.2	1000	ns	ns	ns	ns	1200 - 1300	ns	46000	0.2 - 24	5	ns	ns	2	ns	ns	ns	ns	ns	ns	ns	ns	ns	5.5 - 40	ns
BC WQG (Working) AWF, Long-term	ns	ns	ns	ns	ns	ns	ns	9	ns	1000	0.13	ns	ns	ns	ns	ns	2.5	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	1250	ns	0.8	ns	ns	ns	ns	7.5	60	ns	ns

Location Groups	Sample Location	Sample Date	Sample Name																																										
Locations	SW1-08	2015-Apr-01	20150401_RDOOTS02	-	4.92	-	7.85	-	59.4	10.8[n3]	< 0.5	0.22	19.9	< 0.1	< 1	< 50	0.016	20.2	-	< 1	< 0.5	0.7	13	< 0.2	< 5	2.2	< 1	< 0.01	1.8	< 1	< 10	2000	-	< 0.1	< 0.02	1.9	89	-	< 0.05	-	< 5	< 5	0.28	< 5	< 5	< 0.5
		2016-May-03	SW1-08_20160503	8.37	11.9	2.55	8	67.5	-	5.9	< 0.5	< 0.5	22	< 1	-	< 100	0.0141	23	-	< 1	< 0.3	< 1	< 30	< 0.5	1	2.46	< 0.3	< 0.005	2.1	< 1	< 2	2300	-	0.141	< 0.02	3	-	-	< 0.2	-	< 0.5	< 10	-	0.31	0.85	8.2	-
		2017-May-24	20170524_RDOOTS02	8.62	8.1	2.63	7.93	58.4	-	10.8	< 0.5	< 0.5	< 20	< 0.1	-	< 100	0.0145	19.9	-	< 1	< 0.3	< 1	< 30	< 0.5	< 1	2.13	0.55	< 0.005	1.8	< 1	3.2	2100	-	0.124	< 0.02	2.3	-	-	< 0.2	-	< 0.5	< 10	-	0.25	0.73	< 5	-
		2018-May-29	20180529_RD00TS02	8.05	11.4	2.9	7.96	57.1	-	< 12	0.37	0	20.8	< 0.1	< 0.05	< 10	0.0182	19.1	< 0.01	< 0.1	< 0.1	0.78	< 10	0.062	< 1	2.27	0.49	< 0.005	1.78	< 0.5	6.8/< 50	2200	0.54	0.123	< 0.01	3.17	85.4	< 0.2	< 0.01	< 0.1	< 0.1	0.35	< 0.1	0.242	0.84	< 3	< 0.06
		2020-May-27	20200527_RD00TS02	8.31	11.3	3.1	7.93	-	72.9	10	0.32	0.25	23.3	< 0.1	< 0.05	< 10	0.0284	24.9	< 0.01	0.27	< 0.1	1.06	26	0.297	1	2.56	1.62	< 0.005	1.84	< 0.5	< 50[n3]	2220	0.52	0.146	< 0.01	3.11	106	< 0.2	< 0.01	< 0.1	< 0.1	0.62	< 0.1	0.347	0.75	6.5	< 0.2
		2023-Apr-25	20230425_RD00TS02	-	-	4.32	7.95	-	58.6	8.4	0.36	0.27	18.9	< 0.1	< 0.05	< 10	0.023	19.8	< 0.01	< 0.5	< 0.1	1.79	< 10	< 0.05	< 1	2.22	0.43	< 0.005	1.84	< 0.5	5.3/< 50	2080	0.45	0.171	< 0.01	2.39	86.6	< 0.2	< 0.01	< 0.1	< 0.1	< 0.3	< 0.1	0.23	1.18	5.2	< 0.2

Notes:

•	samples collected at the same location and date are blind field duplicate/parent pairs
'-'	sample not analyzed for parameter indicated
<	less than reported detection limit
m	metres
Result/Result	One or more duplicate results present.
ns	no standard listed
µg/L	microgram per litre
deg C	degree Celsius
mg/L	milligram per litre
pH	potential of hydrogen
BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term

n1 - Guideline applies only to lakes to protect against eutrophication
n3 - Missing DOC/TOC value, used value from next closest sampling date at this station to calculate criteria using WQG calculator

Supplemental Notes for Tables 10 to 15

BC WQG (Approved) AWF, Long-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Long-term
aluminum (T)	Requires the following equation: WGQ=e{[0.645*ln(DOC)]+[2.255*ln(hardness]+[1.995*pH]+[-0.284*(ln(hardness)*pH)]-9.898}/3
ammonia (as N) (T)	Refer to lookup table in guidelines
cadmium (T)	Requires the following equation: WGQ=E^(0.736*LN(HARDNESS)-4.943)
copper (T)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved copper.
lead (T)	Requires the following equation: WGQ=exp(0.514[ln(DOC)] + 0.214[ln(Hardness)] + 0.4354)
manganese (T)	Requires the following equation: WGQ=(0.0044*HARDNESS)+0.605
mercury (T)	0.00125 when MeHg=8.0% of THg, 0.01 when MeHg = 1.0% of THg, 0.02 when MeHg = 0.5% of THg
nickel (T)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved nickel.

nitrite (as N) (F)	**silver (T)**	**sulphate (F)**
20µg/L @ Cl< 2	0.05µg/L @ H<=100mg/L	128mg/L @ H<= 30mg/L
40µg/L @ Cl=2<4	1.5µg/L @ H>100mg/L	218mg/L @ H=30<=75mg/L
60µg/L @ Cl=4<6		309mg/L @ H=75<=180mg/L
80µg/L @ Cl=6<8		429mg/L @ H=180<=240mg/L
100µg/L @ Cl=8<10		
200µg/L @ Cl>= 10		

phosphorus (T)	Guideline applies only to lakes to protect against eutrophication; there is no proposed BC WQG guideline for phosphorus in streams for the protection of aquatic life
temp (field) (T)	Refer to guideline for applicable factors
total organic carbon (T)	The 30-day median shall be within 20% of seasonally-adjusted median background levels as measured historically or at appropriate reference sites. The 30-day median calculation should be based on a min. of 5 weekly samples taken over 30 days
turbidity (field) (T)	Background +2 NTU at any one time over 30 d in clear water; background +5 NTU at any time when background is 8 - 50 NTU; background +10% when background is > 50 NTU
zinc (T)	Requires the following equation: WGQ=exp(0.947[ln(hardness)] - 0.815[pH] + 0.398[ln(DOC)] + 4.625)/2
BC WQG (Approved) AWF, Short-term	BC Approved Water Quality Guidelines, Freshwater Aquatic Life, Short-term
cadmium (T)	Requires the following equation: WGQ=E^(1.03*LN(HARDNESS)-5.274)
copper (T)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved copper.
fluoride (T)	Requires the following equation: WGQ=-51.73 + 92.57*LOG10(HARDNESS)*0.01
manganese (T)	Requires the following equation: WGQ=(0.01102*HARDNESS)+0.54
nickel (T)	The BC Biotic Ligand Model (BLM) is used to determine the applicable guideline and is dependent on several parameters. Guideline is for dissolved nickel.

nitrite (as N) (F)	**silver (T)**
60µg/L @ Cl< 2	0.1µg/L @ H<= 100mg/L
120µg/L @ Cl=2<4	3µg/L @ H>100mg/L
180µg/L @ Cl=4<6	
240µg/L @ Cl=6<8	
300µg/L @ Cl=8<10	
600µg/L @ Cl>= 10	

phosphorus (T)	Guideline applies only to lakes to protect against eutrophication; there is no proposed BC WQG guideline for phosphorus in streams for the protection of aquatic life
temp (field) (T)	Refer to guideline for applicable factors
turbidity (field) (T)	Background +8 NTU at any one over a 24 h duration in clear water; background +5 NTU when background is 8 - 50 NTU; background +10% when background is > 50 NTU
zinc (T)	Requires the following equation: WGQ=exp(0.833[ln(hardness)] + 0.240[ln(DOC)] + 0.526)/2
BC WQG (Working) AWF, Long-term	BC Working Water Quality Guidelines, Freshwater Aquatic Life, Long-term
alkalinity (total as CaCO3) (T)	20 mg/L or more as CaCO3, except where natural concentrations are less.
chromium (III+VI) (T)	Guideline is for Cr(VI), speciated results supersede total chromium results

Figures

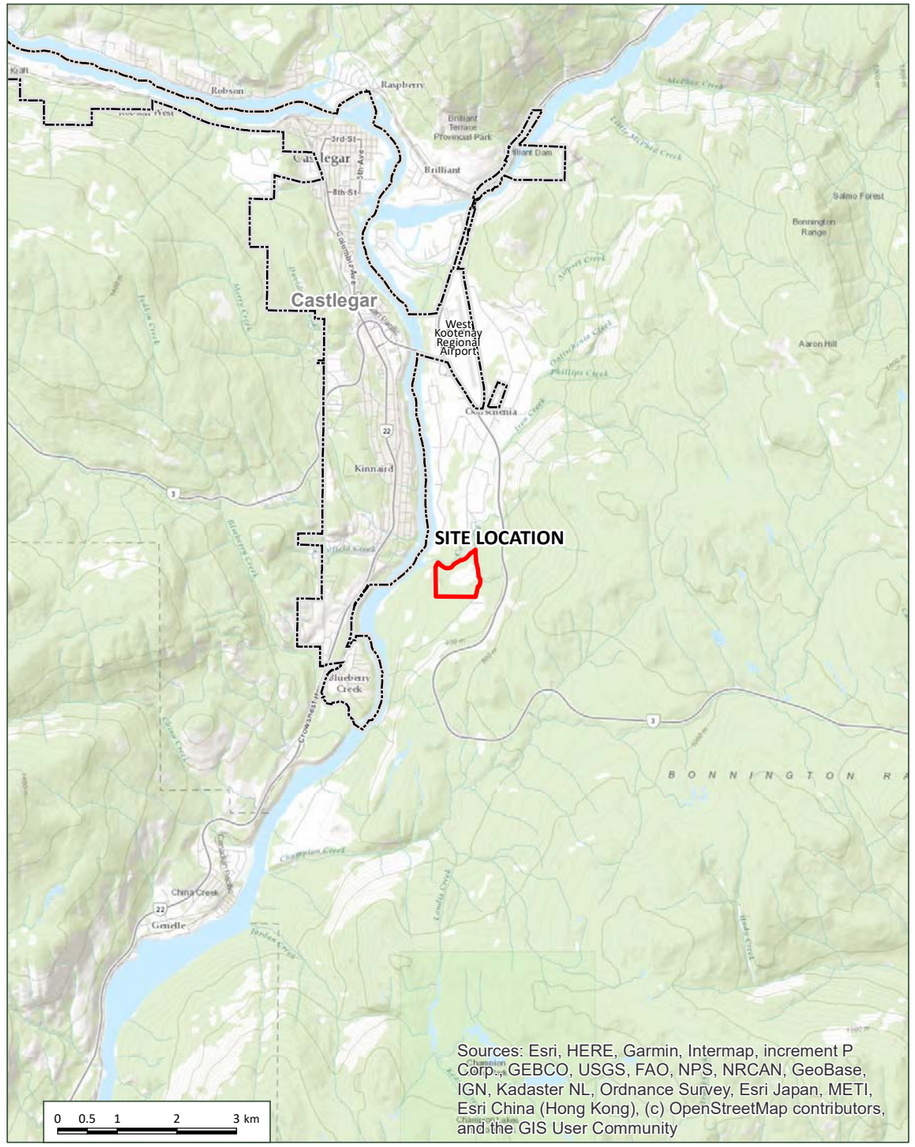
Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024







NOTES:
BASEDATA:
- FRESHWATER ATLAS
  GOVERNMENT OF BRITISH COLUMBIA

LEGEND:
- SITE BOUNDARY
- MUNICIPAL BOUNDARIES
- WATERCOURSE

0 50 100 200 300 m

SCALE 1:10,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 11N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL,
CASTLEGAR, BC

HYDROGEOLOGY AND
HYDROLOGY CHARACTERIZATION REPORT

SITE LOCATION

SLR

FIGURE NO:
1

DATE: November 26, 2024

PROJECT NO: 219.030089.00001

Last Saved: November 26, 2024 12:52:48 PM by tgraham
GIS PATH: G:_Projects\219\219_030089_RDCK\1_Maps\RPT\RPT_202405_HydroGeo_Hydrol\219_030089_OOT_01_SiteLocation_rev0.mxd



LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- CONTOUR - MAJOR (2 m INTERVAL)
- CONTOUR - MINOR (0.5 m INTERVAL)
- MONITORING WELL (OTHERS)
- MONITORING WELL (OTHERS) (NO LONGER MONITORED)
- MONITORING WELL (OTHERS) (DESTROYED)
- SURFACE WATER STATION (OTHERS)
- A A' CROSS SECTION A-A' (REFER TO FIGURE 7)
- CROSS SECTION B-B' (REFER TO FIGURE 8)

NOTES:

NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: REFERENCED FROM: REGIONAL DISTRICT OF CENTRAL KOOTENAY DATA TITLED OOTTISCHENIA_2016.DWG, CONTOURS_1_UNIT.DXF AND SITE RECONNAISSANCE INFORMATION. ParcelPolygon from ArcGIS: LAND TITLE AND SURVEY AUTHORITY OF BRITISH COLUMBIA (PARCELMAP BC)

IMAGERY: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY (IMAGE DATE: 2022)

0 25 50 100 150 m

SCALE 1:3,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 11 U

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

SITE PLAN

SLR

FIGURE NO:
2

DATE: October 25, 2024

PROJECT NO: 219.030089.00001

Cadfile name: S_219-030089-00001-B1.dwg

Last Saved: November 26, 2024 1:19:10 PM by tgraham

GIS PATH: G:_Projects\219\219_030089_RDCK\1_Maps\RPT\RPT_202405_HydroGeo_Hydrol\219_030089_OOT_03_LandWater_Use_rev0.mxd

N

LEGEND:

- SITE BOUNDARY
- SITE BUFFER (500M)
- SITE BUFFER (1000M)
- MUNICIPAL BOUNDARIES

LAND USE

- INDUSTRIAL
- OPEN SPACE
- PARKS AND RECREATION
- RESIDENTIAL 1
- RESIDENTIAL 2
- QUARRY
- MONITORING WELL
- MONITORING WELL (DESTROYED)
- SURFACE WATER SAMPLE LOCATION
- POINTS OF DIVERSION (SPRINGS)
- GROUND WATER WELLS
- WATERCOURSE

NOTES:
BASEDATA:
- FRESHWATER ATLAS
  GOVERNMENT OF BRITISH COLUMBIA
LAND USE DATA: REGIONAL DISTRICT OF CENTRAL KOOTENAY

0 75 150 300 450 m

SCALE 1:12,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 11N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL,
CASTLEGAR, BC

HYDROGEOLOGY AND
HYDROLOGY CHARACTERIZATION REPORT

LAND AND WATER USE

SLR

FIGURE NO:
3

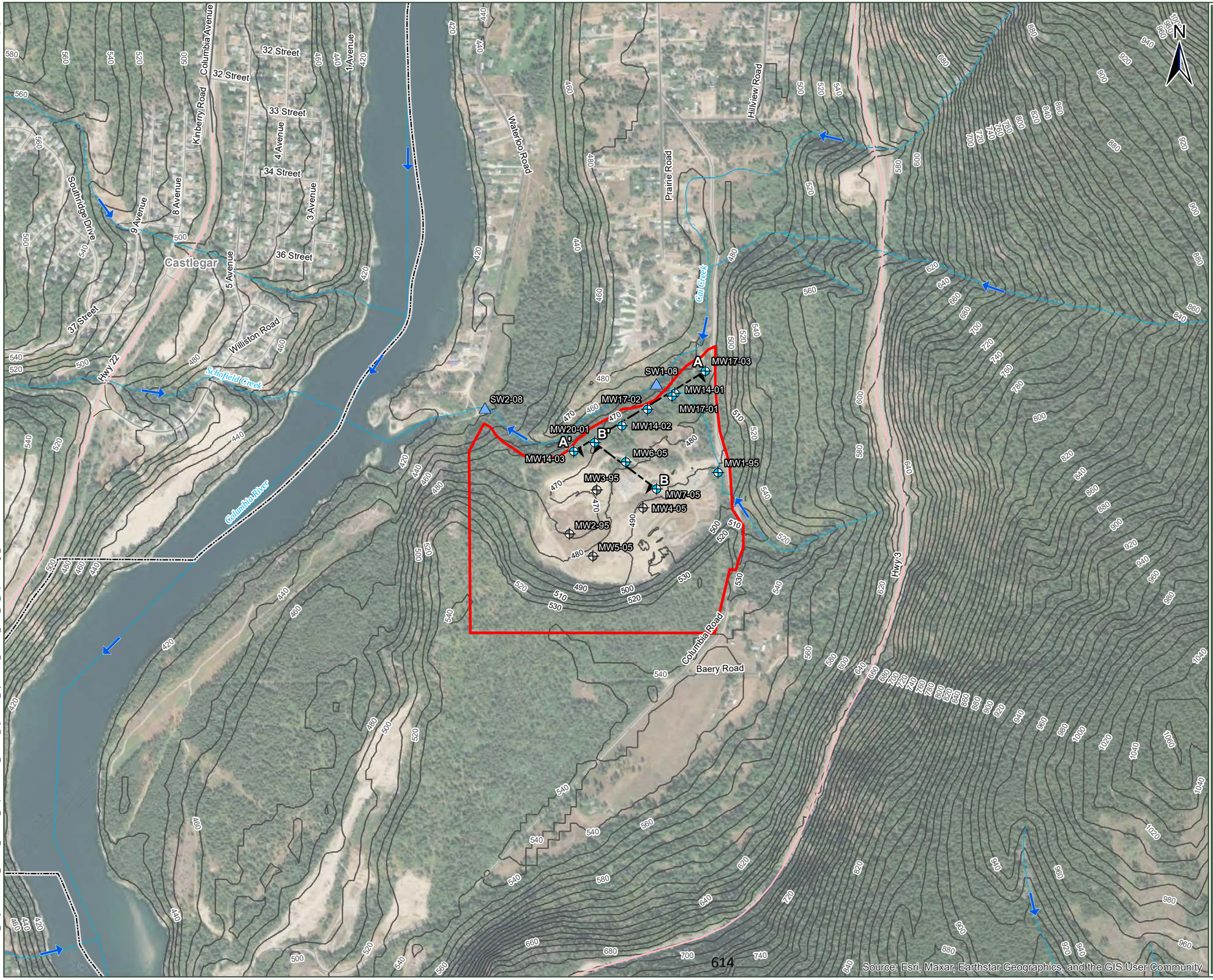
DATE: November 26, 2024 PROJECT NO: 219.030089.00001

613

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Last Saved: November 26, 2024 1:22:11 PM by tgraham

GIS PATH: G:_Projects\219\219_030089_RDCK\1_Maps\RPT\RPT_202405_HydroGeo_Hydrol\219_030089_OOT_04_TopoDrainage_rev0.mxd



LEGEND:

- SITE BOUNDARY
- MUNICIPAL BOUNDARIES
- GROUND ELEVATION CONTOURS - MASL (10 M INTERVAL)
- WATERCOURSE
- DIRECTION OF SURFACE WATER FLOW
- SURFACE WATER SAMPLE LOCATION
- MONITORING WELL
- MONITORING WELL (DESTROYED)
- CROSS SECTION

NOTES:

BASEDATA:
- FRESHWATER ATLAS
  GOVERNMENT OF BRITISH COLUMBIA

CONTOUR SOURCES:
- SITE VICINITY TOPOGRAPHIC CONTOURS PROVIDED BY RDCK IN OOTTISCHENIA_2016.DWG, RECEIVED BY SLR IN MARCH 2024.
- REGIONAL CONTOURS GENERATED FROM CANADIAN DIGITAL ELEVATION DATA (CDED)

0 75 150 300 450 m

SCALE 1:10,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 11N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL,
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

TOPOGRAPHY AND DRAINAGE

SLR

FIGURE NO: **4**

DATE: November 26, 2024

PROJECT NO: 219.030089.00001

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Last Saved: November 26, 2024 1:25:32 PM by tgraham

GIS PATH: G:_Projects\219\219_030089_RDCK\1_Maps\RPT\RPT_202405_HydroGeo_Hydrol\219_030089_OOT_05_BedrockGeology_rev0.mxd

Columbia Avenue
32 Street
32 Street
1 Avenue
Kinberry Road
33 Street
4 Avenue
34 Street
Southridge Drive
9 Avenue
8 Avenue
3 Avenue
Waterloo Road
Prairie Road
Hillview Road
36 Street
5 Avenue
Gui Creek
Castlegar
37 Street
Williston Road
Hwy 22
Schofield Creek
KGWgd
SW1-08
A
MW17-03
SW2-08
MW17-02
MW14-01
MW17-01
MW14-02
A'
B'
MW14-03
MW6-05
MW1-95
MW3-95
B
MW7-05
MW4-05
MW2-95
MW5-05
Columbia River
MJBo
Hwy 3
Columbia Road
Baery Road
DETpg
MJgr
615
MJgr
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

N

LEGEND:

- SITE BOUNDARY
- MUNICIPAL BOUNDARIES
- CROSS SECTION
- MONITORING WELL
- MONITORING WELL (DESTROYED)
- SURFACE WATER SAMPLE LOCATION
- WATERCOURSE

GEOLOGICAL UNITS

- DETpg - Trail gneiss (paragneiss metamorphic rocks)
- KGWgd - Greenwood, Wallace Creek Plutons, Kinnaird Gneiss (granodioritic intrusive rocks)
- MJBo - Bonnington Pluton (granodioritic intrusive rocks)
- MJgr - (granite, alkali feldspar granite intrusive rocks)

NOTES:

BASEDATA:
- FRESHWATER ATLAS
GOVERNMENT OF BRITISH COLUMBIA

BEDROCK GEOLOGY:
CUI, Y., MILLER, D., SCHIARIZZA, P., AND DIAKOW, L.J., 2017.
BRITISH COLUMBIA DIGITAL GEOLOGY.
BRITISH COLUMBIA MINISTRY OF ENERGY, MINES AND
PETROLEUM RESOURCES,
BRITISH COLUMBIA GEOLOGICAL SURVEY OPEN FILE
2017-8, 9P. DATA VERSION 2019-12-19.

0 75 150 300 450 m

SCALE 1:10,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 11N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL,
CASTLEGAR, BC

HYDROGEOLOGY AND
HYDROLOGY CHARACTERIZATION REPORT

BEDROCK GEOLOGY

SLR

FIGURE NO:
5

DATE: November 26, 2024

PROJECT NO: 219.030089.00001

Last Saved: November 26, 2024 1:28:18 PM by tgraham

GIS PATH: G:_Projects\219\219_030089_RDCK\1_Maps\RPT\RPT_202405_HydroGeo_Hydrol\219_030089_OOT_06_SurficialGeology_rev0.mxd

COLL
GLFL
Castlegar
Columbia Avenue
32 Street
33 Street
34 Street
36 Street
37 Street
1 Avenue
3 Avenue
4 Avenue
5 Avenue
8 Avenue
9 Avenue
Kinberry Road
Southridge Drive
Williston Road
Hwy 22
Schofield Creek
Columbia River
Waterloo Road
Prairie Road
Hillview Road
Cat Creek
Hwy 3
Columbia Road
Baery Road
SW1-08
SW2-08
MW17-03
MW17-02
MW17-01
MW14-01
MW14-02
MW14-03
MW6-05
MW1-95
MW3-95
MW7-05
MW4-05
MW2-95
MW5-05
A
A'
B
B'
N
616
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

LEGEND:

- SITE BOUNDARY
- MUNICIPAL BOUNDARIES
- CROSS SECTION
- MONITORING WELL
- MONITORING WELL (DESTROYED)
- SURFACE WATER SAMPLE LOCATION
- WATERCOURSE

PARENT MATERIAL

- COLL (Colluvial)
- GLFL (Glaciofluvial)

NOTES:

BASEDATA:
- FRESHWATER ATLAS
  GOVERNMENT OF BRITISH COLUMBIA

SURFICIAL GEOLOGY:
- PROVINCE OF BRITISH COLUMBIA, 2015,
BRITISH COLUMBIA SOIL MAPPING SPATIAL DATA
(A COMPILATION OF DIGITAL SOIL MAPPING DATASETS).
DATA AVAILABLE FROM THE BRITISH COLUMBIA MINISTRY OF ENVIRONMENT,
ECOSYSTEM INFORMATION SECTION AT:
HTTP://WWW.ENV.GOV.BC.CA/ESD/DISTDATA/ECOSYSTEMS/SOIL_DATA/SOIL_DATA_FGDB/
[ACCESSED JUNE 5, 2024]

0 75 150 300 450 m

SCALE 1:10,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 11N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL,
CASTLEGAR, BC

HYDROGEOLOGY AND
HYDROLOGY CHARACTERIZATION REPORT

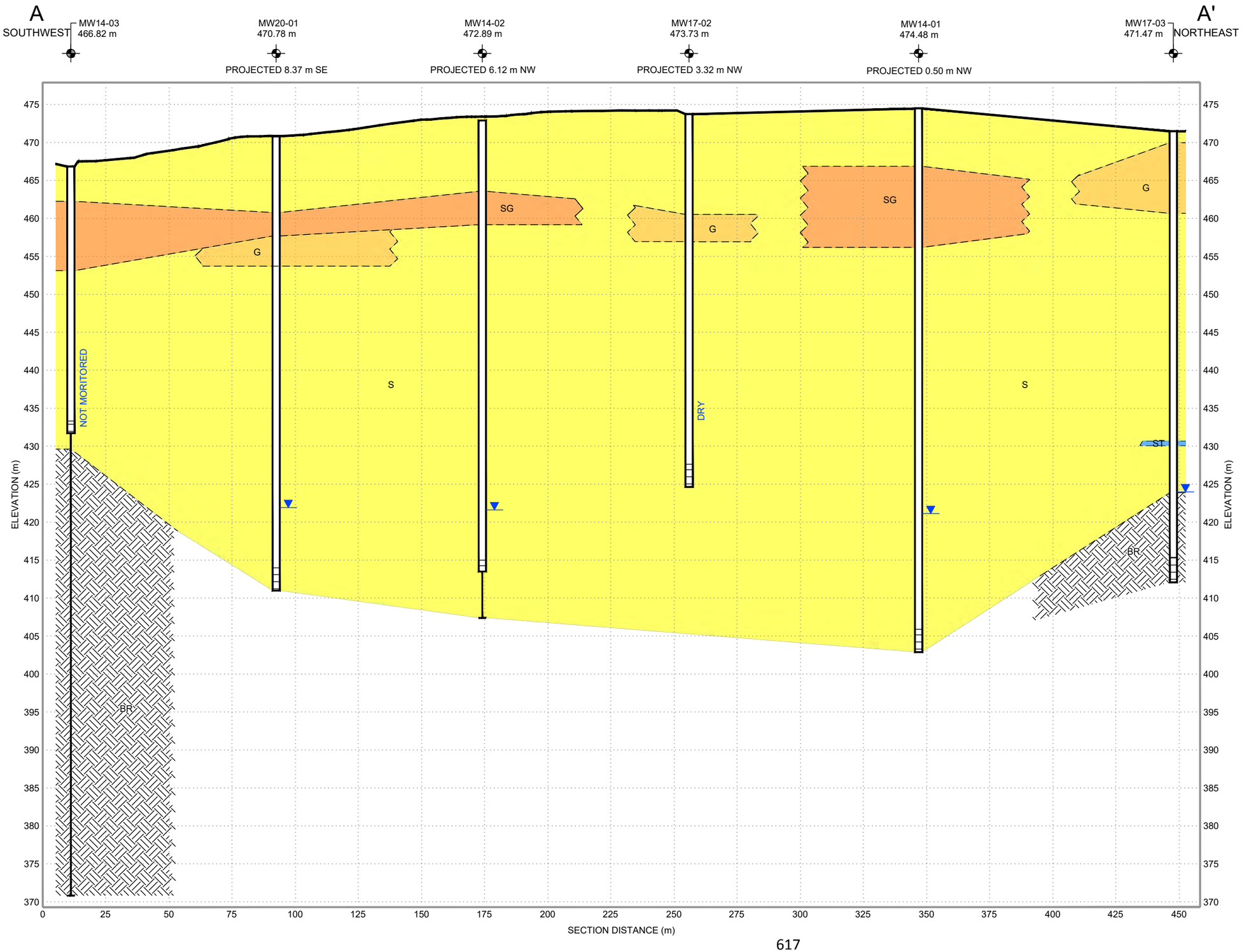
SURFICIAL GEOLOGY

SLR

FIGURE NO:
6

DATE: November 26, 2024

PROJECT NO: 219.030089.00001



LEGEND:

- MONITORING WELL
- MONITORING WELL (OTHERS) (NO LONGER MONITORED)
- WATER LEVEL (MAY 10, 2022)

PRIMARY MATERIAL

- S/G — SAND / GRAVEL
- G — GRAVEL
- S — SAND
- R — REFUSE
- STS — SILTY SAND
- ST — SILT
- BR — BEDROCK

- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: REFERENCED FROM: REGIONAL DISTRICT OF CENTRAL KOOTENAY DATA TITLED OOTTISCHENIA_2016.DWG, CONTOURS_1_UNIT.DXF AND SITE RECONNAISSANCE INFORMATION. ParcelPolygon from ArcGIS: LAND TITLE AND SURVEY AUTHORITY OF BRITISH COLUMBIA (PARCELMAP BC)

0 5 10 20 30 m
VERTICAL SCALE 1:500

0 25 50 100 m
HORIZONTAL SCALE 1:1,500

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

CROSS SECTION A-A'

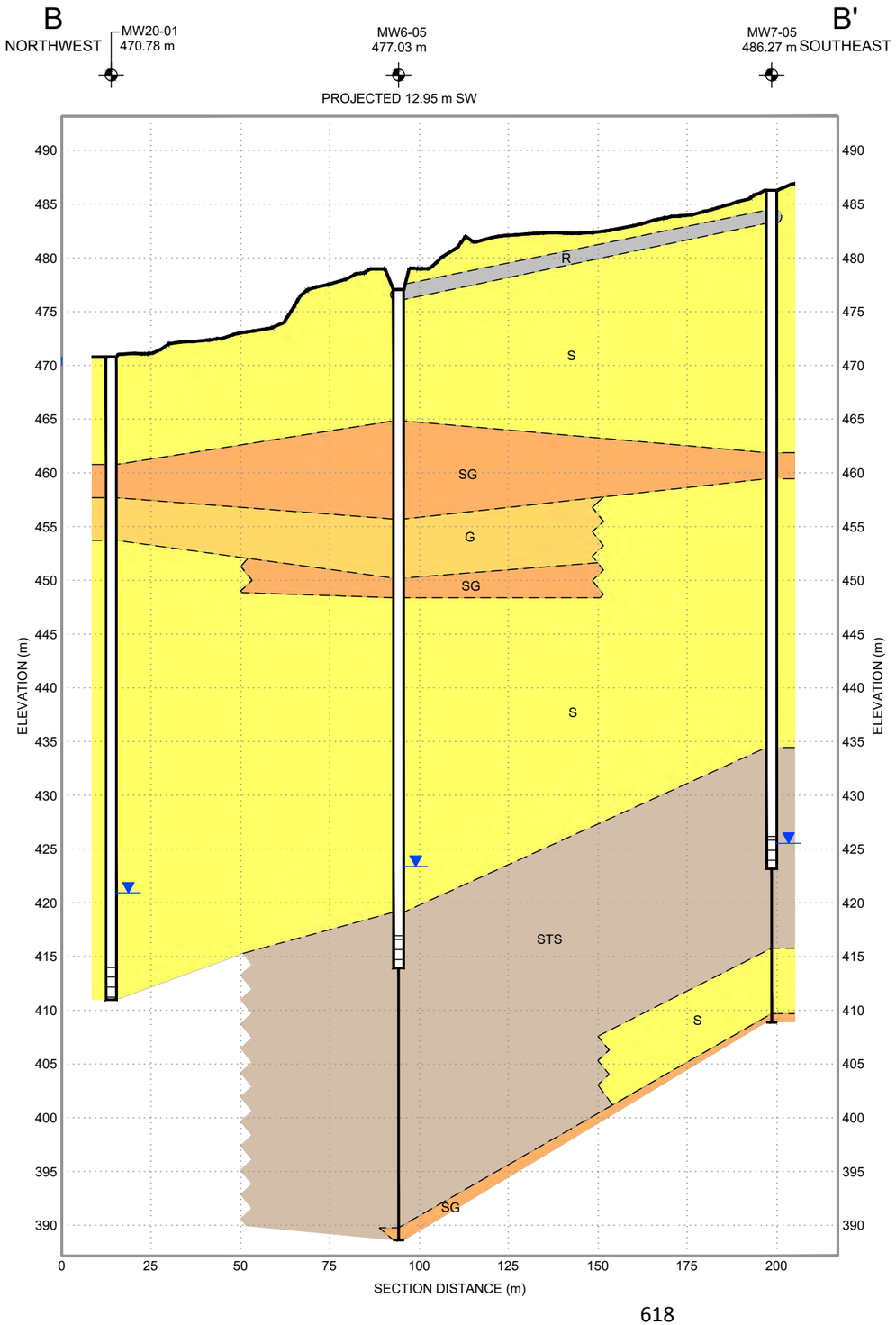
SLR

FIGURE NO:
7

DATE: October 25, 2024

PROJECT NO: 219.030089.00001

Cadfile name: S_219-030089-00001-B1.dwg



LEGEND:

- MONITORING WELL
- WATER LEVEL (MAY 10, 2022)

PRIMARY MATERIAL

- S/G — SAND / GRAVEL
- G — GRAVEL
- S — SAND
- R — REFUSE
- STS — SILTY SAND
- ST — SILT
- BR — BEDROCK

- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: REFERENCED FROM: REGIONAL DISTRICT OF CENTRAL KOOTENAY DATA TITLED OOTTISCHENIA_2016.DWG, CONTOURS_1_UNIT.DXF AND SITE RECONNAISSANCE INFORMATION. ParcelPolygon from ArcGIS: LAND TITLE AND SURVEY AUTHORITY OF BRITISH COLUMBIA (PARCELMAP BC)

VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:1,500

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

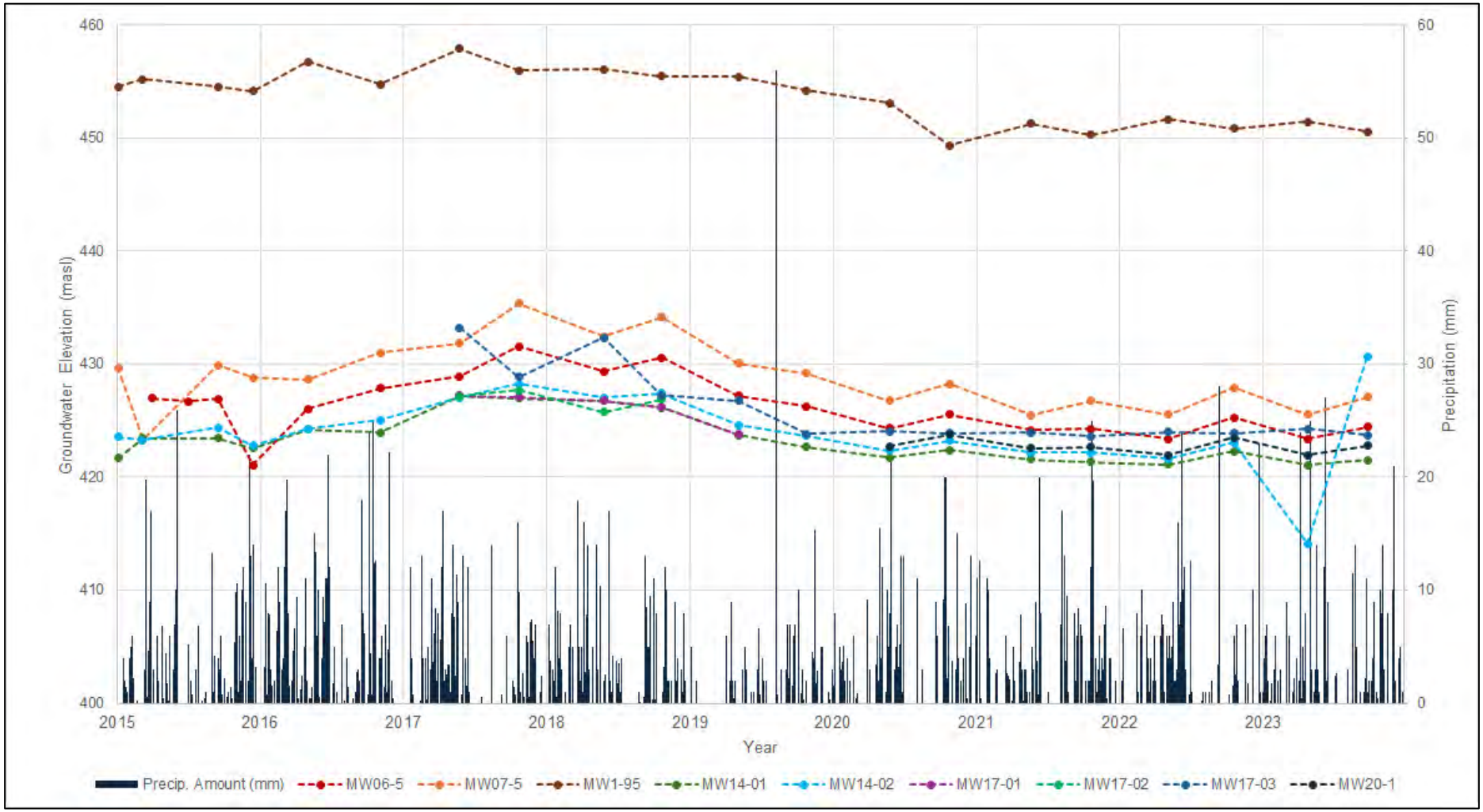
CROSS SECTION B-B'

FIGURE NO:
8

DATE: October 25, 2024
PROJECT NO: 219.030089.00001

Cadfile name: S_219-030089-00001-B1.dwg

FIGURE 9: GROUNDWATER HYDROGRAPHS





LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- WATERCOURSE (FRESHWATER ATLAS)
- MONITORING WELL
- MONITORING WELL (OTHERS) (NO LONGER MONITORED)

GROUNDWATER MONITORING RESULTS

- 421.12 GROUNDWATER ELEVATION (m)
- 422.0 INFERRED GROUNDWATER ELEVATION CONTOUR (INTERVAL 2.0 m)
- INFERRED GROUNDWATER FLOW DIRECTION
- MONITORING WELL NOT MONITORED OR DATA NOT INCLUDED IN INFERRED GROUNDWATER FLOW DIRECTION CALCULATION DUE TO REASON(S) PROVIDED BELOW
- * MONITORING WELL SCREENED IN BEDROCK

NOTES:

NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: REGIONAL DISTRICT OF CENTRAL KOOTENAY DATA TITLED FIG1_SITE_MAP.DWG AND SITE RECONNAISSANCE INFORMATION.
ParcelPolygon from ArcGIS: LAND TITLE AND SURVEY AUTHORITY OF BRITISH COLUMBIA (PARCELMAP BC)

IMAGERY: AERIAL IMAGERY SUPPLIED TO SLR BY RDCK IN MARCH 2024 AND ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY (IMAGE DATE: 2022)

GROUNDWATER ELEVATION CONTOURS AND GROUNDWATER FLOW DIRECTIONS ARE BASED ON INTERPRETATION AND INTERPOLATION BETWEEN THE MEASURED ELEVATIONS AT THE MONITORING WELLS SHOWN AND ARE SPECIFIC TO THE DATE NOTED; THEREFORE, ACTUAL GROUNDWATER ELEVATIONS AND FLOW DIRECTIONS COULD VARY FROM THOSE SHOWN.

ALL GROUNDWATER ELEVATIONS RELATIVE TO GEODETIC DATUM (MEAN SEA LEVEL)

0 25 50 100 150 200 250 m

SCALE 1:4,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 11 U

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

INFERRED GROUNDWATER CONTOUR PLAN AND GROUNDWATER FLOW DIRECTION - MAY 10, 2022

SLR

FIGURE NO:
10

DATE: October 25, 2024

PROJECT NO: 219.030089.00001

Cadfile name: S_219-030089-00001-B1.dwg



LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- WATERCOURSE (FRESHWATER ATLAS)
- MONITORING WELL
- MONITORING WELL (OTHERS) (NO LONGER MONITORED)

GROUNDWATER MONITORING RESULTS

- 422.25 GROUNDWATER ELEVATION (m)
- 424.0 INFERRED GROUNDWATER ELEVATION CONTOUR (INTERVAL 2.0 m)
- INFERRED GROUNDWATER FLOW DIRECTION
- MONITORING WELL NOT MONITORED OR DATA NOT INCLUDED IN INFERRED GROUNDWATER FLOW DIRECTION CALCULATION DUE TO REASON(S) PROVIDED BELOW
- * MONITORING WELL SCREENED IN BEDROCK

NOTES:

NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: REGIONAL DISTRICT OF CENTRAL KOOTENAY DATA TITLED FIG1_SITE_MAP.DWG AND SITE RECONNAISSANCE INFORMATION.
ParcelPolygon from ArcGIS: LAND TITLE AND SURVEY AUTHORITY OF BRITISH COLUMBIA (PARCELMAP BC)

IMAGERY: AERIAL IMAGERY SUPPLIED TO SLR BY RDCK IN MARCH 2024 AND ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY (IMAGE DATE: 2022)

GROUNDWATER ELEVATION CONTOURS AND GROUNDWATER FLOW DIRECTIONS ARE BASED ON INTERPRETATION AND INTERPOLATION BETWEEN THE MEASURED ELEVATIONS AT THE MONITORING WELLS SHOWN AND ARE SPECIFIC TO THE DATE NOTED; THEREFORE, ACTUAL GROUNDWATER ELEVATIONS AND FLOW DIRECTIONS COULD VARY FROM THOSE SHOWN.

ALL GROUNDWATER ELEVATIONS RELATIVE TO GEODETIC DATUM (MEAN SEA LEVEL)

0 25 50 100 150 200 250 m

SCALE 1:4,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 11 U

REGIONAL DISTRICT OF CENTRAL KOOTENAY
OOTISCHENIA LANDFILL
CASTLEGAR, BC

HYDROGEOLOGY AND HYDROLOGY CHARACTERIZATION REPORT

INFERRED GROUNDWATER CONTOUR PLAN AND GROUNDWATER FLOW DIRECTION - OCTOBER 24, 2022

SLR

FIGURE NO: **11**

DATE: October 25, 2024

PROJECT NO: 219.030089.00001

Cadfile name: S_219-030089-00001-B1.dwg

Appendix A Operational Certificate

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024

December 15, 2014

Tracking Number: 155
Authorization Number: 17126

REGISTERED MAIL

REGIONAL DISTRICT OF CENTRAL KOOTENAY
BOX 590
202 LAKESIDE DRIVE
NELSON, BC
V1L 5R4

Dear Operational Certificate Holder:

Enclosed is Operational Certificate 17126 issued under the provisions of the *Environmental Management Act*. This Operational Certificate supersedes Permit PR – 501 which is cancelled in accordance with Section 24(10) of the *Environmental Management Act.* Your attention is respectfully directed to the terms and conditions outlined in the operational certificate.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this operational certificate will be carried out by staff from the Southern Interior Region - Kootenay. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Southern Interior Region - Kootenay, 401 - 333 Victoria St., Nelson, BC V1L 4K3.

Ministry of Environment
Environmental Protection Division
1259 Dalhousie Dr.
Kamloops, BC V2C 5Z5
Southern Interior Region
Telephone: (250) 371-6200
Facsimile: (250) 828-4000

Yours truly,



Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

Enclosure

cc: Environment Canada

Ministry of Environment

OPERATIONAL CERTIFICATE

17126

Under the Provisions of the Environmental Management Act

REGIONAL DISTRICT OF CENTRAL KOOTENAY

BOX 590
202 LAKESIDE DRIVE
NELSON, BC
V1L 5R4

is authorized to manage municipal solid waste and discharge waste as specified in this authorization to the ground in accordance with the Regional District of Central Kootenay's Solid Waste Management Plan. Contravention of any of these terms and conditions is a violation of the *Environmental Management Act (EMA)* and may result in prosecution.

This Operational Certificate supersedes all versions of Permit PR 501, issued under Section 28, of the *Environmental Management Act (EMA)*. All ministry policies and guidelines specified in this document refer to the most current version of these policies and guidelines.

1. AUTHORIZED DISCHARGES & FACILITIES

1.1 Authorized Discharge

This section applies to the discharge of municipal solid waste to a SANITARY LANDFILL, treatment of contaminated soil at a SOIL TREATMENT AREA and discharge of septage to DRYING BEDS at a site known as the Ootischenia Landfill in Castlegar, BC. The site reference number for this discharge is E211662.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

1.1.1 The authorized discharge is:

a. Municipal solid waste and other waste as may be authorized by the Director in writing.
b. Septage in designated drying beds as per the Design & Operations Plan.

For the purpose of this section "Septage" refers to typical septic tank contents.

1.1.2 All solid waste discharged to this landfill must meet the requirements of the Regional District of Central Kootenay Solid Waste Management Plan and applicable by-laws of the Regional District.

The controlled discharge of septage must occur only in beds located as specified in the Design & Operation Plan.

1.1.3 The authorized works are a sanitary landfill and Septage Drying Beds. The authorized works include berms, cover soil or cover material, surface water diversionary works and are inclusive of any related appurtenances pertaining to the works and discharges specified in this section.

The authorized works referred to in this section must be maintained and operable while municipal solid waste, contaminated soil and septage is being actively managed i.e., disposed, transferred and/or recycled at the site. Post closure requirements for the site are specified in Section 5.

The authorized works are located approximately as shown on the attached Site Plan A.

1.1.4 The legal description for the location of the point of discharge is Lot 1, Sublot 23, D.L. 4598, Kootenay District, Plan 6599, plus a portion of Sublot 4598, Kootenay District, Plan X-34 as shown on attached Site Plan A.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

1.1.5 The following waste types and materials are prohibited from being landfilled:

- Hazardous Wastes as defined in the Hazardous Waste Regulation, other than those specifically approved within the Hazardous Waste Regulation for disposal to authorized landfills.
- Human anatomical and animal waste components of biomedical waste and the untreated non-anatomical waste component of biomedical waste. Biomedical wastes are defined in the Guidelines for the Management of Biomedical Wastes in Canada (Canadian Council of Ministers of the Environment, February 1992).
- Bulk liquids and semi-solid wastes, which contain free liquids, as determined by US EPA Method 9095A Paint Filter Liquids Test, Test Methods for Evaluating Solid Wastes -Physical/Chemical Methods (EPA Publication No. Sw-846).
- Waste oil.
- Vehicle hulks.
- Automobile batteries.
- Wastes that are specifically prohibited by applicable by-laws or waste bans of the Regional District.

1.1.6 The disposal of animal carcasses is not allowed, an exception being those of a domestic nature, the result of animal road kills or animal control activities of the Ministry of Environment's Conservation Officer Service (COS). Disposal of other animal carcasses is allowed if authorized by the Director.

Mortalities from agricultural operations may be discharged where the generator has demonstrated to the satisfaction of the Director that the carcasses cannot be disposed of in accordance with the Agricultural Waste Control Regulation under the *Environmental Management Act*.

1.1.7 The total waste discharged during any operational period of the operational site life must not exceed that calculated for the period based on the fill rate specified in the Design & Operations Plan.

1.1.8 Storage of recyclable material must be in accordance with the Design & Operations Plan and applicable regulations.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

1.1.9 Composting of material from septage drying beds is permitted provided that compost is utilized onsite only.

1.1.10 Contaminated soil that contains contaminants in concentrations less than hazardous waste as defined in the Hazardous Waste Regulation under the *Environmental Management Act* may be disposed at the landfill. Disposal includes but is not limited to monofilling, co-disposal with other wastes, and use as daily or intermediate cover material. The use of these soils as final cover material is prohibited if contaminants exceed commercial / industrial land use standards as specified in the Contaminated Sites Regulation under the *Environmental Management Act*.

1.1.11 The disposal of waste asbestos in compliance with the requirements of Section 40 of the Hazardous Waste Regulation under the *Environmental Management Act* is permitted. In accordance with Section 40 "Management of Waste Asbestos", under part 6 "Management of Specific Hazardous Wastes" of the Hazardous Waste Regulation, the waste asbestos disposed at a landfill other than a secure landfill must be immediately covered with a minimum of 0.5 metre of cover material.

2. DESIGN & OPERATIONS PLAN

2.1 The Operational Certificate holder must ensure that a Qualified Professional prepares and maintains a Design and Operations (D & O) Plan for the landfill which is acceptable to the Director. The current Plan must be reviewed within twenty four months of the completion of consolidation of landfilling operations at Ootischenia as specified by the Regional District of Central Kootenay's Resource Recovery Plan (RRP). Further to this initial review and update within twenty four months, the D & O Plan should be reviewed and updated at least once every five years.

The D & O Plan must address, but not be limited to, each of the subsections in the Landfill Criteria for Municipal Solid Waste including performance, siting, design, operational, closure and post-closure criteria. The facilities must be developed, operated and closed in accordance with the Plan. Should there be any inconsistency between this Operational Certificate and the Plan, this Operational Certificate must take precedence.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

Written authorization from the Director must be obtained prior to implementing any changes to the approved plans. Based on any information obtained in connection with this facility, the Director may require revision of, or addition to, the design, operating and closure plans.

"As built" drawings certified correct and sealed by a Qualified Professional must be submitted electronically within 60 days of the completion of engineered construction activities required as per the Design & Operations Plan.

3. LANDFILL OPERATIONS

3.1 Inspections

3.1.1 Waste Inspections

The waste acceptance policies and procedures for the landfill must include a program to detect a prohibited waste so that it is prevented from being disposed of in a landfill cell. The Operational Certificate holder must also establish procedures for addressing such non-compliance to prevent recurrence of the same.

3.1.2 Inspections of Authorized Works

The Operational Certificate holder must inspect the authorized works at least once every three months to ensure compliance with this Operational Certificate and the BC Landfill Criteria. A record of the inspections and actions recommended or action items must be maintained in the operating record at the site office and made available to the Director upon request. During such inspections, the Operational Certificate holder must also inspect the property boundaries and immediately notify the Regional Manager Environmental Protection of:

- any visual or physical evidence of concerns pertaining to the authorized works such as leachate breaks, damage to monitoring wells;
- any visual or physical evidence of concerns of potential environmental impacts including but not limited to significant litter beyond the property boundary.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

3.2 Site Access & Supervision

Locking gates must be maintained at all access routes to the landfill site. Gates, perimeter fencing and/or barriers must be installed where necessary to prevent unauthorized access to the site by vehicles. Gates must be locked during non-operating hours. Onsite signage onsite must be in accordance with the BC Landfill Criteria.

The Operational Certificate holder must ensure that any person(s) authorized to work within the landfill boundary and directly involved in the landfilling of waste is fully cognizant of this Operational Certificate and applicable sections of the BC Landfill Criteria for Municipal Solid Waste and must take all reasonable measures to ensure that the person(s) complies with all requirements of the same. A landfill operator that has received BC Qualified Landfill Operator training, is familiar with the requirements of the Operational Certificate and the specifications of the Design and Operations Plan, must be present at all times during operating hours. Training records for staff must be maintained and made available to the Director upon request.

3.3 Scavenging & Salvaging

Uncontrolled scavenging of waste is prohibited. The controlled separation of salvageable waste stream components by persons authorized by the Operational Certificate holder is permitted in areas designated for separation and storage of these materials.

3.4 Public Health Safety & Nuisance

Operation of the landfill must be carried out in a manner that ensures that the facility does not pose a threat to public health or safety. The Operational Certificate holder must manage accumulations of litter within the site and prevent litter escaping from the fill area.

3.5 Waste Deposition, Compaction & Cover

The Operational Certificate holder must ensure that waste deposition and compaction meets or exceeds the requirements of the BC Landfill Criteria or its most current version. Control must be exercised to ensure keeping freshly deposited refuse in a well defined and small/manageable working face.

3.5.1 Daily Cover

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

Application of daily cover must be in accordance with requirements of the BC Landfill Criteria. Alternate Daily Cover (ADC) that is functionally equivalent to daily soil cover may be used.

3.5.2 **Intermediate Cover**

Application of intermediate cover must be in accordance with requirements of the BC Landfill Criteria or its most current version. The Director must be notified in writing of the use of functionally equivalent intermediate cover material.

3.5.3 **Final Cover**

Final cover must be installed and maintained in accordance with the requirements of the BC Landfill Criteria. Completed portions of the landfill are to progressively receive final cover during the active life of the landfill as specified in the Design & Operations Plan.

3.6 Litter, Wildlife & Vector Control

The Operational Certificate holder must ensure that vector and wildlife attractants are minimized as a result of routine landfilling operations. Such measures include but are not limited to:

a. Application of cover material in a timely and consistent manner in compliance with the requirements of the BC Landfill Criteria. Installation and maintenance of electrified wildlife control fencing where deemed necessary. The active landfill cell must be enclosed by a bear resistant electrified fence. The fence must be energized during the active bear season and Bear Warning Signs must be posted along the fence**.**
b. Ensuring that the public drop off area is used in a manner that does not contribute to wildlife attraction. This includes the timely transfer of waste from public drop off areas to the tipping face or beyond the wildlife control fence, maintaining adequate bin capacity for public drop-off and addressing improper bin usage through awareness raising measures for the public or site users.
c. Implementing a bird control strategy and bird control measures at the site if required by the Director.

Litter must be controlled and minimized by compacting the waste, minimizing the work face area, applying cover at the required frequencies and good

housekeeping practices. A regular litter pick-up program to target windblown litter must be established as part of routine site operations. Litter prevention measures including provision of litter control fences must be under taken, if necessary. Controls must prevent the accumulation, or off-site migration, of litter in quantities that create a nuisance or cause other problems.

For the purpose of this section, a "vector" is defined as an organism or carrier capable of transmitting a pathogen from one organism to another including, but not limited to flies and other insects, rodents, and birds.

For the purpose of this section an "attractant" is defined as waste, municipal solid waste, refuse, organic matter, compost, garbage, food or food waste that attracts bears or other wildlife.

3.7 Operations, Maintenance & Emergency Procedures Manual

The Operational Certificate holder must prepare an Operations, Maintenance and Emergency Procedures Manual. This manual must be reviewed and kept updated to reflect current site conditions. A copy of the manual must be available at the site office and must be made available to the Director upon request.

3.8 Fire Prevention & Control

The Operational Certificate Holder must take all reasonable measures to prevent fires from occurring at the site and is responsible for complying with all local fire safety requirements. The Operational Certificate holder must provide and maintain firefighting equipment and materials as required for the site.

In the event of a landfill fire the following must be notified immediately:

- The Fire Department
- Provincial Emergency Program (PEP)
- The Regional Manager Environmental Protection

3.9 Maintenance of Works & Emergency Procedures

The Operational Certificate holder must maintain the authorized works in good working order. In the event of an emergency or condition beyond the control of the Operational Certificate holder which prevents continuing operation of the authorized works and/or the continued performance of the prescribed methods of operation, the Operational Certificate holder must immediately notify the

Regional Manager Environmental Protection and take appropriate remedial action in consultation with a Qualified Professional if specified by the Director.

Any activity or construction at the disposal site must be carried out in a manner that protects the integrity of the areas under final cover and without compromising landfill stability or without damage to the authorized works and related appurtenances.

Any settlement of areas under final cover or differential settlement that prevents the authorized works and appurtenances mentioned in Section 1 from functioning as intended in the Design & Operations plan must be addressed/ remedied accordingly to the satisfaction of the Director.

All access roads, within the landfill boundary, used for transporting waste to the tipping area for disposal must be maintained as necessary to assure safe and reliable all-weather access to the tipping face.

3.10 **Qualified Professionals**

Information pertaining to the landfill including details of works, plans, assessments, investigations, surveys, programs and reports, must be prepared by a Qualified Professional unless specified otherwise by the Director.

3.11 **Additional Facilities or Works**

The Director may require additional investigations, surveys, and the construction of additional facilities or works related to the landfill operation. The Director may also revise the requirements of any of the information required by this Operational Certificate including plans, programs, assessments and reports.

3.12 **Groundwater & Surfacewater Quality Protection**

The Operational Certificate holder must take appropriate measures to ensure that ground water and surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines or other appropriate criteria as may be specified by the Director at and beyond the landfill property boundary.

These measures include but are not limited to:

Date issued: December 15, 2014



Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

a. Ensuring that the landfill is operated in accordance with a Design & Operations Plan which specifies measures to prevent decreases in groundwater and surface water quality at and beyond the property boundary.
b. Ensuring that the landfill is operated in a manner that prevents the exceedance in surface water of anticipated leachate indicators or parameters distinctive of leachate or those attributable to landfilling operations at the site or those specified by the Director at the landfill boundary.
c. Ensuring that adequate storm water works are constructed and maintained to ensure that run-off is intercepted and conveyed away from construction, operational and capped phases and directed to the storm water management basin.
d. Ensuring that storm water management works at the landfill are designed for predicted storm events and that designs are updated, if necessary, to include revisions to reasonable contingencies for the changes to precipitation, if any, at the site resulting from perceptible long term climate shifts.
e. Ensuring that measures are taken to prevent stormwater from entering landfilled waste and that the management systems for storm water that has not come in contact with waste are hydraulically separate from those for managing impacted surface water.
f. Ensuring that the landfill is operated in a manner that prevents the exceedance beyond BC Water Quality Guidelines in groundwater, of anticipated leachate indicators or parameters distinctive of leachate or those specified by the Director at the property boundary. Ensuring that suitable measures are taken to investigate an increasing trend for these parameters if this trend corresponds to an increasing trend also at other wells downgradient of the waste footprint and in the groundwater flowpath towards the property boundary.

   If exceedances to the specified water quality criteria occur at the landfill boundary as a result of landfill operations, suitable corrective measures acceptable to the Director must be undertaken.

3.13 **Landfill Gas**

The Operational Certificate holder must ensure that operation of the landfill must not cause combustible gas concentrations to exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit at or in on-site or off-site structures.

The Operational Certificate holder must ensure that the facility is in compliance with the requirements of the *Landfill Gas Management Regulation* on or before applicable dates specified in the regulation. The requirements of the regulation and its guideline documents must be incorporated by the Operational Certificate

holder into the Design and Operation Plan revisions as they come into effect and as applicable.

4. MONITORING & REPORTING REQUIREMENTS

4.1 Environmental Monitoring

4.1.1 Environmental Monitoring Program

The Operational Certificate holder must ensure that a Qualified Professional develops, maintains, conducts and reports to the Regional Manager, Environmental Protection a monitoring program to identify potential impacts to the environment and public health from the facility. The program must be designed to assess and identify:

- The design performance of the landfill including but not limited to compliance with Water Quality performance standards at the property boundary.
- Landfill leachate as a contaminant source.
- Surface Water Quality.

The monitoring program must address, but not be limited to relevant sections of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. The Environmental Monitoring Program must take into consideration results from previous monitoring programs and any other investigations conducted at the site to ensure that early detection of potential impacts is possible.

The Environmental Monitoring Program must be reviewed and reported on annually. The need for subsequent increased or decreased monitoring must be assessed annually by the Operational Certificate Holder on the basis of available monitoring data. Based on the results of the monitoring program, or any other information relevant to the site, the Director may vary the frequency, location and analyses of environmental monitoring as warranted.

The Operational Certificate holder must ensure that groundwater monitoring wells are established and maintained to allow for uninterrupted monitoring as specified by the Environmental Monitoring Program. Background monitoring locations should be established and maintained. If progressive filling will result in the need for some background wells to be decommissioned, other background monitoring well locations should be identified in a timely manner to replace them. In the event that site hydrogeology restricts available locations for

background groundwater monitoring wells, the use of data from other groundwater wells may be used provided they have been demonstrated as being suitable for the purpose of establishing background groundwater quality.

The location and installation of all monitoring wells must be specified and supervised by a Qualified Professional who is knowledgeable in the fields of Hydrogeology and Landfill Impact Assessment. The Operational Certificate holder must ensure that monitoring wells and other equipment are adequately secured and maintained, including provisions to ensure protection from damage due to weather, vehicles or vandalism. In the event of damage to the wells or monitoring equipment which could affect/compromise the integrity of monitoring data, the Operational Certificate holder must take immediate and necessary measures to ensure that conditions for uninterrupted monitoring are restored.

The Operational Certificate holder must maintain records of all monitoring program data and analyses and make these available for inspection upon request.

4.1.2 **Field Sampling Techniques**

Sampling must be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination and breakage.

4.1.3 **Laboratory Analysis**

Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publication Centre,

P. O. Box 9452, Stn. Prov. Govt. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

4.2 Reporting

4.2.1 Monitoring Event Reporting

The Operational Certificate Holder must notify the Regional Manager Environmental Protection of the completion of a monitoring event at the landfill through a memorandum within 60 days of the end of each event. The memorandum must identify exceedances to the water quality criteria for surface and ground water and observed non-compliance with operational certificate requirements.

4.2.2 Non-Compliance Reporting

The Operational Certificate holder must notify the Regional Manager Environmental Protection by facsimile or email of any non-compliance with the requirements of this Operational Certificate. The Operational Certificate holder must identify the non-compliance, the cause of non-compliance and any remedial action to address the non-compliance.

4.2.3 Wildlife Reporting

The Operational Certificate holder must maintain an onsite log of any ongoing bear activity such as digging around the perimeter of the electric fencing or other attempts to penetrate the fencing, and any observations pertaining to wildlife intrusion attempts. Any penetrations of the fencing by bears should be immediately reported to the Conservation Officer Service (COS) via the Report All Poachers & Polluters reporting line at 1877 952 7277.

4.2.4 Five Year Report

The Operational Certificate holder must submit to the Director a report every five years by April 30 of the respective fifth year after the last report. This report must be prepared by a qualified professional and must include but not be limited to:

a. an executive summary;
b. A current topographic map detailing airspace consumption, on-site borrow pit changes and future developments;

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

c. Volume and density analysis or an in-place material summary, updated estimates for the remaining capacity, site life, revised closure date for the current phase or sequence and revised closure date for the current landfill footprint;
d. An update on the financial assurance mechanism including a statement of the current dollar value of the Closure Fund and the amount earmarked for the Landfill site;
e. A detailed hydrogeological assessment of the site based on the previous five years monitoring data and other relevant information. The hydrogeological review must provide an update on the attenuative capacity of the site for contaminants of concern;
f. Any proposed changes to the Design and Operations Plan and the Environmental Monitoring Program (EMP), with rationale for the changes and any changes to the closure or post-closure plans;
g. A review of the preceding five years of operation or an operations update which summarizes landfill development work completed in the subject reporting years and work planned for the subsequent five years;
h. A summary of any new information that could affect the facilities, plans, assessments, surveys, programs and reports;
i. A statement regarding the facility's compliance with the objectives of the Regional Solid Waste Management Plan.
j. Any additional information requested by the Director.

4.2.5 **Design & Operations Plan Review**

The Design and Operations plan must be reviewed every five years throughout the operating life of the landfill and updated to include at least the next five years of landfill operations. Updated plans must be prepared by a Qualified Professional. The review must take into account the information from the hydrogeological assessment specified in Section 4.2.3e. The Regional Manager, Environmental Protection may request additional reviews of the design based on the compliance history and design performance of the site.

4.2.6 **Annual Report**

The Operational Certificate holder must submit to the Director an Annual Report for the facility by April 30 each year. The report must include memorandum summarizing operational information and results of monitoring as per the Environmental Monitoring Program for the site. The report must include sample data sheet and the results of laboratory analysis.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

This report must be prepared by a qualified professional and must include but not be limited to:

a. an executive summary
b. the type and tonnage of waste received, recycled, stored on-site and discharged/landfilled for the years reported;
c. A review of the preceding year of operation or an operations update which summarizes landfill development work completed in the subject reporting year and work planned for the subsequent year.
d. A summary of any new information that could affect the facilities, plans, assessments, surveys, programs and reports
e. An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis and include trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;
f. A summary of significant occurrences or observations of wildlife (medium and large carnivores) at the landfill;
g. A list of training programs completed for landfill operators during the previous year;
h. Any additional information requested by the Director.

Annual Reporting information requirements specified under this clause may be included along with the five year report specified in clause 4.2.3 for every fifth year.

4.2.5 **Reporting Format & Records Retention**

All reports must be submitted, suitably formatted in electronic format only. The Operational Certificate Holder must maintain records of all monitoring data in perpetuity and must also ensure that the results of monitoring and analysis are submitted in electronic format suitable for entry into applicable provincial databases.

4.3 Notifications

The Operational Certificate Holder must notify stakeholders specified by the Director regarding exceedances beyond the BC Water Quality Guidelines at

groundwater monitoring wells located at the property boundary, if such exceedances can be attributed to the landfilling of waste.

5. CLOSURE & POST CLOSURE REQUIREMENTS

5.1 Closure & Post Closure Plan

A Closure Plan and Final Cover Design that meets or exceeds the requirements of the BC Landfill Criteria should be submitted to the Director at least 12 months prior to the closure of the landfill. The plan must also include a Post Closure Plan or Aftercare measures to be taken at the landfill. The post closure plan must be reviewed every five years throughout the post closure period.

Completion of closure works in accordance with the Closure Plan and Final Cover Design must be certified by a Qualified Professional within sixty days of the implementation of the Final Cover Design.

5.2 Closure Fund

The Operational Certificate holder must provide for the funding of progressive closure operations, final closure and operations beyond closure by maintaining a closure fund. The value of the closure fund must meet or exceed the estimated closure and post-closure costs as established in the approved Design and Operations Plan and updated in the annual report, plus a reasonable contingency for any remediation which may be required. Reported costs must be adjusted for inflation annually. Alternately, a closure and post-closure financial security acceptable to the Director may be built over time.

The Operational Certificate holder must determine and ensure that the closure fund is adequate by preparing annually a financial statement of the fund which must be made available to the Director upon request. The financial statement must report the accrued capital, interest and additions to the fund for the previous year and review the sufficiency of the fund and the rate of accrual in consideration of the projected costs of closure and post-closure obligations.

The Operations Certificate holder must take measures to ensure that the closure and post-closure funds will ultimately meet or exceed the estimated closure and post-closure costs and include a reasonable contingency for any remediation that may be required.

5.3 Site Decommissioning

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate holder must submit a site profile to the manager at least 10 days prior to decommissioning the facilities authorized in Section 1.

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

Location Map

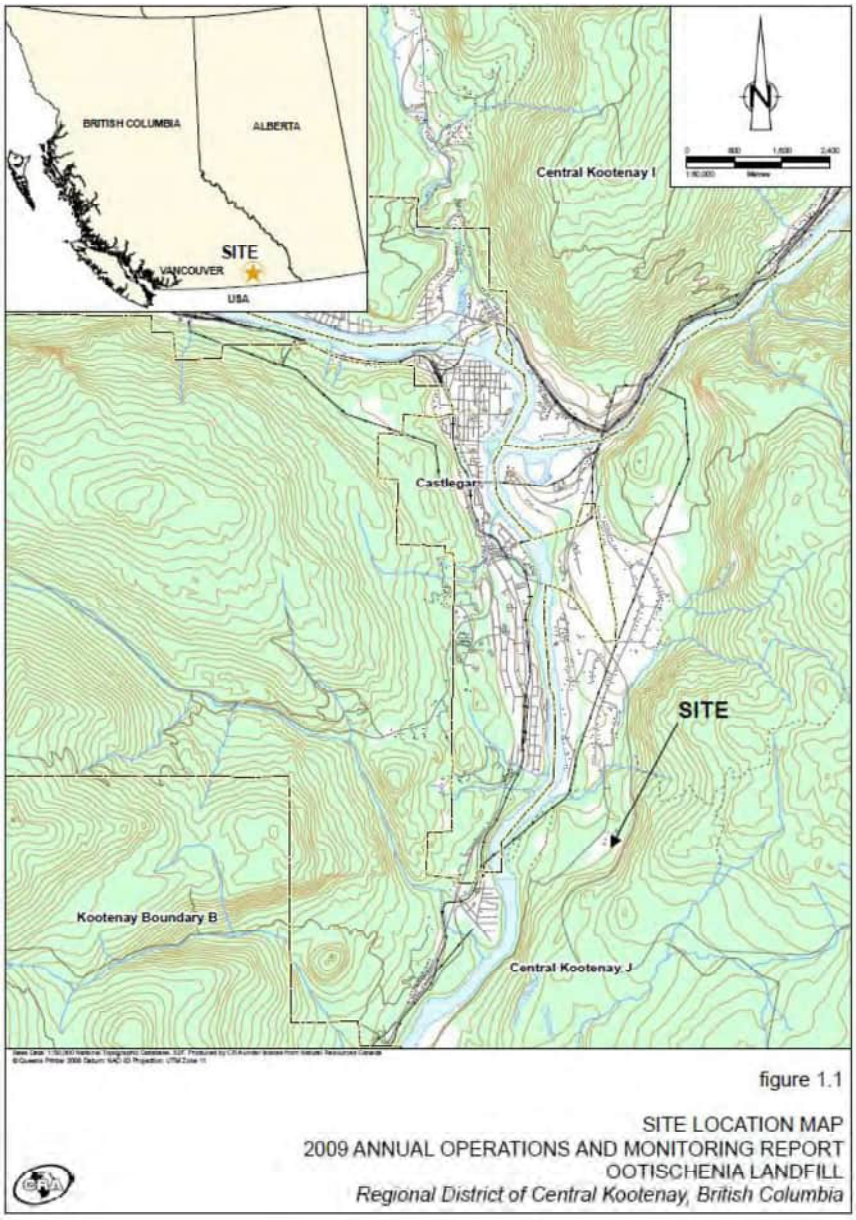


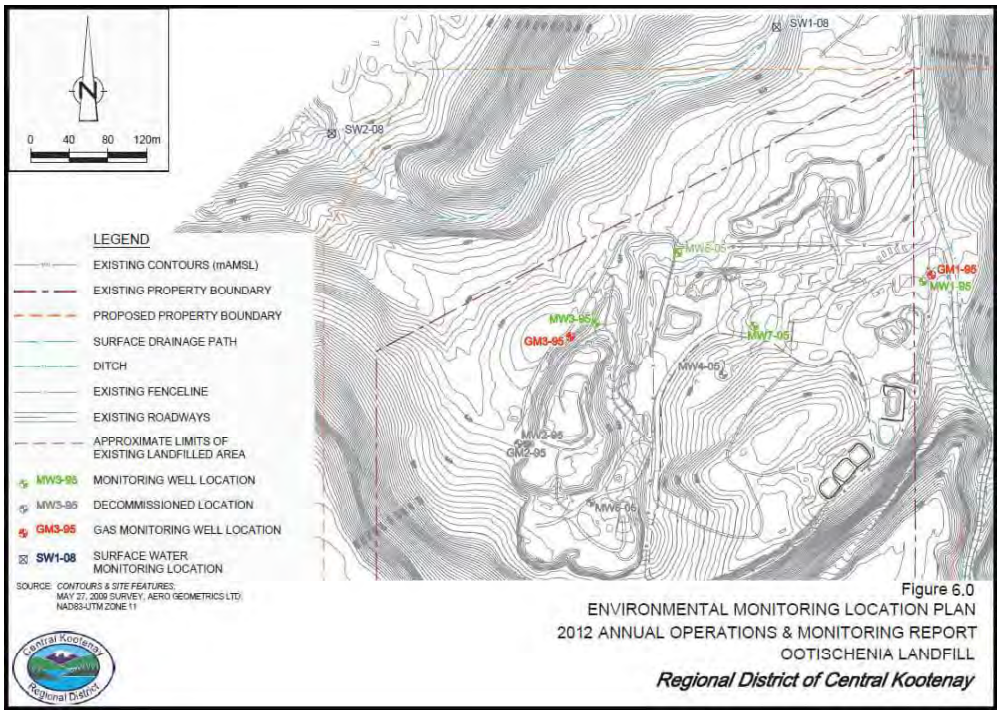
figure 1.1

SITE LOCATION MAP
2009 ANNUAL OPERATIONS AND MONITORING REPORT
OOTISCHENIA LANDFILL
Regional District of Central Kootenay, British Columbia

Location: Lot 1, Sub Lot 23, D.L. 4598, Plan 6599, plus a portion of Sub Lot 23, Plan X-34, D.L. 4598

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region



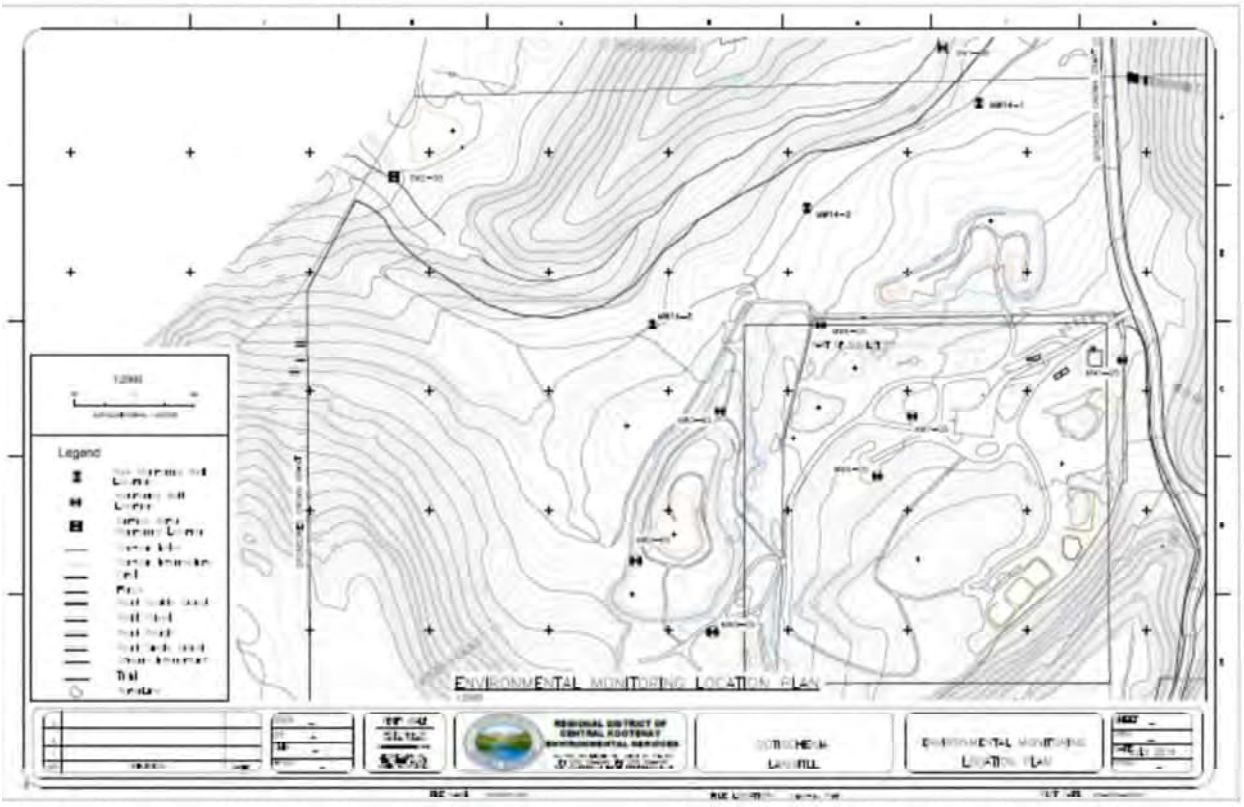
Site Plan indicating monitoring locations



Site Plan showing phased filling

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region



Site Plan indicating Monitoring Well locations

Date issued: December 15, 2014

Carol Danyluk, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region

Appendix B Environmental Monitoring Plan

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024

Table E.2: Amec Foster Wheeler Proposed 2017 Sampling Schedule

Ootischenia Landfill						
Field Designation	**EMS Number**	**Matrix**	**Well Depth**	**Purpose**	**April or May**	**October or November**
MW1-95	E232086	Groundwater	67.1	Background	A	A, B
MW06-05	None	Groundwater	63.1	Downgradient monitoring	A	A, B
MW07-05	None	Groundwater	63.1	Leachate monitoring	A	A, B
MW14-01	None	Groundwater	71.6	Downgradient monitoring	A	A, B
MW14-02	None	Groundwater	59.4	Downgradient monitoring	A	A, B
MW17-01	None	Groundwater	51.5	Downgradient monitoring	A	A, B
MW17-02	None	Groundwater	49.1	Downgradient monitoring	A	A, B
MW17-03	None	Groundwater	TBD	Downgradient monitoring	A	A, B
SW-1	None	Surface Water	n/a	Surface water monitoring	A	A, B
SW-2	None	Surface Water	n/a	Surface water monitoring	A	A, B

Summary of Analytical Program	**Spring**	**Fall**
Total Number of Locations Sampled	10	10
Duplicates (1 duplicate for every 10 samples)	1	1
Total Number of Analyses	11	11

Schedule A

Field Parameters
pH
Specific Conductance
Reduction-Oxidation Potential (ORP)
Temperature
Total Dissolved Solids
Turbidity

General Chemistry
Alkalinity
Chloride
Sulphate
Hardness (Dissolved)
pH
Specific Conductance
Total Organic Carbon (TOC)
Total Inorganic Carbon (TIC)
Chemical Oxygen Demand (COD)

Nutrients
Ammonia
Nitrate
Nitrite
Phosphorus (Total)

Metals (Dissolved)
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

QA/QC
Ion Balance

Schedule B

Volatile Organic Compounds (VOCs)
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Chloroethyl vinyl ether
Bromodichloromethane
Bromoform
Bromomethane (Methyl Bromide)
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform (Trichloromethane)
Chloromethane (Methyl Chloride)
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Dibromochloromethane
Methylene chloride
Tetrachloroethene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane (CFC-11)
Vinyl chloride

Volatile Organic Compounds (BTEX)
Benzene
Ethylbenzene
Toluene
Xylene (total)

Note: BTEX is normally included within VOC analysis

Appendix C Borehole Logs

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-1C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
0.0				SAND – some fine gravel, trace silt, medium grained, brown, damp.
10.0	■	1		
				– fine to medium grained, some gravel.
20.0	■	2		
30.0	■	3		
40.0	■	4		
50.0	■	5		
				– gravel content decrease to trace.
60.0	■	6		– some silt, fine grained – no gravel.
70.0	■	7		
75.0				

WELL INSTALLATION

PLASTIC M.C. LIQUID

4 8 12 16

DEPTH (ft): 0.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, 50.0, 55.0, 60.0, 65.0, 70.0, 75.0

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-1

COMPLETION DEPTH: 220.0 ft
COMPLETE: 16/08/95

MONITORING WELLS | OOTISCHENIA LANDFILL | BOREHOLE No: MW- 1
REGIONAL DISTRICT OF CENTRAL KOOTENAY | Project No: 0810-9
ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
75.0				SAND (con't)
80.0	■	8		– some silt, fine grained, light brown, moist.
85.0				
90.0	■	9		
95.0				
100.0	■	10		
105.0				
110.0	■	11		
115.0				
120.0	■	12		– apparent increase in moisture content.
125.0				
130.0	■	13		– trace silt, trace fine gravel, fine grained.
135.0				
140.0	■	14		– some silt, some fine gravel, well-graded, dark grey, damp.
145.0				
150.0	■	15		

WELL INSTALLATION

PLASTIC M.C.
4 8 12

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO | COMPLETION D
REVIEWED BY: | COMPLETE:
Fig. No: C-1

MONITORING WELLS
REGIONAL DISTRICT OF CENTRAL KOOTENAY

OOTISCHENIA LANDFILL

BOREHOLE No: MW-1C
Project No: 0810-90020
ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION	WELL INSTALLATION
150.0	■	15		– silty, moist.	
				SAND (con,t)	
155.0				– silty, dark grey, moist.	
				– discrete silt lumps in return.	
160.0	■	16		– grading to a SILT and SAND	
				SILT – some clay, trace/some sand, low-plasticity, dark grey, moist.	
165.0				– increase in drilling penetration resistance – could indicate stiff/hard consistency.	
170.0	■	17		– some fine gravel.	
175.0				– sandy.	
180.0	■	18		– trace sand, trace gravel.	
				BEDROCK	
185.0					
190.0	■	19			
195.0					
200.0	■	20			
205.0					
▼					
210.0					
215.0					
220.0				END OF HOLE AT 220 feet.	
225.0					

PLASTIC — M.C. — LIQUID
4 8 12 16

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-1

COMPLETION DEPTH: 220 ft
COMPLETE: 16/08/95

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-2C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
0.0				SAND – trace silt, fine grained, light brown, damp/dry.
10.0	■	1		– trace silt, trace/some fine gravel, medium grained, brown, moist.
				– gravelly.
20.0	■	2		– silty, fine grained, moist/wet (no gravel).
30.0	■	3		
35.0				– some gravel, some silt.
40.0	■	4		
45.0				– silty, fine grained.
50.0	■	5		
60.0	■	6		
70.0	■	7		
75.0				

WELL INSTALLATION

PLASTIC — M.C. — LIQUID

4 8 12 16

DEPTH (ft) 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65.0 70.0 75.0

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-2

COMPLETION DEPTH: 177.0 ft
COMPLETE: 17/08/95

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-2C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED ☒ ▨ ▥ ▯

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION	WELL INSTALLATION
75.0				SAND (con't)	
80.0	■	8		– gravelly, trace silt, trace cobbles and boulders (rock chips in return).	
85.0					
90.0	■	9			
95.0				BEDROCK	
100.0	■	10			
105.0					
110.0	■	11			
115.0					
120.0	■	12			
125.0					
130.0	■	13			
135.0					
140.0	■	14			
145.0					
150.0		15			

PLASTIC — M.C. — LIQUID
4 8 12 16

DEPTH (ft): 75.0, 80.0, 85.0, 90.0, 95.0, 100.0, 105.0, 110.0, 115.0, 120.0, 125.0, 130.0, 135.0, 140.0, 145.0, 150.0

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-2

COMPLETION DEPTH: 177.0 ft
COMPLETE: 17/08/95

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-2C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
150.0				BEDROCK (con't)
160.0		16		
170.0		17		– water in return.
				END OF HOLE AT 177 feet.

WELL INSTALLATION

PLASTIC M.C. LIQUID

4 8 12 16

DEPTH (ft)

150.0 155.0 160.0 165.0 170.0 175.0 180.0 185.0 190.0 195.0 200.0 205.0 210.0 215.0 220.0 225.0

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-3C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
0.0				SAND – trace silt, fine grained, light brown, damp/dry.
10.0	■	1		
20.0	■	2		– fine grained, damp/moist.
25.0				– coarse grained, trace fine gravel – wet.
30.0	■	3		
40.0	■	4		
50.0	■	5		– moist.
55.0				– gravelly – well-graded gravel – damp.
60.0	■	6		
70.0	■	7		
75.0				

WELL INSTALLATION

PLASTIC M.C. LIQUID

4 8 12 16

DEPTH (ft): 0.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, 50.0, 55.0, 60.0, 65.0, 70.0, 75.0

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-3

COMPLETION DEPTH: 172.0 ft
COMPLETE: 21/08/95

*rB

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-3C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION
75.0				SAND (con't)
				– some gravel, fine to medium grained, damp.
80.0		8		– some silt, fine grained (no gravel), moist.
85.0				– trace silt.
90.0		9		– some silt.
				– silty.
95.0				
100.0		10		
105.0				
110.0		11		
115.0				
120.0		12		– trace silt, fine to medium grained, moist.
125.0				
130.0		13		
135.0				
140.0		14		
145.0				
150.0		15		

WELL INSTALLATION

PLASTIC — M.C. — LIQUID

4 8 12 16

DEPTH (ft)

75.0 80.0 85.0 90.0 95.0 100.0 105.0 110.0 115.0 120.0 125.0 130.0 135.0 140.0 145.0 150.0

EBA Engineering Consultants Ltd.
Nelson, B.C.

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-3

COMPLETION DEPTH: 172.0 ft
COMPLETE: 21/08/95

MONITORING WELLS	OOTISCHENIA LANDFILL	BOREHOLE No: MW-3C
REGIONAL DISTRICT OF CENTRAL KOOTENAY		Project No: 0810-90020
		ELEVATION: 0.0 (ft)

SAMPLE TYPE ■ DISTURBED

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL DESCRIPTION	WELL INSTALLATION
150.0		15		SAND (con't)	
160.5		16		– some gravel, medium grained, saturated.	
170.0		17		– no gravel.	
				END OF HOLE AT 172 feet.	

PLASTIC M.C. LIQUID
4 8 12 16

DEPTH (ft)
150.0 155.0 160.5 165.0 170.0 175.0 180.0 185.0 190.0 195.0 200.0 205.0 210.0 215.0 220.0 225.0

LOGGED BY: RB/TO
REVIEWED BY:
Fig. No: C-3

COMPLETION DEPTH: 172.0 ft
COMPLETE: 21/08/95
Page 3 of 3

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW4-05
DATE COMPLETED: October 19, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF RISER GROUND SURFACE	481.17 480.25					
0	ML SANDY SILT (TOPSOIL) - trace clay, low plasticity, fine grained sand, dark brown, moist, rootlets.	479.64	Concrete Seal				
1	SM/ML SAND AND SILT - fine grained, brown, moist.			1	G		
2	SM/GM SAND AND GRAVEL - trace silt, fine to coarse grained, brown, moist, random cobbles.	478.12					
3	SM SILTY SAND - trace gravel, fine to medium grained, brownish grey, moist.	476.90					
4							
5			Bentonite Gravel Seal	2	G		
6							
7							
8	- trace gravel, random cobbles, at 7.92m BGS			3	G		
9							
10							
11			51 mm Ø Sch 80 PVC Riser	4	G		
12							
13							
14	- cobbles and small boulders, from 13.72 to 15.24m BGS			5	G		
15							
16							
17			152 mm Ø Borehole	6	G		
18							
19				7	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/18/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW4-05
DATE COMPLETED: October 19, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21					G		
22	- cobbles and small boulders. from 22.25 to 22.86m BGS						
23			Bentonite Gravel Seal	8	G		
24	- cobbles and small boulders. from 24.38 to 26.52m BGS						
25							
26	- fine to medium grained sand. from 25.60 to 27.43m BGS			9	G		
27		452.62					
28	SM SAND - silty to some silt, trace gravel, fine to medium grained, grey, moist.						
29				10	G		
30			152 mm Ø Borehole				
31							
32				11	G		
33	- trace gravel, fine to coarse grained. at 33.53m BGS						
34							
35			51 mm Ø Sch 80 PVC Riser	12	G		
36							
37	- trace to some gravel, random cobbles, no evidence of any staining or oxidation indicating groundwater presence. from 36.58 to 37.49m BGS						
38	- trace to some gravel, random cobbles, no evidence of any staining or oxidation indicating groundwater presence. from 38.10 to 38.71m BGS			13	G		
39					G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/18/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW4-05
DATE COMPLETED: October 19, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
41	439.72 ML SILT - trace clay, trace fine sand, trace gravel, low plasticity, grey, moist.	439.72					
	439.11 SM/ML SAND AND SILT - trace gravel, fine to medium grained, grey, moist.	439.11		14	G		
42							
43	- little gravel, random cobbles, fine grained, grey moist. at 42.67m BGS		Bentonite Gravel Seal				
	- fine to medium grained, grey, moist. at 43.28m BGS						
44	- silty, grey to greyish white, moist. at 43.59m BGS		152 mm ⌀ Borehole	15	G		
45							
46	- fine to coarse grained, grey, moist, no staining or oxidation indicating groundwater presence. from 46.02 to 47.55m BGS						
47				16	G		
48	- fine to medium grained, no staining or oxidation indicating groundwater presence. at 47.55m BGS						
49	- silty, fine to coarse grained, some oxidation visible on cuttings. from 48.77 to 53.34m BGS						
50				17	G		
51							
52				18	G		
53	426.91	426.91					
54							
55							
56							
57			No. 10/20 Silica Sand Pack				
58			51 mm ⌀ Sch 80 PVC Well Screen				
59							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/18/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW4-05
DATE COMPLETED: October 19, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
61							
62							
63							
64							
65							
66			152 mm ø Borehole				
67							
68							
69			Bentonite Gravel and Native Cave				
70							
71	END OF BOREHOLE @ 70.41m BGS Refusal at 70.41 m bgs		WELL DETAILS Screened interval: 424.17 to 421.12m AMSL 56.08 to 59.13m BGS Length: 3.05m Diameter: 51mm Slot Size: 10 Material: Schedule 80 PVC Seal: 479.34 to 426.00m AMSL 0.91 to 54.25m BGS Material: Bentonite Gravel Sand Pack: 426.00 to 420.82m AMSL 54.25 to 59.44m BGS Material: No. 10/20 Silica Sand				
72							
73							
74							
75							
76							
77							
78							
79							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/18/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW5-05
DATE COMPLETED: October 21, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL
	TOP OF RISER	474.37
	GROUND SURFACE	473.66
0	SM SILTY SAND - trace gravel, trace clay, fine to coarse grained, brown, moist.	473.05
1	SW SAND - trace silt, trace gravel, fine to coarse grained, brown, moist.	
2		
3		470.31
4	BOULDER.	469.70
	SW/GW SAND AND GRAVEL- trace silt, fine to coarse grained, brown, moist.	469.09
5	SW SAND - trace silt, trace gravel, fine to coarse grained, brown, moist.	468.17
6	SP SAND - trace silt, fine grained, light brown, moist.	
7		
8		
9		
10		
11		
12		
13		
14		
15		458.11
16	SW/GW SAND AND GRAVEL - trace silt, fine to medium grained, brown, moist.	457.81
	SP/SM SAND - little silt, trace gravel, fine to medium grained, brown, moist.	
17		
18		455.37
19	SM SAND - some to trace silt, fine grained, brown, moist. - trace gravel. at 18.90m BGS	

Monitoring Well: Concrete Seal; Bentonite Gravel; Native Cave and Cuttings; 51 mm ø Sch 80 PVC Riser; 172 mm ø Borehole

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE
1	G		
2	G		
3	G		
4	G		
5	G		
6	G		
7	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/21/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW5-05
DATE COMPLETED: October 21, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21							
22			Native Cave and Cuttings				
23				8	G		
24	- trace silt. at 24.38m BGS						
25							
26				9	G		
27	- some silt. at 27.43m BGS						
28							
29				10	G		
30			172 mm Ø Borehole				
31							
32	SP/SM SAND - trace silt, fine to medium grained, brown, moist.	441.65		11	G		
33							
34							
35				12	G		
36							
37							
38			51 mm Ø Sch 80 PVC Riser	13	G		
39			Bentonite Gravel Seal		G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/21/05 STATIC WATER LEVEL ▽ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW5-05
DATE COMPLETED: October 21, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: D. GRAY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
41	- very moist, grey. at 40.23m BGS - wet. at 41.15m BGS		51 mm Ø Sch 80 PVC Riser	14	G		
42	SM/GM SAND AND GRAVEL - some to trace silt, fine to coarse grained, grey, wet.	431.90	Bentonite Gravel Seal				
43							
44			51 mm Ø Sch 80 PVC Well Screen	15	G		
45	GRANITE (BEDROCK). END OF BOREHOLE @ 44.65m BGS Bedrock encountered at 44.50 m bgs	429.16 429.01	172 mm Ø Borehole				
46							
47							
48							
49							
50							
51							
52							
53							
54							
55							
56							
57							
58							
59							

WELL DETAILS
Screened interval:
430.68 to 429.16m AMSL
42.98 to 44.50m BGS
Length: 1.52m
Diameter: 51mm
Slot Size: 10
Material: Schedule 80 PVC
Seal:
435.56 to 431.60m AMSL
38.10 to 42.06m BGS
Material: Bentonite Gravel
Sand Pack:
431.60 to 429.01m AMSL
42.06 to 44.65m BGS
Material: No. 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/21/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW6-05
DATE COMPLETED: October 26, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL
	TOP OF RISER	475.58
	GROUND SURFACE	474.66
0	SM SILTY SANDS AND REFUSE - trace gravel, plastics, fine to med grained, brown, moist.	
1	SM SAND - some silt, trace gravel, fine to med grained, red-brown, moist.	473.75
4	SM SAND - some silt, fine to med grained, light to med brown, moist.	470.70
6	SM SAND - trace silt, fine to med grained, light brown, moist.	468.57
12	SM/GM SAND AND GRAVEL - trace silt, fine to med grained, brown, moist.	462.47
15	GM/SM GRAVEL AND SAND - trace silt, fine to med grained sand, fine to coarse grained gravel, brown, moist.	459.42

Monitoring Well: Concrete Seal; Bentonite Gravel; Cuttings; 51 mm ø Sch 80 PVC Riser; Drilling Casing; Bentonite Gravel Seal 172 mm ø Borehole

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE
1	G		
2	G		
3	G		
4	G		
5	G		
6	G		
7	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/26/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW6-05
DATE COMPLETED: October 26, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21					G		
22	GM GRAVEL - some cobbles, some sand, trace silt, med to coarse grained gravel, fine to med grained sand, brown, moist.	453.33					
23				8	G		
24							
25							
26				9	G		
27	SM/GM SAND AND GRAVEL - trace silt, fine to med grained sand, med to coarse grained gravel, some cobbles, light brown, moist.	447.84					
28							
29	SP SAND - trace silt, fine grain, light brown, moist.	446.01		10	G		
30			172 mm Ø Borehole				
31			Cuttings				
32				11	G		
33							
34							
35	- some silt. at 35.05m BGS			12	G		
36							
37	SM SAND - some silt, fine grained, light brown, moist.	438.09					
38			51 mm Ø Sch 80 PVC Riser	13	G		
39					G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/26/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW6-05
DATE COMPLETED: October 26, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
41			51 mm ø Sch 80 PVC Riser	14	G		
42							
43							
44				15	G		
45							
46							
47				16	G		
48							
49							
50				17	G		
51	- wet. at 51.21m BGS		▼				
52	- light to dark brown. at 51.82m BGS						
53				18	G		
54							
55							
56				19	G		
57							
58	- SM SILTY SAND - fine grained, light brown, moist. at 57.91m BGS	416.75	Bentonite Gravel Seal				
59				20	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ 10/26/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW6-05
DATE COMPLETED: October 26, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
61			51 mm ø Sch 80 PVC Well Screen				
62				21			
63							
64							
65				22			
66							
67							
68				23			
69							
70							
71				24			
72							
73							
74				25			
75							
76			Native Cave				
77				26			
78							
79	- trace gravel, coarse grained. at 79.25m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/26/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW6-05
DATE COMPLETED: October 26, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
81				27	G		
82							
83							
84				28	G		
85							
86							
87				29	G		
88	SM/GM SAND AND GRAVEL - trace silt, fine to coarse grained, grey, wet.						
	- GRANITE (BEDROCK), at 88.39m BGS	386.27					
89	END OF BOREHOLE @ 88.39m BGS						
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							

WELL DETAILS
Screened interval:
414.62 to 411.57m AMSL
60.05 to 63.09m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: Schedule 80 PVC
Seal:
418.58 to 415.53m AMSL
56.08 to 59.13m BGS
Material: Bentonite Gravel
Sand Pack:
415.53 to 410.66m AMSL
59.13 to 64.01m BGS
Material: No. 10/20 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/26/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW7-05
DATE COMPLETED: October 25, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF RISER GROUND SURFACE	485.20 484.00					
0	SM SAND - trace silt, fine to med grained, brown, moist.		Concrete Seal				
1				1	G		
2	- REFUSE - plastic from 1.83 to 3.05m BGS						
3		480.95					
4	SM SAND - trace silt, med grain, grey, moist, wood pieces.						
5			Bentonite Gravel	2	G		
6							
7							
8				3	G		
9	- no longer wood pieces present. at 9.14m BGS		Native Cave and Cuttings				
10							
11				4	G		
12			51 mm Ø Sch 80 PVC Riser				
13							
14	- plastic. at 14.33m BGS			5	G		
15		468.76					
16	SM SAND - some silt, med grained, grey, moist.						
17			172 mm Ø Borehole	6	G		
18							
19							
		464.19		7	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/25/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW7-05
DATE COMPLETED: October 25, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
21	SM SAND - some silt, coarse grained, dark grey, moist.				G		
22							
23	- light brown. from 22.86 to 24.38m BGS			8	G		
24		459.61					
25	GM/SM GRAVEL AND SAND - some silt, fine to coarse grained gravel, med grained sand, grey, moist.						
26				9	G		
27		457.18					
28	SM SAND - trace silt, fine to med grained, light brown, moist.						
29				10	G		
30			172 mm Ø Borehole				
31			Native Cave and Cuttings				
32				11	G		
33	SP SAND - fine grained, light brown, moist.	451.08					
34							
35				12	G		
36							
37							
38			51 mm Ø Sch 80 PVC Riser	13	G		
39							
	SM SAND - trace silt, fine grained, light brown,	444.37			G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/25/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW7-05
DATE COMPLETED: October 25, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
41	moist.			14	G		
42							
43	- some silt. from 42.67 to 51.82m BGS			15	G		
44							
45							
46				16	G		
47							
48							
49				17	G		
50							
51							
52	- SILTY SAND. from 51.82 to 56.39m BGS			18	G		
53							
54							
55				19	G		
56		427.61	▽				
57	SM SILTY SAND - med to coarse grained, light brown and dark grey, wet.		Bentonite Gravel Seal				
58			51 mm ø Sch 80 PVC Riser				
59			Bentonite Gravel Seal	20	G		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/25/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW7-05
DATE COMPLETED: October 25, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
61							
62							
63							
64	- light brown. at 64.01m BGS						
65							
66							
67							
68							
69							
70	SM SAND - some silt, coarse grained, light brown, wet.	413.89					
71							
72							
73							
74							
75							
76	GM/SM GRAVEL AND SAND - med to coarse grained with cobbles, brown, wet.	407.80					
77	GRANITE (BEDROCK) at 77.42m BGS	406.58					
	END OF BOREHOLE @ 77.42m BGS						
78							
79							

Monitoring Well:
- 51 mm Ø Sch 80 PVC Well Screen
- 172 mm Ø Borehole
- 152 mm Ø Borehole
- Native Cave

SAMPLE NUMBER: 21, 22, 23, 24, 25, 26

WELL DETAILS
Screened interval:
423.95 to 420.91m AMSL
60.05 to 63.09m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/25/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OOSTISCHENIA LANDFILL
PROJECT NUMBER: 19326-10
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY
LOCATION: CASTLEGAR, BRITISH COLUMBIA

HOLE DESIGNATION: MW7-05
DATE COMPLETED: October 25, 2005
DRILLING METHOD: 152 mm AIR ROTARY
FIELD PERSONNEL: A. TAYLOR

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
81			Material: Schedule 80 PVC Seal: 428.53 to 424.41m AMSL 55.47 to 59.59m BGS Material: Bentonite Gravel Sand Pack: 424.41 to 419.99m AMSL 59.59 to 64.01m BGS Material: No. 10/20 Silica Sand				
82							
83							
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ 10/25/05 STATIC WATER LEVEL ▼ 10/27/05

OVERBURDEN LOG 19326-10.GPJ CRA_CORP.GDT 11/9/05

THORMAN DRILLING LTD

WATER WELLS AND ENVIRONMENTAL DRILLING

Nelson: 250-354-1333
Toll Free: 1-888-354-1333
Fax: 250-354-1331
Cell: 250-354-8337
e:mail: thorman@shaw.ca

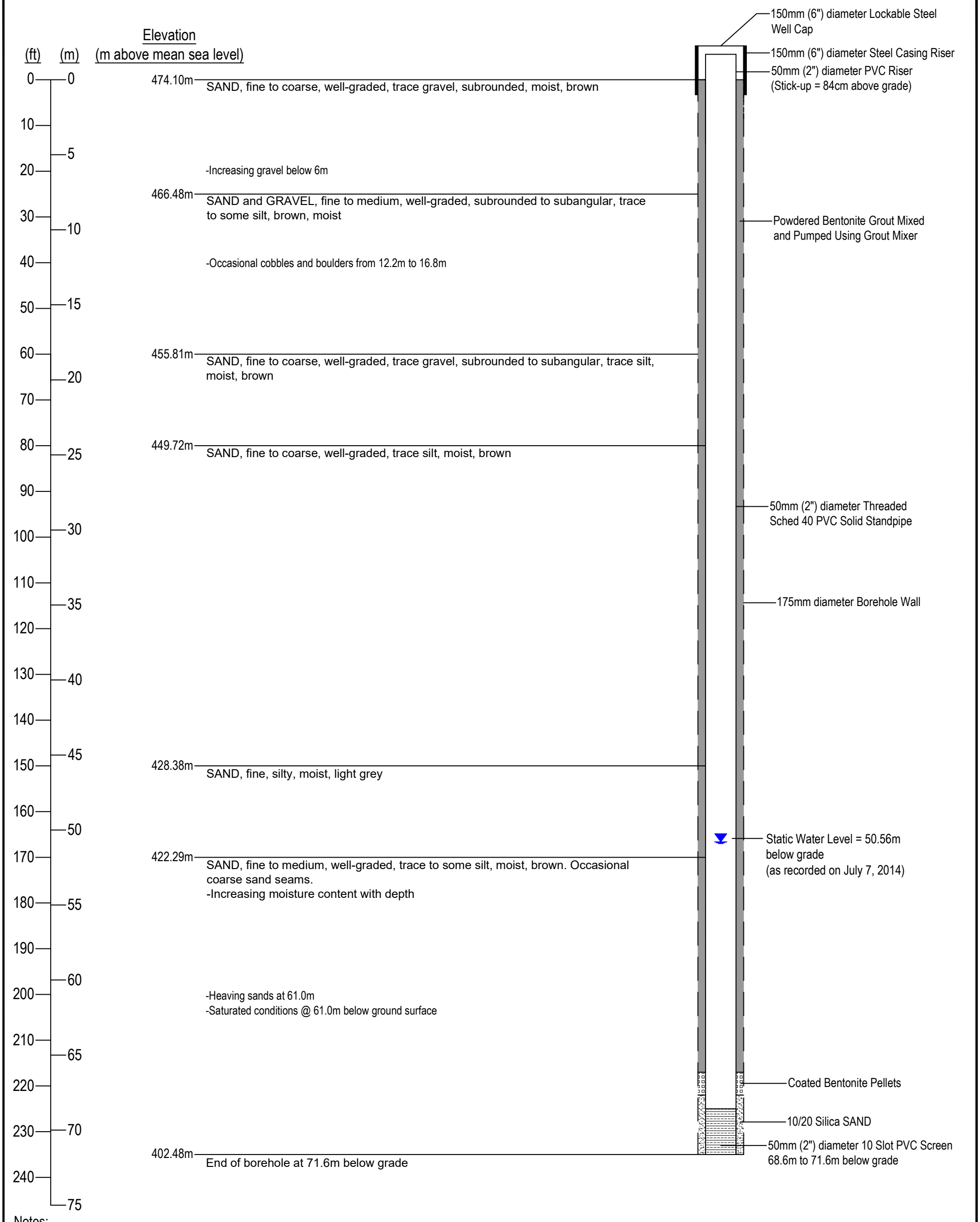
P.O. Box 986,
(111 Cottonwood Road)
Nelson, B.C.,
V1L 6A5

November 21, 2006

RE: WELL #0601 AT OOTISCHENIA LANDFILL

Description	Depth	Depth	
Hard silty Gravel	0 ft.	0 ft.	Bentonite Chips
	4 ft.	4 ft.	
Sandy Gravel			Bentonite Grout
	12 ft.		
Sand		30 ft.	
	63 ft.		
Sandy Gravel			
	72 ft.		Sand and Gravel Backfill
Sand			
	118 ft.		
Course Gravel with Cobbles and some Sand			
	128 ft.		
Bedrock			
	132 ft.	132 ft.	





Notes:

1. MW14-1 drilled and developed using Foremost DR 24 air-rotary drill rig owned and operated by JR Drilling Ltd.
2. MW14-1 logged by Dan Kennedy, EIT, based on soil samples collected along 1.5m intervals.
3. Northing = 5456944.81N, Easting = 454062.24E NAD 83, Zone 11 (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).
4. Ground surface elevation = 474.10m, Top of PVC elevation = 474.94m (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).

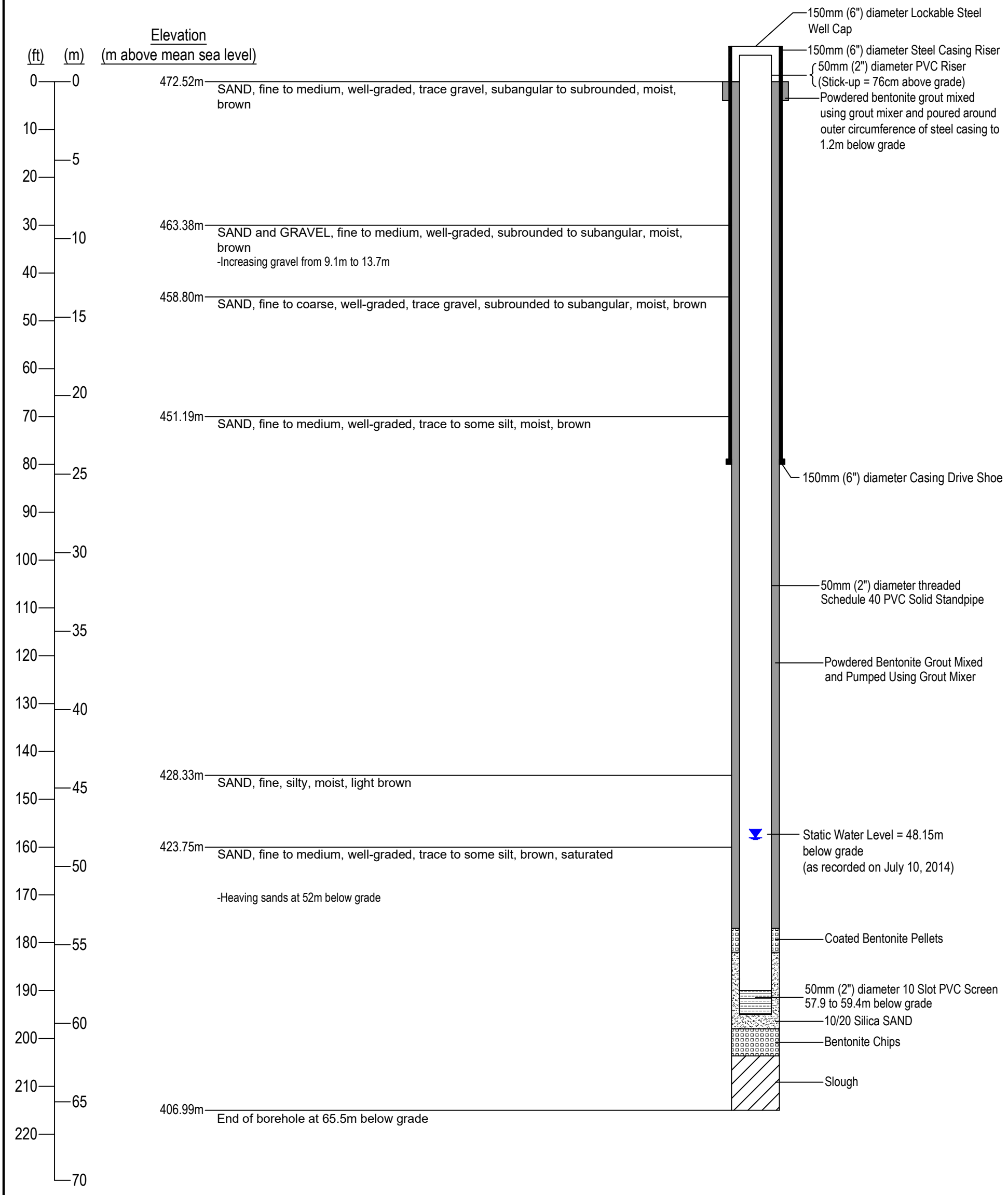
Vertical Scale:

0m 2 4 6 8 10

1 : 250

CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY	DWN BY: BB	TITLE: MW14-1 BOREHOLE LOG AND WELL COMPLETION DETAILS	REV. NO.: A
	CHK'D BY: DK		DATE: JULY 2014
AMEC Environment & Infrastructure Suite 600, 4445 Lougheed Highway Burnaby, BC, CANADA V5C 0E4 Tel. (604) 294-3811 Fax (604) 294-4664	DATUM: NAD83	PROJECT: OOTISCHENIA LANDFILL MONITORING WELL INSTALLATIONS CASTLEGAR, BC	PROJECT NO: CE04484
	PROJECTION: UTM Zone 11		FIGURE 1
	SCALE: 1:250		

S:\External\CE04484-CAD\CE04484-Figures-Well.dwg – Figure1 – Aug. 08, 2014 9:47am – ben.brown



Notes:

1. MW14-2 drilled and developed using Foremost DR 24 air-rotary drill rig owned and operated by JR Drilling Ltd.
2. MW14-2 logged by Dan Kennedy, EIT, based on soil samples collected along 1.5m intervals.
3. Northing = 5456853.39N, Easting = 453915.95E, Zone 11 (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).
4. Ground surface elevation = 472.52m, Top of PVC elevation = 473.28m (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).

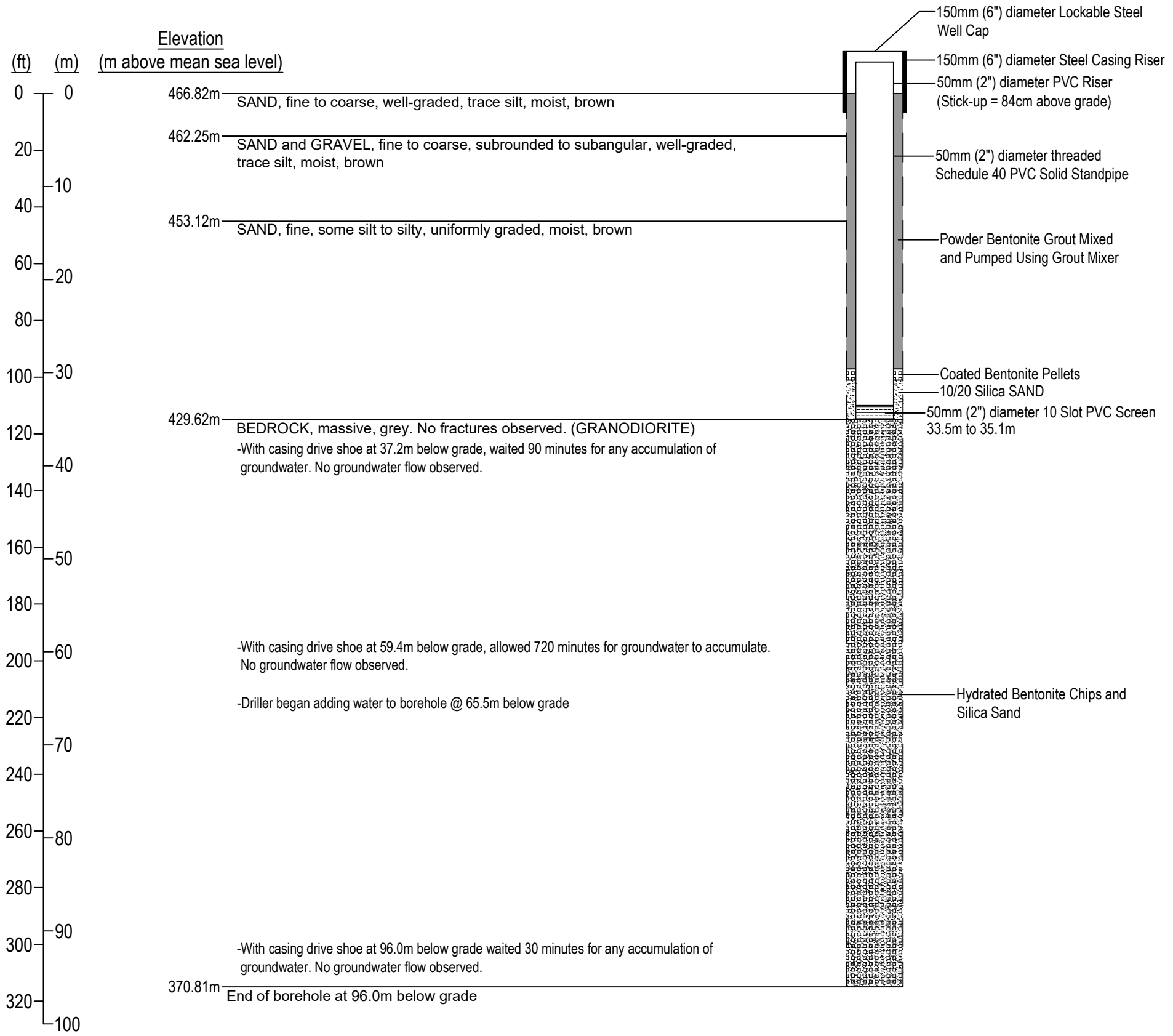
Vertical Scale:

0m 2 4 6 8 10

1 : 250

CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY	DWN BY: BB	TITLE: MW14-2 BOREHOLE LOG AND WELL COMPLETION DETAILS	REV. NO.: A
	CHK'D BY: DK		DATE: JULY 2014
AMEC Environment & Infrastructure Suite 600, 4445 Lougheed Highway Burnaby, BC, CANADA V5C 0E4 Tel. (604) 294-3811 Fax (604) 294-4664	DATUM: NAD83 PROJECTION: UTM Zone 11 SCALE: 1:250	PROJECT: OOTISCHENIA LANDFILL MONITORING WELL INSTALLATIONS CASTLEGAR, BC	PROJECT NO: CE04484 FIGURE 2

S:\External\CE04484-CAD\CE04484-Figures-Well.dwg – Figure2 – Aug. 08, 2014 9:47am – ben.brown



Notes:

1. MW14-3 drilled and developed using Foremost DR 24 air-rotary drill rig owned and operated by JR Drilling Ltd.
2. MW14-3 logged by Dan Kennedy, EIT, based on soil samples collected along 1.5m intervals.
3. Northing = 5456757.70N, Easting = 453784.35E NAD 83, Zone 11 (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).
4. Ground surface elevation = 466.82m, Top of PVC elevation = 467.66m (based on data acquired by Hango Land Surveys using dual frequency RTK GPS equipment).
5. Depth to groundwater measured on July 16, 2014. No accumulation of groundwater was measured in PVC standpipe.

Vertical Scale:

0m 5 10 15 20

1 : 500

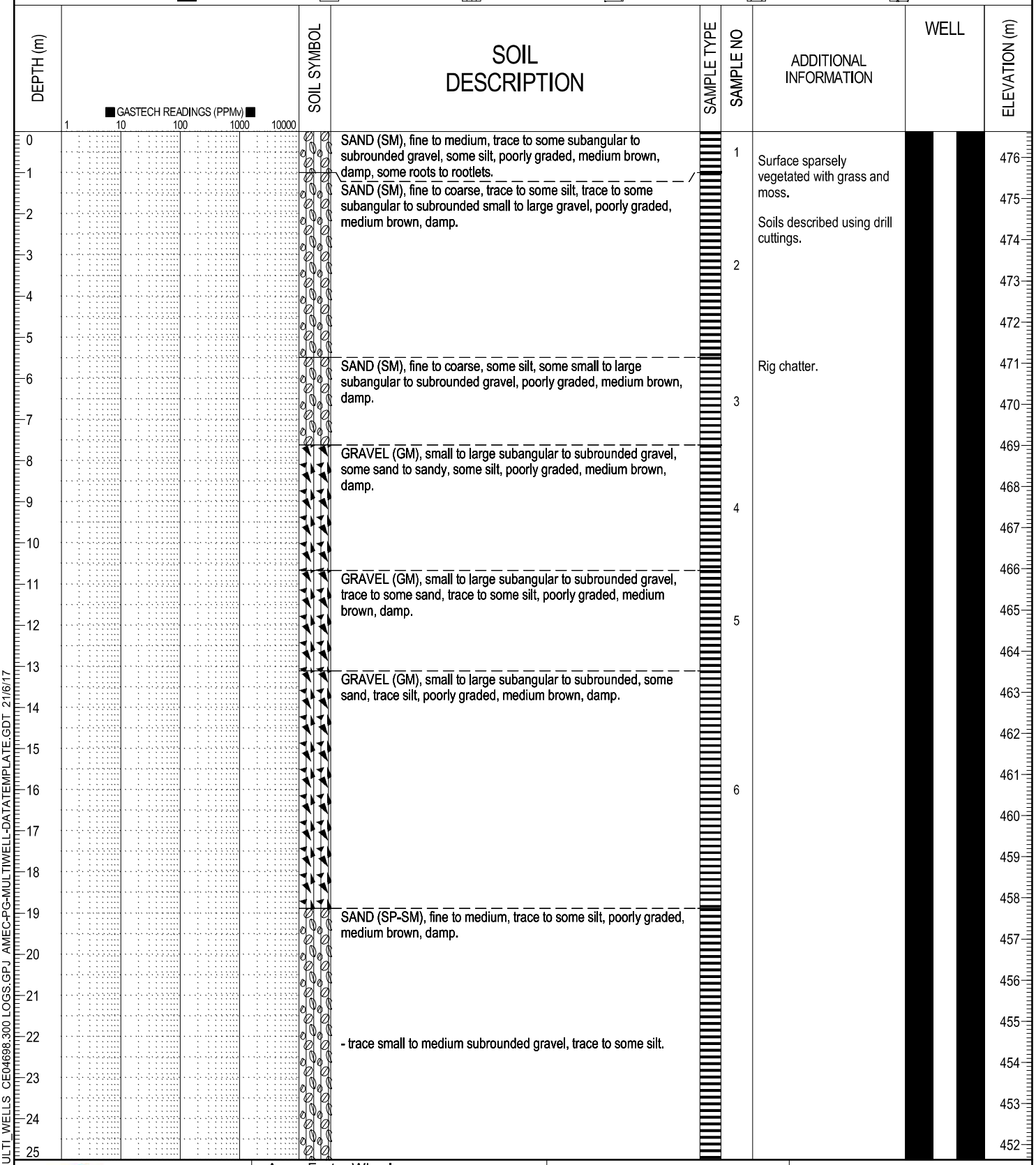
CLIENT: REGIONAL DISTRICT OF CENTRAL KOOTENAY	DWN BY: BB CHK'D BY: DK	TITLE: MW14-3 BOREHOLE LOG AND WELL COMPLETION DETAILS	REV. NO.: A DATE: JULY 2014
AMEC Environment & Infrastructure Suite 600, 4445 Lougheed Highway Burnaby, BC, CANADA V5C 0E4 Tel. (604) 294-3811 Fax (604) 294-4664	DATUM: NAD83 PROJECTION: UTM Zone 11 SCALE: 1:250	PROJECT: OOTISCHENIA LANDFILL MONITORING WELL INSTALLATIONS CASTLEGAR, BC	PROJECT NO: CE04484 FIGURE 3

S:\External\CE04484-CAD\CE04484-Figures-Well.dwg – Figure3 – Aug. 08, 2014 9:47am – ben.brown

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-01**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5456941.464 EASTING: 454059.785	ELEVATION: 476.63 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

amec foster wheeler

Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 51.5 m
ENTERED BY: ET	COMPLETION DATE: 17/5/17
REVIEWED BY: DW	Page 1 of 3

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-01**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5456941.464 EASTING: 454059.785	ELEVATION: 476.63 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH (m)	GASTECH READINGS (PPMv) 1 10 100 1000 10000	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	ADDITIONAL INFORMATION	WELL	ELEVATION (m)
25			SAND (SP-SM), fine to medium, trace to some silt, poorly graded, medium brown, damp. *(continued)*					451
26								
27			- gravel absent.					450
28								449
29								448
30								447
31								446
32					7			445
33			- trace small to large subangular to subrounded gravel, trace silt.					444
34								443
35								442
36								441
37								440
38								439
39								438
40			- gravel absent.					437
41								436
42								435
43								434
44			- finer grained sand present.					433
45								432
46			SAND (SM), fine grained, trace to some silt, poorly graded, medium brown, damp to moist.					431
47			- trace small to medium subrounded gravel, wet.			Water Level observed at 47.4m below ground surface on 22 May 2017		430
48								429
49					8			428
50								427

ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

amec foster wheeler
Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 51.5 m
ENTERED BY: ET	COMPLETION DATE: 17/5/17
REVIEWED BY: DW	Page 2 of 3

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-01**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5456941.464 EASTING: 454059.785	ELEVATION: 476.63 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH (m)	GASTECH READINGS (PPMv) 1 10 100 1000 10000	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	ADDITIONAL INFORMATION	WELL	ELEVATION (m)
50			SAND (SM), fine grained, trace to some silt, poorly graded, medium brown, damp to moist. *(continued)*					426
51								425
52			End of Borehole 51.45 m. Monitoring Well Installed.					424
53								423
54								422
55								421
56								420
57								419
58								418
59								417
60								416
61								415
62								414
63								413
64								412
65								411
66								410
67								409
68								408
69								407
70								406
71								405
72								404
73								403
74								402
75								

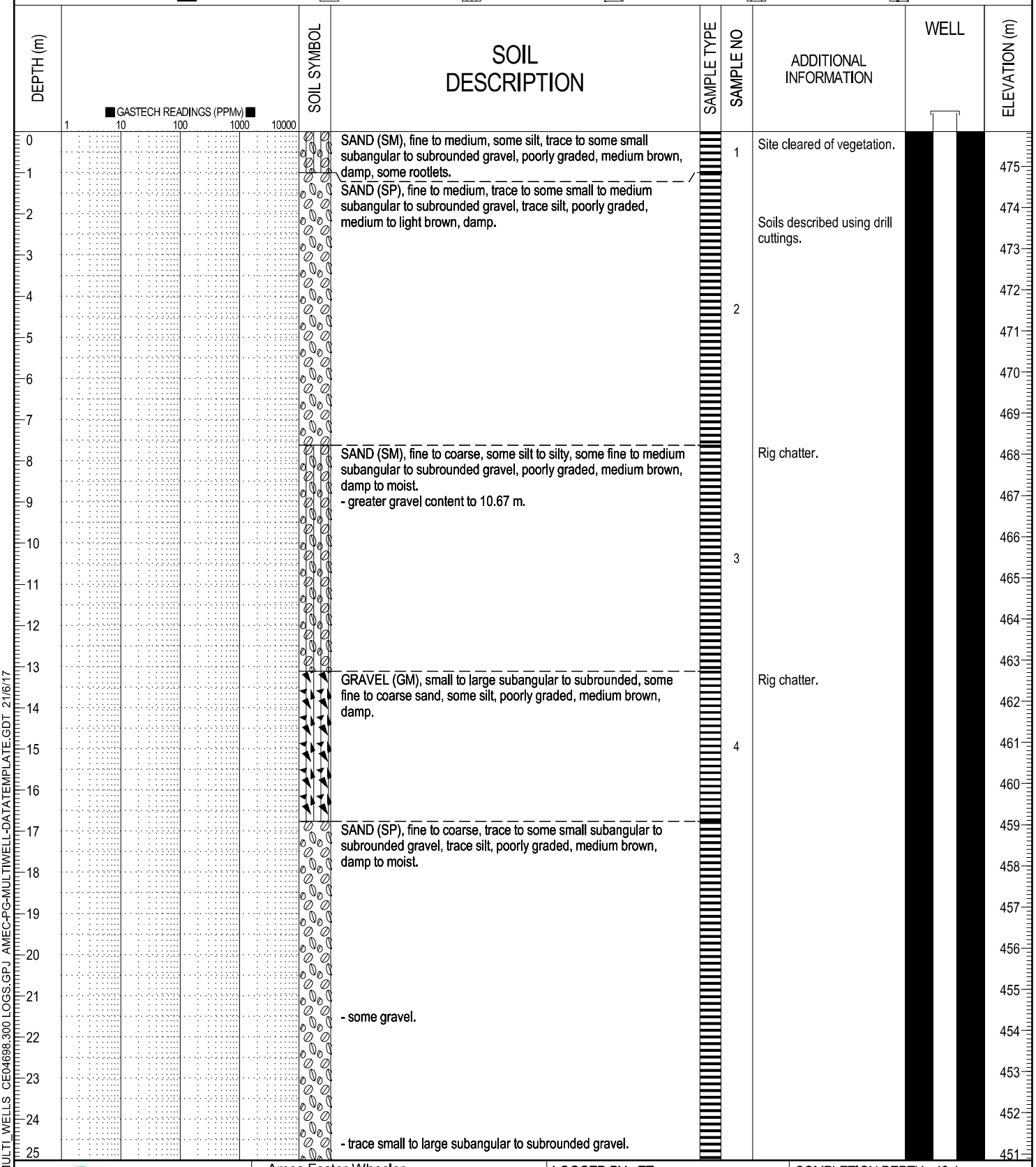
amec foster wheeler
Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 51.5 m
ENTERED BY: ET	COMPLETION DATE: 17/5/17
REVIEWED BY: DW	Page 3 of 3

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-02**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5456896.494 EASTING: 453985.535	ELEVATION: 475.84 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 49.1 m
ENTERED BY: ET	COMPLETION DATE: 18/5/17
REVIEWED BY: DW	Page 1 of 2

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-02**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5456896.494 EASTING: 453985.535	ELEVATION: 475.84 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH (m)	GASTECH READINGS (PPMv) 1 10 100 1000 10000	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	ADDITIONAL INFORMATION	WELL	ELEVATION (m)
25			SAND (SP), fine to coarse, trace to some small subangular to subrounded gravel, trace silt, poorly graded, medium brown, damp to moist. *(continued)*		5			450
26								449
27								448
28								447
29								446
30								445
31								444
32								443
33								442
34			SAND (SP), fine, trace silt, poorly graded, medium brown, moist.					441
35								440
36								439
37								438
38			- some silt.					437
39								436
40								435
41					6			434
42								433
43								432
44								431
45								430
46			- fine to coarse, trace to some silt.					429
47			- wet.			Water Level observed at 46.6m below ground surface on 22 May 2017		428
48								427
49								426
50			End of Borehole 49.12 m. Monitoring Well Installed.					

ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

amec foster wheeler
Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 49.1 m
ENTERED BY: ET	COMPLETION DATE: 18/5/17
REVIEWED BY: DW	Page 2 of 2

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-03**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5457000.671 EASTING: 454146.127	ELEVATION: 473.71 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH (m)	GASTECH READINGS (PPMv) 1 / 10 / 100 / 1000 / 10000	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	ADDITIONAL INFORMATION	WELL	ELEVATION (m)
0			SAND (SM), fine to medium, some silt, some subangular to subrounded gravel, poorly graded, medium brown, damp, some roots and rootlets.		1	Surface cleared of vegetation.		473
1			SAND (SP), medium to coarse, trace silt, trace small subrounded gravel, poorly graded, medium brown, moist.		2			472
2			GRAVEL (GM), small to large subangular to subrounded, some sand to sandy, some silt, poorly graded, medium brown, moist.			Soils described using drill cuttings. Rig chatter.		471
3								470
4								469
5					3			468
6								467
7								466
8								465
9			GRAVEL (GP-GM), small to large subangular to subrounded, some sand, trace to some silt, cobbles, poorly graded, medium brown, damp.		4	Casing blocked by bentonite during backfill installation. Area surrounding the well may include slough or an unbackfilled annulus.		464
10								463
11			SAND (SM), fine to coarse grained, gravelly, small to large subangular to subrounded, trace to some silt, cobbles, poorly graded, medium brown, damp.					462
12								461
13					5			460
14								459
15								458
16			SAND (SP), fine to medium, trace silt, poorly graded, medium brown, damp.			Rig chatter.		457
17								456
18								455
19								454
20					6			453
21								452
22								451
23								450
24								449
25								

ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

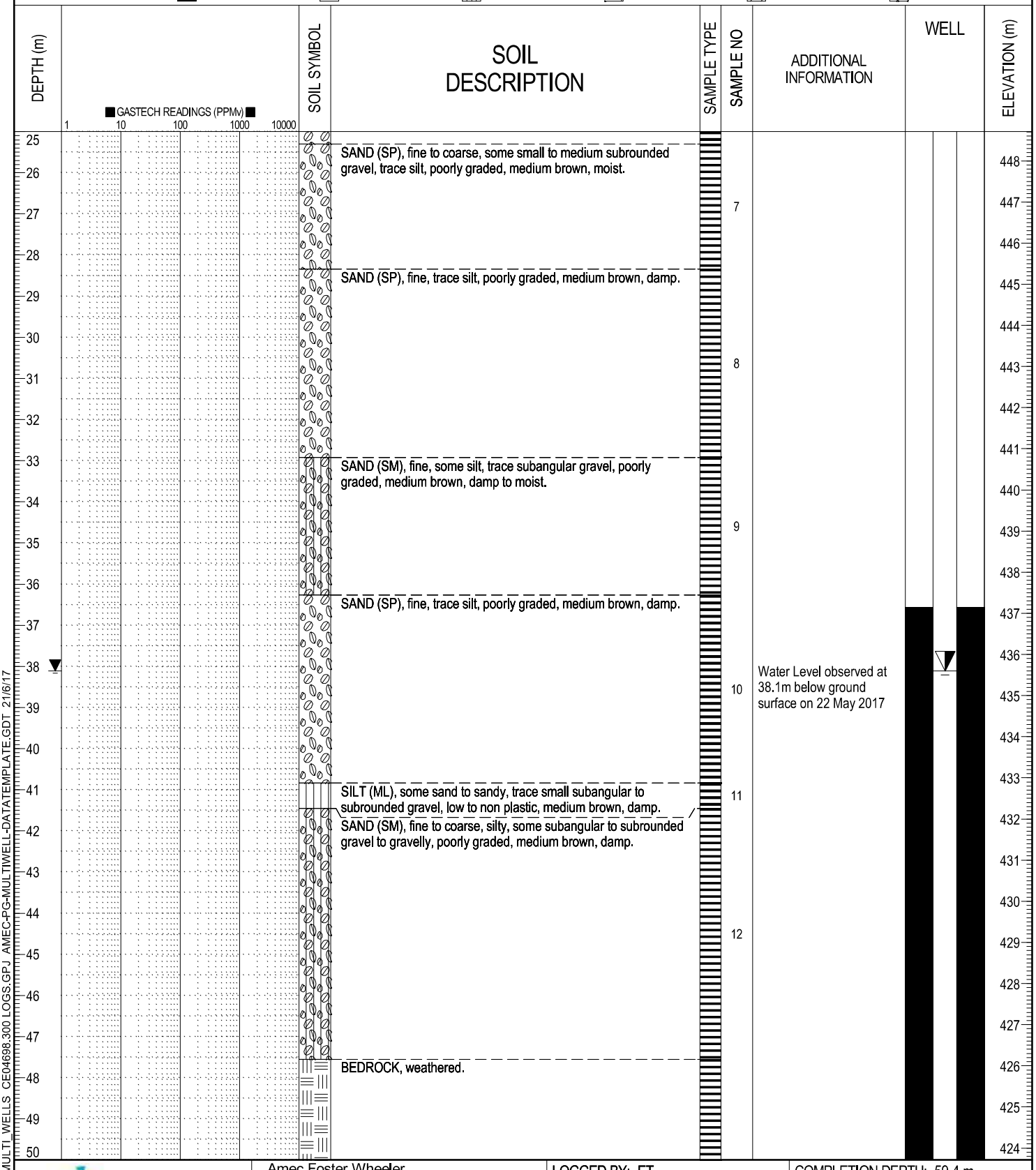
amec foster wheeler
Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 59.4 m
ENTERED BY: ET	COMPLETION DATE: 19/5/17
REVIEWED BY: DW	Page 1 of 3

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-03**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5457000.671 EASTING: 454146.127	ELEVATION: 473.71 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

amec foster wheeler

Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET	COMPLETION DEPTH: 59.4 m
ENTERED BY: ET	COMPLETION DATE: 19/5/17
REVIEWED BY: DW	Page 2 of 3

CLIENT: Regional District of Central Kootenay	PROJECT: 5 Year Hydrogeology Review	BOREHOLE NO: **MW17-03**
DRILLER: JR Drilling Ltd	671 Columbia Road, Ootischenia, BC	PROJECT NO: CE04698.300
DRILL TYPE/METHOD: Truck/Air Rotary	NORTHING: 5457000.671 EASTING: 454146.127	ELEVATION: 473.71 m

SAMPLE TYPE: TUBE | NO RECOVERY | SPLIT SPOON | GRAB | MUD RETURN | CORE RETURN

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH (m)	GASTECH READINGS (PPMv) 1 10 100 1000 10000	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	ADDITIONAL INFORMATION	WELL	ELEVATION (m)
50			BEDROCK, weathered. *(continued)*					423
51								422
52					13			421
53								420
54								419
55								418
56								417
57			BEDROCK.			Bedrock not weathered. Drillers reported harder drilling.		416
58					14			415
59								414
60			End of Borehole at 59.44 m. Monitoring Well Installed.					413
61								412
62								411
63								410
64								409
65								408
66								407
67								406
68								405
69								404
70								403
71								402
72								401
73								400
74								399
75								

Amec Foster Wheeler
913 Laval Crescent
Kamloops, British Columbia
Canada V2C 5P4

LOGGED BY: ET | COMPLETION DEPTH: 59.4 m

ENTERED BY: ET | COMPLETION DATE: 19/5/17

REVIEWED BY: DW | Page 3 of 3

ENVIRO_MULTI_WELLS CE04698.300 LOGS.GPJ AMEC-PG-MULTIWELL-DATATEMPLATE.GDT 21/6/17

wood.	Environment & Infrastructure Solutions 913 Laval Crescent Kamloops, BC V2C 4P5 TEL:250-374-1347 FAX:	BOREHOLE NO: **MW20-01** PROJECT NO: VE52811
CLIENT: Regional District of Central Kootenay		CONTRACTOR: Owen's Drilling Ltd.
PROJECT NAME: Groundwater Monitoring Well Installation		DRILL RIG: Truck Mount
PROJECT LOCATION: 671 Columbia Road, Ootischenia, BC		DRILL METHOD / DIA.: Air Rotary / 0.152

NORTHING: 5456796.122	DATUM: --	GROUND ELEV.: **475.39 m**
EASTING: 453856.369	STICKUP HEIGHT: 1.17 m	CASING ELEV.: 476.56 m

SAMPLE TYPES: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core | WL at Completion

BACKFILL TYPES: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand | Static WL

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	INSTALLATION OR BACKFILL DETAILS/NOTES	Elevation (m)
0	SAND (SM), fine to coarse, some subrounded gravel, some silt, poorly graded, medium brown, damp.		1		475
1	- at 1.0 m, damp to moist below 1.0 m.		2	Driller reported easy drilling.	474
2					473
3	- at 3.0 m, fine gravel, sands become more well graded with depth.		3		472
4				ESTIMATED ELEVATION-470.78... since we don't have a survey yet	471
5	- at 5.2 m, sands grade to medium and coarse grained.		4		470
6	469.29 m SAND (SM), fine grained, some silt, trace small gravel, poorly graded, medium brown, damp.		5	Rig chatter.	469
7					468
8					467
9	466.59 m SAND (SM), fine, some small to medium subrounded gravel to gravelly, some silt, medium brown, moist.		6		466
10	465.39 m GRAVEL AND SAND (GM-SM), small to large subrounded gravel, fine to coarse sand, trace to some silt, well graded, medium brown, damp.		7	Rig chatter. Driller observed harder drilling.	465
11	- at 11.3 m, some silt, some cobbles.		8	Driller suspects cobbles.	464
12	- between 12.5 m and 12.8 m, cobbley and gravelly layer.		9	Rig chatter. Driller suspects cobbley and bouldery layer.	463
13	462.29 m GRAVEL (GM), small to large subangular to subrounded, some fine to coarse sand, well graded, medium brown, damp.		10		462
14					461
15	- at 15.2 m some cobbles.		11	Rig chatter.	460

ENTERED BY: ET	COMPLETION DEPTH: 59.8 m	GENERAL COMMENTS:
LOGGED BY: ET	DRILL DATE: 20-May-2020	
REVIEWED BY: DW		

C:\USERS\ERIN.TORRY\DESKTOP\TEMP FOLDER\OOTISCHENIA TEMP\GINT LOGS\NEW LOGS\#2\OOT LOGS 2.GPJ 20/09/23 02:26 PM (BOREHOLE REPORT (ENVIRO))

wood.	Environment & Infrastructure Solutions 913 Laval Crescent Kamloops, BC V2C 4P5 TEL:250-374-1347 FAX:	BOREHOLE NO: **MW20-01** PROJECT NO: VE52811
CLIENT: Regional District of Central Kootenay		CONTRACTOR: Owen's Drilling Ltd.
PROJECT NAME: Groundwater Monitoring Well Installation		DRILL RIG: Truck Mount
PROJECT LOCATION: 671 Columbia Road, Ootischenia, BC		DRILL METHOD / DIA.: Air Rotary / 0.152

NORTHING: 5456796.122	DATUM: --	GROUND ELEV.: **475.39 m**
EASTING: 453856.369	STICKUP HEIGHT: 1.17 m	CASING ELEV.: 476.56 m

SAMPLE TYPES: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core | WL at Completion

BACKFILL TYPES: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand | Static WL

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	INSTALLATION OR BACKFILL DETAILS/NOTES	Elevation (m)
17		458.32 m SAND (SM), fine to coarse (mostly fine), gravelly, small to large subangular to subrounded, some silt, some cobbles and boulders, poorly graded, medium grey, damp.		12	Rig chatter. Driller suspects cobbles and boulders.	459
18						458
19						457
20		455.59 m SAND (SM), fine grained, trace to some silt, poorly graded, light brown, damp.		13	Driller reported easy drillng.	456
21						455
22						454
23						453
24				14		452
25				15		451
26						450
27						449
28		- at 28.4 m, sands grade to very fine.		16		448
29				17		447
30						446
31						445
						444

ENTERED BY: ET	COMPLETION DEPTH: 59.8 m	GENERAL COMMENTS:
LOGGED BY: ET	DRILL DATE: 20-May-2020	
REVIEWED BY: DW		

C:\USERS\ERIN.TORRY\DESKTOP\TEMP FOLDER\OOTISCHENIA TEMP\GINT LOGS\NEW LOGS\#2\OOT LOGS 2.GPJ 20/09/23 02:26 PM (BOREHOLE REPORT (ENVIRO))

wood.	Environment & Infrastructure Solutions 913 Laval Crescent Kamloops, BC V2C 4P5 TEL:250-374-1347 FAX:	BOREHOLE NO: **MW20-01** PROJECT NO: VE52811
CLIENT: Regional District of Central Kootenay		CONTRACTOR: Owen's Drilling Ltd.
PROJECT NAME: Groundwater Monitoring Well Installation		DRILL RIG: Truck Mount
PROJECT LOCATION: 671 Columbia Road, Ootischenia, BC		DRILL METHOD / DIA.: Air Rotary / 0.152

NORTHING: 5456796.122	DATUM: --	GROUND ELEV.: **475.39 m**
EASTING: 453856.369	STICKUP HEIGHT: 1.17 m	CASING ELEV.: 476.56 m

SAMPLE TYPES: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core | WL at Completion
BACKFILL TYPES: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand | Static WL

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	INSTALLATION OR BACKFILL DETAILS/NOTES	Elevation (m)
33				18		443
34						442
35						441
36		- at 35.7 m, damp to moist.		19		440
37		- at 36.9 m, sands grade to fine.		20		439
38						438
39						437
40				21		436
41						435
		433.94 m				434
42		SAND (SP), fine to medium grained (mostly fine), trace silt, poorly graded, light brown, damp to moist.		22		433
43						432
44						431
45				23		430
46						429
47				24		428
				25		

ENTERED BY: ET	COMPLETION DEPTH: 59.8 m	GENERAL COMMENTS:
LOGGED BY: ET	DRILL DATE: 20-May-2020	
REVIEWED BY: DW		

C:\USERS\ERIN.TORRY\DESKTOP\TEMP FOLDER\OOTISCHENIA TEMP\GINT LOGS\NEW LOGS\#2\OOT LOGS 2.GPJ 20/09/23 02:26 PM (BOREHOLE REPORT (ENVIRO))

wood.	Environment & Infrastructure Solutions 913 Laval Crescent Kamloops, BC V2C 4P5 TEL:250-374-1347 FAX:	BOREHOLE NO: **MW20-01** PROJECT NO: VE52811
CLIENT: Regional District of Central Kootenay		CONTRACTOR: Owen's Drilling Ltd.
PROJECT NAME: Groundwater Monitoring Well Installation		DRILL RIG: Truck Mount
PROJECT LOCATION: 671 Columbia Road, Ootischenia, BC		DRILL METHOD / DIA.: Air Rotary / 0.152

NORTHING: 5456796.122	DATUM: --	GROUND ELEV.: **475.39 m**
EASTING: 453856.369	STICKUP HEIGHT: 1.17 m	CASING ELEV.: 476.56 m

SAMPLE TYPES: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core | WL at Completion

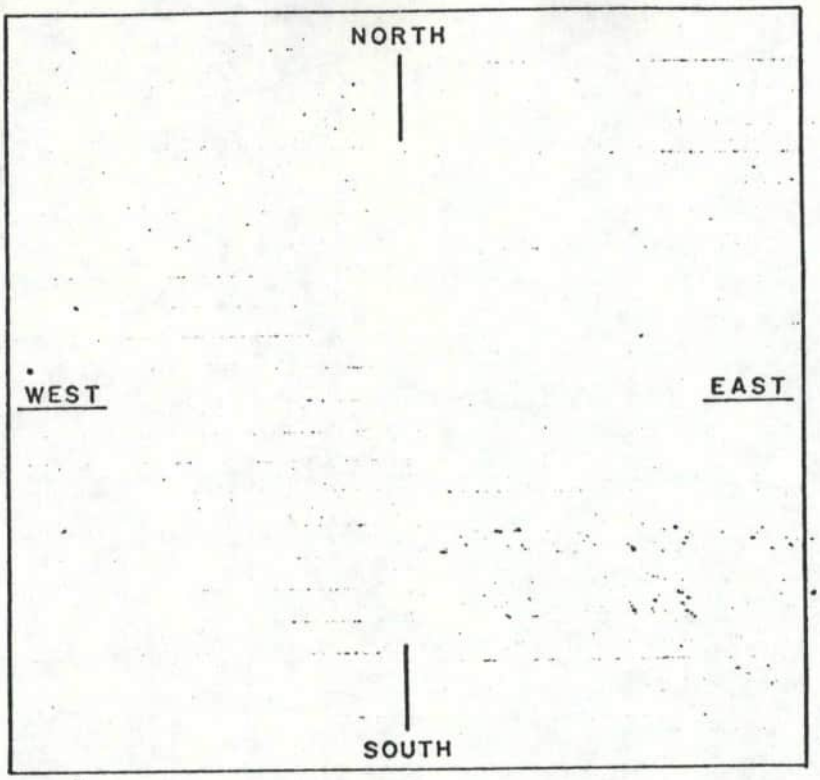
BACKFILL TYPES: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand | Static WL

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	INSTALLATION OR BACKFILL DETAILS/NOTES	Elevation (m)
49		- at 48.5 m, moist to wet.		26	Groundwater measured at 48.29 m below ground surface 21 May 2020	427
50		- at 50.3 m, wet.		27		426
51						425
52						424
53						423
54		- at 53.9 m, saturated.		28		422
55		- at 54.9 m, medium brown.		29		421
56						420
57						419
58						418
59				30		417
60		415.58 m Monitoring Well Installed. **End of Borehole @ 59.81 m (415.58 m elev.)**				416
61						415
62						414
63						413
						412

ENTERED BY: ET	COMPLETION DEPTH: 59.8 m	GENERAL COMMENTS:
LOGGED BY: ET	DRILL DATE: 20-May-2020	
REVIEWED BY: DW		

C:\USERS\ERIN.TORRY\DESKTOP\TEMP FOLDER\OOTISCHENIA TEMP\GINT LOGS\NEW LOGS\#2\OOT LOGS 2.GPJ 20/09/23 02:26 PM (BOREHOLE REPORT (ENVIRO))

WATER RIGHTS BRANCH
RECEIVED
JAN 20 1977
NELSON, B.C.



Driller's Comments: Well Will be Pump tested at a later Date

GOVERNMENT OF BRITISH COLUMBIA

Well bard copy.

MEMORANDUM

TO: Comptroller of Water Rights,
Parliament Buildings,
Victoria, B. C.

FROM: Water Rights Branch,
Regional Office, Nelson, B. C.

August 5, 19 77.

SUBJECT: Ootischenia Improvement District - New Well.

MINISTRY OF THE ENVIRONMENT

AUG 11 1977

MAIL ROOM
VICTORIA, B.C.

OUR FILE: 0254750-8

YOUR FILE: 0317588

A copy of the well test data for the new well recently developed by the Ootischenia Improvement District is attached for your information.

Would you please pass this data onto the Groundwater Division of the Water Investigations Branch for their analysis. The test was supervised by Mr. E. Wilson, Consulting Engineer for the District, who has not yet advised me of the estimated capacity of this aquifer. I would appreciate, if the information is sufficient, any estimate of capacity of aquifer that the Groundwater Division could supply.

T. H. OXLAND, REGIONAL ENGINEER.

Attachment

THO:jw

Discussed with Mr. Oxland. This is for our information, he does not expect analysis by Groundwater until E. Wilson submits a report. They did monitor one adjacent well, and are monitoring Columbia River levels for any relationship. Well is equipped and in operation.

Aman
Aug 23/77

RECEIVED
Community Water Supply Division
AUG 11 1977
REF.
ACK.
ANS.

140567

ENG R
Ltr
12 Aug 77

WATER INVESTIGATIONS BRANCH, WATER RESOURCES SERVICE, VICTORIA, B.C.

WELL DATA SHEET

OWNER: Name OOTISHENIA Imp. Dist. Address Box 3047 CASTLEGAR

LOCATION OF WELL: (LEGAL) LOT 28 OF D.L.OT 4588, K.D. PLAN 4882.

PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

TYPE OF WORK: Owner's number of well (if more than one) . . . .
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

DIMENSIONS: Diameter of well 8 inches.
Drilled 249 ft. Depth of completed well 137 ft.

CONSTRUCTION DETAILS:
Casing installed: Threaded ☐ Welded ☑
322 Gage 8 " Diam. from 0 ft. to 246 ft.
Gage " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☑ No ☐
Manufacturer's Name JOHNSON STAINLESS STEEL
Type Model No.
Diam. 8 Slot size 150 from 227 ft. to 237 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☑ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

PUMP: Manufacturer's Name
Type: H.P.
Pump intake set at ft.

WATER LEVELS: Land-surface elevation above mean sea level . . . ft.
Static level 147 ft. below top of well Date Nov 30/76
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date

WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand	0	40
Sand & Gravel	40	80
BROWN SAND	80	95
SAND & GRAVEL	95	155
FINE SAND	155	218
COURSE Gravel	218	237
TILL VERY DENSE	237	246
BED ROCK	246	249

Work started Mar 15, 1976 Completed DEC 1, 1976

WATER ANALYSIS

Hardness ppm pH
Iron ppm Chloride ppm
Temperature of water

WELL DRILLER

NAME Double "J" Well Drilling Ltd
(Person, firm, or corporation)
Address Box 3062 Castlegar B.C.

SKETCH LOCATION OF WELL ON REVERSE SIDE

Copy of this information for Water Investigations Branch, Water Resources Service, Parliament Buildings, Victoria, B.C.

GOVERNMENT OF BRITISH COLUMBIA

MEMORANDUM

TO Comptroller of Water Rights,
Parliament Buildings,
Victoria, B. C.

FROM Water Rights Branch,
Regional Office, Nelson, B. C.

January 24, 1977

DEPT. OF ENVIRONMENT
WATER RESOURCES

SUBJECT Ootischenia Improvement District - New Well.

OUR FILE 0254750-8

YOUR FILE

JAN 28 1977

MAIL ROOM
VICTORIA, B.C.

The Ootischenia Improvement District has recently had a well drilled and tested within Lot 28 of D. L. 4598, Kootenay District, Plan 4882. The well log and the data on the pump test are attached for your information. Would you please request the Hydrology Division of the Water Investigations Branch to assess this data and advise this office on the production of the well.

I would appreciate this information as soon as possible since the Ootischenia Improvement District are now discussing modifications to their system with a consulting engineer anticipating the use of this well to supplement their present supply.

T. H. OXLAND, REGIONAL ENGINEER.

Attachments

THO:jw

RECEIVED
Community Water Supply Division
JAN 28 1977
REF.
ACK.
ANS.

To ENGR
31 Jan 77

T.P. 4 Feb 77

137619

693

Well log & data copy

534-7901

Aqua-Flo TESTING & EQUIPMENT LTD.

P.O. BOX 3397
LANGLEY, B.C.
V3A 4R7

WELL LOG

DRAWDOWN ☑

Job No. .....

Location. CASTLEGAR

Sheet. 1 of 4

Owner .....

Bill To .....

.....

Engineer NONE

Drilled By .....

Type of Well CASED

Depth of Well .....

Size of Casing 8" TELESCOPIC

Amount of Casing .....

Top of Screen 227'

Amount of Screen 150 SLOT x 10'

Static Level 199.15'

Casing Stickup .75'

Approx. G.P.M. When Baled 260 PLUS.

Pump Used MYERS 20 H.P. 3 PH

Size of Discharge 3" x 60'

Pump Setting 221' to top of pump.

Date and Time Started JAN 13/77

Date and Time Finished JAN 19/77

4 3 INCHE

199.15

DATE	TIME	ELAPSED TIME MINUTES	D.T.W.	Q / G.P.M.			REMARKS
JAN 13 77	4:30	.5	200.45	205			
	4:31	1	200.54				
		1.5	200.57				
	4:32	2					
		2.5	200.68				
	4:33	3	200.69				
		3.5	200.72				
	4:34	4	200.67				
		4.5	200.67	205			
	4:35	5	200.68				
	4:36	6	200.70				
	4:37	7	200.70				
	4:38	8	200.76				
	4:39	9	200.71				
	4:40	10	200.71				
	4:42	12	200.72				
	4:44	14	200.72	205			
	4:46	16	200.69				
	4:48	18	200.70				
	4:50	20	200.70				

Aqua-Flo

TESTING & EQUIPMENT LTD.

LANGLEY, B.C.
V3A 4R7

WELL LOG

DRAWDOWN ☑

RECOVERY ☐

Job No. .....

Location CASTLEGAR

Sheet 2 of 4

DATE	TIME	ELAPSED TIME MINUTES	D.T.W.	Q G.P.M.			REMARKS
N 13	16.55	25	200.72	205			
	1700	30	200.72				
		35	200.72				
	1710	40	72				
		45	78				
	1720	50	78				
		60	78	205			
		70	78				
		80	82				
	1800	90	82				
		100	82				
		125	82				
	1900	150	82	205			
	1950	200	.92				
	2040	250	201.00				
	2130	300	.02				
	2220	350	06				
	2310	400	12				
	0000	450	12				
	0050	500	15	205			
	0140	550	18				
	0230	600	22				
	0320	650	22				
	0410	700	30				
	0500	750	30				
	0550	800		205			
	0640	850	38				
	0730	900	42				
	0820	950	43				
	0910	1000	46				
	1000	1050	46				
	1050	1100	49				

534-7001

Aqua-Flo

TESTING & EQUIPMENT LTD.

LANGLEY, B.C.
V3A 4R7

WELL LOG

DRAWDOWN ☑

RECOVERY ☐

Job No. .....

Location CASTLEGAR

Sheet 3 of 4

DATE	TIME	ELAPSED TIME MINUTES	D.T.W.	Q G.P.M.			REMARKS
JN 14	1140		201.49				
	1230		201.52				WATER CLEAR
	1320						NO NOTICABLE
	1410						TASTE
	1500		201.60				
	1550		201.62				
	1640						

534-7901

Aqua-Flo TESTING & EQUIPMENT LTD.

P.O. BOX 3397
LANGLEY, B.C.
V3A 4R7

WELL LOG

DRAWDOWN ☐
RECOVERY ☑

Job No. .....
Location CASTLEGAR
Sheet 4 of 4

DATE	TIME	ELAPSED TIME MINUTES	D.T.W.	Q G.P.M.			REMARKS
N 14	1640	0.0	201.67				
		.5	200.00				
		1	199.90				
		1.5	200.12				
		2	200.16				
	1642.5	2.5	200.16				
		3	200.15				
		3.5	200.15				
		4	200.14				
		4.5	200.13				
	1645	5	200.12				
		6	200.11				
		7	200.07				
		8	200.05				
		9	200.07				
	1650	10	200.06				
		12	200.05				
		14	200.03				
		16	200.05				
		18	200.05				
	1700	20	200.08				
		25	200.07				
		30	200.03				
		35	200.03				
		40	200.02				
		45	200.01				
		50	200.00				
	1730	60	200.00				
	2350		199.78				
JAN 15	0810		199.75				

WATER RIGHTS BRANCH
RECEIVED
JUL 21 1977
NELSON, B.C.

WELL LOG

Drawdown ☑

Owner: Qotischenia Improvement District
Bill to: .....
.....
Engineer: E. Wilson
Drilled by: Double "J"
Type of Well: Domestic Waterworks
Depth of Well: 229'
Size of Casing: 8"
Amount of Casing: 219'
Top of Screen: 219'
Amount of Screen: 10' 150 slot

Job No: .....
Location: .....
Sheet: 1 of 5
Static Level: 193' 0"
Casing Stickup: 8"
Approx GPM when baled: .....
Pump Used: Plegger 60 H.P.
Size of Discharge: 4"
Pump Setting: 214'
Date and Time Started: 6:00:00 A.M. July 8/77
Date and Time Finished: 6:00:00 A.M. July 9/77
Pumping 488 USGPM
5" orifice in 6" pipe
15½" on manometer

Date	Time	Elapsed Time Minutes	D.T.W.	Q US G.P.M.			Remarks
July 8/77	6:00:00 A.M.		Static 193'				Pump started
"	6:00:30	30 sec	203'	488			
	6:01:00	1 min	204' 4"	"			
	6:01:30	1.5 min	205' 7"	"			
	6:02:00	2 min	206' 9"	"			
	6:02:30	2.5	207' 9"	"			
"	6:03:00	3	207' 9"	"			
	6:03:30	3.5	207' 10"	"			
	6:04:00	4	207' 11"	"			
"	6:04:30	4.5	207' 11"	"			
	6:05:00	5 min	207' 11"	"			
"	6:06:00	6	207 11¼	"			
	6:07	7	207 11½	"			
	6:08	8	207 11½	"			
	6:09	9	207 11¾	"			
	6:10	10	207 11¾	"			
"	6:12 A.M.	12	207 11¾	"			

Signature of Tester: [signature]

WELL LOG

Job No.....
Location.....
Sheet 2 of 5

Drawdown ☑
Recovery ☐

Date	Time	Elapsed Time Minutes	D.T.W.	Q G.P.M			Remarks
July 8/77	6:14 AM	14 min	207' 11 3/4"				
	6:16	16 "	207' 11 3/4				
	6:18	18 "	208' -				
	6:20	20 "	208' -				
	6:25	25	208'				
	6:30	30	208' 1"				
	6:35	35	208' 1"				
	6:40	40	208' 1"				
	6:45	45	208' 1"				
	6:50	50	208' 1"				
	7:00	60	208' 2"				
	7:10	70	208' 2 1/2				
	7:20	80	208' 2 1/2				
	7:30	90	208' 2 1/2				
	7:40	100	208' 2 3/4				
	8:30	150	208' 4"				
	9:20	200	208' 5 1/2				
	10:10	250	208' 6"				
	11:00	300	208' 6 1/2				
	11:50 AM	350	208' 7"				
	12:40 PM	400	208 8				
	1:30	450	208 9 3/4				
	2:20	500	208 10	480 GPM			COLUMN DROPPED 1/2"
	4:00	600	208 11 3/4				FLOW → 480
	5:40	700	209' -				
	7:20	800	209' 2"				
	9:00	900 min	209' 3"				

Signature of Tester

WELL LOG

Job No.....

Location.....

Sheet 3 of 5

Drawdown ☑
Recovery ☐

Date	Time	Elapsed Time Minutes	D.T.W.	Q / G.P.M			Remarks
	10:40 PM	1000	209' 4½"				
JULY 9/77	12:20 AM	1100	209' 6"				
	2:00	1200	209' 6½				
	3:40	1300	209' 9"				
	5:20	1400	209' 10½				
	6:00 AM	1440 min	209 11"				

Signature of Tester Wm. J. Courtaloup

WELL LOG

Job No.....
Location.....
Sheet 4 of 5

Drawdown ☐
Recovery ☑

Date	Time	Elapsed Time Minutes	D.T.W.	Q G.P.M			Remarks
July 9/77	6:30:30 AM	30 sec	—				
		1 min	—				
		1½	197' 7"				
		2	197' 1"				
		2½	196' 11"				
		3	196 10				
		3½	196 8½				
		4	196 7½				
		4½	196 6½				
	6:35	5	196 5½				
		6	196 4½				
		7	196 3½				
		8	196 2½				
		9	196 2				
	6:40	10	196 1½				
		12	196 ¾				
		14	196				
		16	195 11				
		18	195 10½				
	6:50	20	195 10				
		25	195 9				
	7:00 AM	30	195 8½				
		35	195 8				
		40	195 7¼				
		45	195 6¾				
		50	195 6¼				
	7:30	60	195 5¼				

Signature of Tester [signature]

WELL LOG

Job No.....
Location.....
Sheet 5 of 5

Drawdown ☐
Recovery ☑

Date	Time	Elapsed Time Minutes	D.T.W.	Q G.P.M			Remarks
~~July 9/11 5:30 PM~~							
July 9/11	7:40 AM	70	195 4¾				
	8:30 AM	120 min	195 2½				
	9:20	170 min	195 1½				
	10:10	220	195 ½				
	11:00	270	194 11½				
	11:50 AM	320	194 10¾				
	12:40 PM	370	194 10"				
	4:00 PM	570	194 7¾				
	5:40 PM	670	194 6¾				
July 10/11	7:00 AM	1470 min	194 4½				

Signature of Tester: [signature]

82F.022.4.2.3 WTN 36104

WATER WELL RECORD

DEPT. OF ENVIRONMENT, WATER RESOURCES SERVICE, WATER INVESTIGATIONS BRANCH VICTORIA, BRITISH COLUMBIA

Z WELL NO. 8

E

N

LEGAL DESCRIPTION: LOT 28 SEC. ____ TP. ____ R. ____ D.L. 4598 LAND DISTRICT KOOTENAY DIST. 41 PLAN 4882

DESCRIPTIVE LOCATION CASTLEGAR S.OF ILLINARD LICENCE NO. ____ DATE ____

Z 4 X 11 Y 4 NO. 4

OWNER'S NAME KOTISCHENIA IMPROVEMENT DISTRICT ADDRESS BOX 3042 CASTLEGAR

DRILLER'S NAME DOUBLE "J" WELL DRILLING ADDRESS BOX 3042 CASTLEGAR DATE COMPLETED DEC. 1 1976

NAT. TOPO. SHEET NO. 82F/S6E KOOTENAY SHEET 3

DEPTH 248' ELEVATION OF (066) ☐ ESTIMATED ☐ SURVEYED CASING DIAM. 8" LENGTH 0-246'

METHOD OF CONSTRUCTION CABLETOOL CASING DIAM ____ LENGTH ____

SCREEN LOCATION 227-237' SCREEN ■ SIZE 150 SLOT LENGTH 10' TYPE JOHNSON SS

SANITARY SEAL YES ☐ NO ☐ SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

PERFORATED CASING ☐ LENGTH ____ PERFORATIONS FROM ____ TO ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

DISTANCE TO WATER 197'0" ☐ ESTIMATED WATER LEVEL

FROM GROUND LEVEL ☐ MEASURED ELEVATION ____ ARTESIAN PRESSURE ____

DATE OF WATER LEVEL MEASUREMENT ____ WATER USE DOMESTIC WATERWORKS (MUNICIPAL)

PRODUCTION TEST SUMMARY

DATE JAN. 13-14, 1977

TEST BY ____

BAIL TEST ■ PUMP TEST ☐ DURATION OF TEST 24 HOURS

RATE 200 GPM + DRAWDOWN 2.47'

WATER LEVEL AT COMPLETION OF TEST 201.62'

AVAILABLE DRAWDOWN 49' SPECIFIC CAPACITY ____

PERMEABILITY ____ STORAGE COEFF. ____

TRANSMISSIVITY ____

RECOMMENDED PUMPING RATE ____

RECOMMENDED PUMP SETTING ____

CHEMISTRY

TEST BY ____ DATE ____

TOTAL DISSOLVED SOLIDS ____ mg/l TEMPERATURE ____ °C pH ____ SILICA (SiO_2) ____ mg/l

CONDUCTANCE ____ μmhos/cm AT 25°C TOTAL IRON (Fe) ____ mg/l TOTAL HARDNESS ($CaCO_3$) ____ mg/l

TOTAL ALKALINITY ($CaCO_3$) ____ mg/l PHEN. ALKALINITY ($Ca\ CO_3$) ____ mg/l MANGANESE (Mn) ____ mg/l

COLOUR ____ ODOUR ____ TURBIDITY ____

ANIONS	mg/l	epm	CATIONS	mg/l	epm
CARBONATE (CO_3)			CALCIUM (Ca)		
BICARBONATE (HCO_3)			MAGNESIUM (Mg)		
SULPHATE (SO_4)			SODIUM (Na)		
CHLORIDE (Cl)			POTASSIUM (K)		
$NO_2 + NO_3$ (NITROGEN)			IRON (DISSOLVED)		
* TKN. (NITROGEN)					
PHOSPHORUS (P)					

* TKN = TOTAL KJELDAHL NITROGEN CHEMISTRY SITE NO. ____

NO_2 = NITRITE NO_3 = NITRATE WATER CLEAR, NO NOTICEABLE TASTE

CHEMISTRY FIELD TESTS

TEST BY ____ DATE ____ EQUIPMENT USED ____

LITHOLOGY

FROM	TO	DESCRIPTION
0	40	SAND
40	80	SAND & GRAVEL
80	85	BROWN SAND
85	155	SAND & GRAVEL
155	218	FINE SAND
218	237	COARSE GRAVEL
237	246	TILL, VERY DENSE



NOT W.V. NOT CONFIDENTIAL (per ADK on 10/6/88)

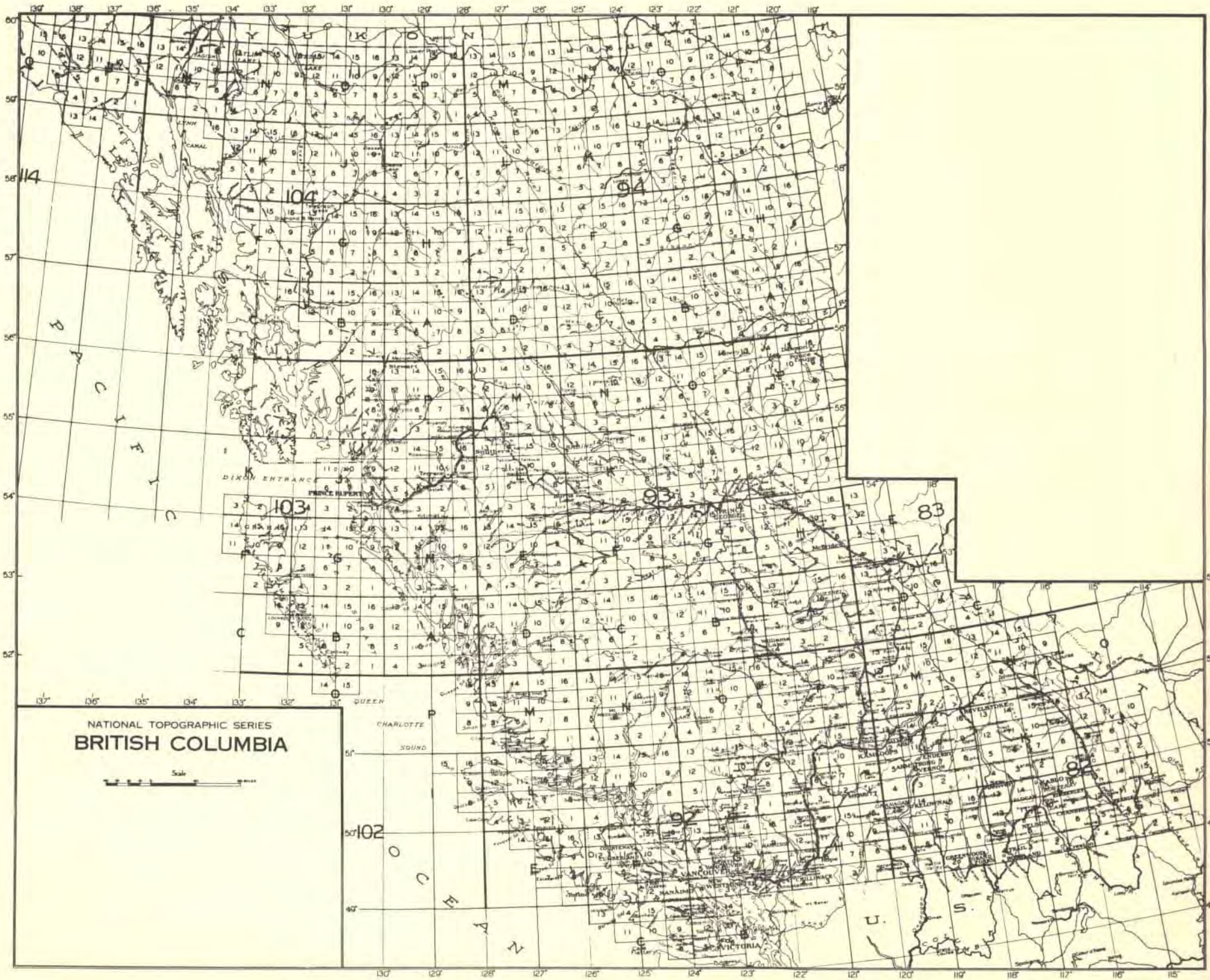
CONTENTS OF FOLDER

■ DRILL LOG ■ PUMP TEST DATA ☐ CHEMICAL ANALYSIS

☐ SIEVE ANALYSIS ☐ GEOPHYSICAL LOGS ☐ REPORT

OTHER ____

SOURCES OF INFORMATION ____


NATIONAL TOPOGRAPHIC SERIES
BRITISH COLUMBIA
Scale
PACIFIC OCEAN
U. S.
DIXON ENTRANCE
PRINCE RUPERT
QUEEN CHARLOTTE SOUND
VANCOUVER
VICTORIA
114
104
94
103
93
83
102
92
82


LAND DISTRICTS
N.W.T.
YUKON
Atlin
Cassiar
Liard R.
PEACE RIVER
CASSIAR
Stikine R.
Finlay R.
Fort St. John
Peace R.
Dawson Creek
Parsnip R.
Stewart
Nass R.
Smithers
Babine Lake
Terrace
Skeena R.
Prince Rupert
COAST RANGE 5
Kitimat
PRINCE GEORGE
CARIBOO
COAST RANGE 4
Quesnel
Williams Lake
COAST RANGE 3
LILLOOET
Fraser R.
KAMLOOPS
DIV. OF YALE
Thompson R.
Kamloops
OSOYOOS
Vernon
DIV. OF YALE
KOOTENAY
Kootenay Lake
Kootenay R.
Nelson
Cranbrook
Trail
Kelowna
Penticton
SIMILKAMEEN
DIV. OF YALE
NEW WESTMINSTER
YALE
VANCOUVER
DIV. OF YALE
NANAIMO
VICTORIA
COAST RANGE 2
COAST RANGE 1
Port Hardy
RUPERT
Queen Charlotte Sound
QUEEN CHARLOTTE
PACIFIC OCEAN
ALBERTA
Columbia R.
50 0 50 100 150
Miles
LAND DISTRICTS IN THIS AREA NOT SHOWN DUE TO SMALL AREA OF MAP.

NORTH

WEST

SEE INSIDE

EAST

SOUTH

CARD BY Alarmeri DATE Sept. 16, 1977

ADDITIONAL DATA ADDED BY

REMARKS

June 1981.
WELL IS LOCATED ON LOT 28
in the NE corner by compass
& SE corner by map.)*
supplies the subdivision
the water is pumped to the
reservoir. Both * have the
water used on park.
Source of xerox
82.F.022.4.4.1

COMPLETE PUMP
INSTALLATIONS

SOIL AND
FOUNDATION
SAMPLING

DOUBLE J WELL DRILLING
LTD.

P.O. BOX 3062, CASTLEGAR, B.C.

INDUSTRIAL AND
DOMESTIC DRILLING

PHONE
365-6655
365-6751

Ootischenia Improvement District

Log of Test Hole # 3

On Paul Strelaeff's Property

0 - 12	sand
12 - 62	very course ~~xx~~ gravel and cobbles
62 - 75	course sand
75 - 208	sandy brown clay
208 - 280	silt

Well was drilled in the north west corner of Lot 24 of SL 15 of Lot 4598 Kty Dist Plan 4882.

82F.022.4.2.3

MERIDIAN | TENS UNITS RANGE | TENS UNITS SECTION | QUARTER (NE SE SW NW) | TENS UNITS LAND DISTRICT: 4

82 F/5bE

GROUND WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C. 24-XII-74

WTN 5056

LOCATION (COMPLETE LEGAL DESCRIPTION) NW corner Lot 24 of SL 15 of Lot 4598 Plan 4882 Kootenay Dist.

OWNER'S NAME Ootischenia Improvement Dist. ADDRESS #2

DRILLER'S NAME Double J Well Drilling ADDRESS Castlegar, DATE OF COMPLETION

DEPTH 280 ELEVATION OF COLLAR (066) CASING DIAM. LENGTH TYPE

METHOD OF DIGGING SCREEN ☐ SIZE LENGTH TYPE

LOCATION OF SCREEN DEVELOPED ☐ DESCRIBE

PERFORATED CASING ☐ LENGTH LOCATION OF PERFORATIONS

GRAVEL PACK ☐ LENGTH DIAM. SIZE GRAVEL, ETC.

PUMP ☐ TYPE POWER

CAPACITY OTHER DATA

COSTS WELL PUMP PUMP HOUSE, ETC.

MAINTENANCE

DISTANCE TO WATER FROM TOP OF CASING ☐ ESTIMATED ☐ MEASURED ELEVATION FLUCTUATION

HIGH WATER MONTH LOW WATER MONTH OBSERVATION DATA ☐ FILE No.

WATER USE

MAX. RATE WITHDRAWAL ☐ ESTIMATED ☐ MEASURED

TEMPERATURE PUMPS SAND ☐

CLOGS SCREEN ☐ TYPE DEPOSIT AQUIFER DATA

LICENSE No. DATE LICENSE AMOUNT

DATE APPLICATION USE

Remark: On Paul Strelaeff's Property Lot 3

LOCATION SKETCH-INDICATE NORTH

WATER QUALITY: ANALYSIS, SOFT, HARD, HIGH IRON, HIGH SULPHUR, SALTY, ALKALINE, SALINE, POLLUTED, INADEQUATE QUALITY

CAPACITY GPD.: DRY HOLE, INADEQUATE QUANTITY, PUMPING TEST; 0 – 10^3, 10^3 – 10^4, 10^4 – 10^5, 10^5 – 10^6, 10^6

METHOD: DUG, DRIVEN, DRILLED, JETTED, BORED

DEPTH: 0 – 25, 25 – 30, 50 – 100, 100 – 200, 200 – 400, > 400

OBSERVATION, ABANDONED, DEVELOPED, SCREEN, PERF. CASING, GRAVEL ENV., PUMP

TYPE WELL: FLOWING, NON-FLOW ARTESIAN, WATER TABLE, PART CONFINED

CHARACTER OF SUPPLY AQUIFER: SAND, GRAVEL, TILL

WATER USE: DOMESTIC, GARDEN, STOCK, COOLING, IRRIGATION, INDUSTRIAL, WATERWORKS

RELIABILITY OF DATA: GOOD, FAIR, POOR

ROCK, SPRING

OTHER AQUIFER PRESENT (TENS, UNITS); OTHER AQUIFER PRESENT (TENS, UNITS); SUPPLY AQUIFER (TENS, UNITS): 1 2 4 7

ACCOUNTAMATIC 'ONE WRITE' SYSTEMS LTD., VICTORIA B.C. 12708

LOG

FROM	TO	DESCRIPTION	NAME

82F.022.4.2.3 WTN 36645

WATER WELL RECORD

DEPT. OF ENVIRONMENT, WATER RESOURCES SERVICE, WATER INVESTIGATIONS BRANCH VICTORIA, BRITISH COLUMBIA

Lot 1

Z WELL NO. 6

E

N

Z 4 X 11 Y 4 NO. 3

LEGAL DESCRIPTION: LOT 1 SEC. TP. R. D.L. 4598 LAND DISTRICT KOOTENAY. PLAN 11635

DESCRIPTIVE LOCATION NEAR D-D OOSTICHENIA S. OF KINNARD LICENCE NO. DATE

NAT. TOPO. SHEET NO. 82F/5bE KOOTENAY SHT 3

OWNER'S NAME GEORGE LEWIS ADDRESS CASTLEGAR B.C. 365-5751

DRILLER'S NAME PACIFIC PUMP + PRESSURE ADDRESS DATE COMPLETED 2-2-77

DEPTH 64' ELEVATION OF (109) ☐ ESTIMATED ☐ SURVEYED CASING DIAM. LENGTH

METHOD OF CONSTRUCTION CABLE TOOL CASING DIAM 6" LENGTH 0-60'

SCREEN LOCATION 59-64' SCREEN ☒ SIZE .020 LENGTH 5' TYPE JOHNSON SS.

SANITARY SEAL YES ☐ NO ☐ SCREEN ☐ SIZE LENGTH TYPE

PERFORATED CASING ☐ LENGTH PERFORATIONS FROM TO

GRAVEL PACK ☐ LENGTH DIAM. SIZE GRAVEL, ETC.

DISTANCE TO WATER 42' ☐ ESTIMATED WATER LEVEL Dev. method: SURGE & BAIL.

FROM Top of CASING. ☐ MEASURED ELEVATION ARTESIAN PRESSURE

DATE OF WATER LEVEL MEASUREMENT WATER USE

PRODUCTION TEST SUMMARY

DATE

TEST BY DRILLER

BAIL TEST ☒ PUMP TEST ☐ DURATION OF TEST 2 hrs.

RATE 300 GPH DRAWDOWN 11'

WATER LEVEL AT COMPLETION OF TEST 53'

AVAILABLE DRAWDOWN SPECIFIC CAPACITY

PERMEABILITY STORAGE COEFF.

TRANSMISSIVITY

RECOMMENDED PUMPING RATE 350 GPH (MAX)

RECOMMENDED PUMP SETTING 60

CHEMISTRY

TEST BY DATE

TOTAL DISSOLVED SOLIDS mg/l TEMPERATURE °C pH SILICA (SiO_2) mg/l

CONDUCTANCE μmhos/cm AT 25°C TOTAL IRON (Fe) mg/l TOTAL HARDNESS ($CaCO_3$) mg/l

TOTAL ALKALINITY ($CaCO_3$) mg/l PHEN. ALKALINITY ($Ca\ CO_3$) mg/l MANGANESE(Mn) mg/l

COLOUR ODOUR TURBIDITY

ANIONS	mg/l	epm	CATIONS	mg/l	epm
CARBONATE (CO_3)			CALCIUM (Ca)		
BICARBONATE (HCO_3)			MAGNESIUM (Mg)		
SULPHATE (SO_4)			SODIUM (Na)		
CHLORIDE (Cl)			POTASSIUM (K)		
$NO_2 + NO_3$ (NITROGEN)			IRON (DISSOLVED)		
• TKN. (NITROGEN)					
PHOSPHORUS (P)					

• TKN = TOTAL KJELDAHL NITROGEN CHEMISTRY SITE NO.

NO_2 = NITRITE NO_3 = NITRATE

CHEMISTRY FIELD TESTS

TEST BY DATE EQUIPMENT USED

LITHOLOGY

FROM	TO	DESCRIPTION
0	1'	GRASSY TOP SOIL
1'	2'	SILT
2'	4'	SILTY GRAVEL
4'	57'	SANDY SILT
57'	64'	SILTY SAND MAKING WATER

CONTENTS OF FOLDER

☒ DRILL LOG ☐ PUMP TEST DATA ☐ CHEMICAL ANALYSIS

☐ SIEVE ANALYSIS ☐ GEOPHYSICAL LOGS ☐ REPORT

OTHER

SOURCES OF INFORMATION DRILLER

82F.022.4.2.3 WTN 35658

12

WATER WELL RECORD

DEPT. OF ENVIRONMENT, WATER RESOURCES SERVICE, WATER INVESTIGATIONS BRANCH VICTORIA, BRITISH COLUMBIA

LEGAL DESCRIPTION: LOT A SEC. ____ TP. ____ R. ____ D.L. 4598 LAND DISTRICT KOOTENAY PLAN 11769

DESCRIPTIVE LOCATION SOUTH 1ST AVE. LICENCE NO. ____ DATE 76-8-26

Z ____ WELL NO. ____ E ____ N ____

Z 4 X 11 Y 5 NO. 6

WELL LOG MAP

NAT. TOPO. SHEET NO. 3

OWNER'S NAME CITY OF CASTLEGAR ADDRESS CASTLEGAR.

DRILLER'S NAME PACIFIC P&P. ADDRESS CASTLEGAR DATE COMPLETED 76-9-5

DEPTH 364' ELEVATION OF (109) ☐ ESTIMATED ☐ SURVEYED CASING DIAM. 16" 12" 8" LENGTH PULLED PULLED PULLED.

METHOD OF CONSTRUCTION ____ CASING DIAM ____ LENGTH ____

SCREEN LOCATION ____ SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

SANITARY SEAL YES ☐ NO ☐ SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

PERFORATED CASING ☐ LENGTH ____ PERFORATIONS FROM ____ TO ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

DISTANCE TO WATER ____ ☐ ESTIMATED WATER LEVEL

FROM ____ ☐ MEASURED ELEVATION ____ ARTESIAN PRESSURE ____

DATE OF WATER LEVEL MEASUREMENT ____ WATER USE ____

PRODUCTION TEST SUMMARY

DATE ____

TEST BY ____

BAIL TEST ☐ PUMP TEST ☐ DURATION OF TEST ____

RATE ____ DRAWDOWN ____

WATER LEVEL AT COMPLETION OF TEST ____

AVAILABLE DRAWDOWN ____ SPECIFIC CAPACITY ____

PERMEABILITY ____ STORAGE COEFF. ____

TRANSMISSIVITY ____

RECOMMENDED PUMPING RATE ____

RECOMMENDED PUMP SETTING ____

CHEMISTRY

TEST BY ____ DATE ____

TOTAL DISSOLVED SOLIDS ____ mg/l TEMPERATURE ____ °C pH ____ SILICA (SiO_2) ____ mg/l

CONDUCTANCE ____ μmhos/cm AT 25°C TOTAL IRON (Fe) ____ mg/l TOTAL HARDNESS ($CaCO_3$) ____ mg/l

TOTAL ALKALINITY ($CaCO_3$) ____ mg/l PHEN. ALKALINITY ($Ca\ CO_3$) ____ mg/l MANGANESE (Mn) ____ mg/l

COLOUR ____ ODOUR ____ TURBIDITY ____

ANIONS	mg/l	epm	CATIONS	mg/l	epm
CARBONATE (CO_3)			CALCIUM (Ca)		
BICARBONATE (HCO_3)			MAGNESIUM (Mg)		
SULPHATE (SO_4)			SODIUM (Na)		
CHLORIDE (Cl)			POTASSIUM (K)		
$NO_2 + NO_3$ (NITROGEN)			IRON (DISSOLVED)		
• TKN. (NITROGEN)					
PHOSPHORUS (P)					

• TKN = TOTAL KJELDAHL NITROGEN CHEMISTRY SITE NO. ____

NO_2 = NITRITE NO_3 = NITRATE

CHEMISTRY FIELD TESTS

TEST BY ____ DATE ____ EQUIPMENT USED ____

CONTENTS OF FOLDER

☐ DRILL LOG ☐ PUMP TEST DATA ☐ CHEMICAL ANALYSIS

☐ SIEVE ANALYSIS ☐ GEOPHYSICAL LOGS ☐ REPORT

OTHER ____

SOURCES OF INFORMATION Driller, Bill Hadikin - City of Castlegar Foreman (Telephone)

LITHOLOGY

FROM	TO	DESCRIPTION
0'	3'	SILT WITH STONES.
3'	7'	OLD FILL, STONES & ASPHALT.
7'	12'	GRAVEL & BOULDERS.
12'	15'	BRWN SILT.
15'	40'	fine SILTY SAND.
40'	132'	fine grey SAND & SILT
132'	134'	SILTY SAND W/SHARP RR gravel
134'	192'	Very fine grey SAND & SILT
192'	226'	COMPACT SILT WITH thin SAND lines
226'	259'	VERY fine grey SAND & SILT
259'	301'	HARD SAND SILT
301'	309'	fine SAND (grey) W/thin SILT INTERBEDS
309'	364'	HARD SANDY SILT W/very THIN SAND LAYERS.
		NO AQUIFER.
		HOLE #1
		See More Inside

BRITISH COLUMBIA

Well Summary

Well Tag Number: 124984
Well Status: New
Observation Well Number:
Well Identification Plate Number: 66954
Well Class: Water Supply
Observation Well Status:
Owner Name: mattson
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number: 501
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

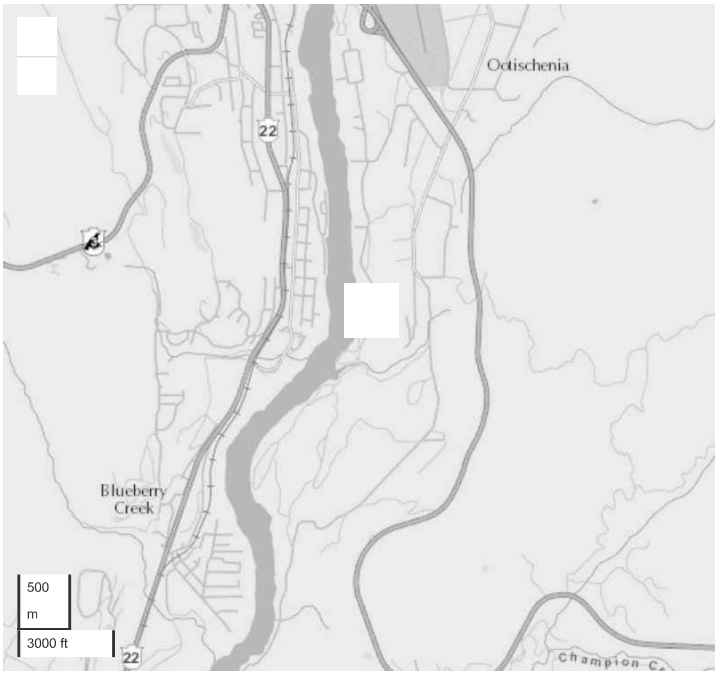
Location Information

Street Address: 695 waterloo road
Town/City: castlegar

Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	030905711

Description of Well Location: on lot



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.26526
Longitude: -117.63919
UTM Easting: 453497
UTM Northing: 5457141
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2022-02-10	2022-02-10	J.R. Drilling Ltd.	February 14th 2022 at 8:05 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2022-02-10	2022-02-10				

Well Completion Data

Total Depth Drilled: 75 ft bgl
Estimated Well Yield: 30 USgpm
Static Water Level (BTOC): 11 feet btoc
Finished Well Depth: 75 ft bgl
Well Cap: sealed
Artesian Flow:
Final Casing Stick Up: 16 inches
Well Disinfected Status: Disinfected
Artesian Pressure (head):
Depth to Bedrock:
Drilling Method: Dual Rotary
Artesian Pressure (PSI):
Ground elevation:
Method of determining elevation:
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	20	till	loose	Dry	tan	Loose		
20	60	silt	loose	Wet	grey	Loose		
60	75	sand gravel	loose	Wet	tan	Loose		

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	75	Production casing	Steel	6	250	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth:
Surface Seal Thickness: 2 inches
Surface Seal Depth: 16 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method: Screen
Type: Telescope
Material: Stainless Steel
Opening: Continuous Slot
Bottom: Bail
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
71.00	75.00	5.00	Screen	30.00

Well Development

Developed by: Air lifting
Development Total Duration: 3 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 30 USgpm
Estimation Duration: 3 hours
Static Water Level Before Test: 19 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

No comments submitted

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

7 4 2 1	7 4 2 1	6 5 4 C E	2 1	7 4 2 1	2 1	7 4 2 1	NE SE SW NW	4 2 1	7 4 2 1
UNITS.	MUNICIPALITY	MERIDIAN	TENS	UNITS	TENS	UNITS	QUARTER	TENS	UNITS
			RANGE		SECTION			LAND DISTRICT	

82F.022.4.2.3 2

WTN 26939 GROUND — WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C. Z4-XII-74

LOCATION BLKS-7 DL 1236 PI 2767 NEAR KINNARD 5.OF West Kootenay 82F/5bE
(COMPLETE LEGAL DESCRIPTION)

OWNER'S NAME J. Trousdale ADDRESS Fruitdale #1

DRILLER'S NAME P P + P (109) ADDRESS Castlegar DATE OF COMPLETION sept 12/72

DEPTH 54 ELEVATION OF COLLAR _____ CASING DIAM. 6" LENGTH _____ TYPE _____

METHOD OF DIGGING cabletool SCREEN ☒ SIZE #20 LENGTH _____ TYPE _____

LOCATION OF SCREEN bottomed at 50ft. DEVELOPED ☐ DESCRIBE _____

PERFORATED CASING ☐ LENGTH _____ LOCATION OF PERFORATIONS _____

GRAVEL PACK ☐ LENGTH _____ DIAM. _____ SIZE GRAVEL, ETC. _____

PUMP ☐ TYPE _____ POWER _____

CAPACITY _____ OTHER DATA _____

COSTS WELL _____ PUMP _____ PUMP HOUSE, ETC. _____

MAINTENANCE _____

DISTANCE TO WATER FROM TOP OF CASING 44' ☐ ESTIMATED ☒ MEASURED ELEVATION _____ FLUCTUATION _____

HIGH WATER _____ MONTH _____ LOW WATER _____ MONTH _____ OBSERVATION DATA ☐ FILE No. _____

WATER USE _____

MAX. RATE WITHDRAWAL ☐ ESTIMATED ☐ MEASURED _____

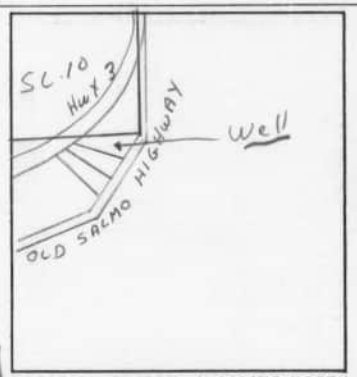
TEMPERATURE _____ PUMPS SAND ☐ _____

CLOGS SCREEN ☐ TYPE DEPOSIT _____ AQUIFER DATA _____

LICENSE No _____ DATE LICENSE _____ AMOUNT _____

DATE APPLICATION _____ USE _____

82F/4-21



SHT # 3 LOCATION SKETCH—INDICATE NORTH

WATER QUALITY: ANALYSIS; SOFT; HARD; HIGH IRON; HIGH SULPHUR; SALTY; ALKALINE; SALINE; POLLUTED; INADEQUATE QUALITY

CAPACITY GPD.: DRY HOLE; INADEQUATE QUANTITY; PUMPING TEST; $0 - 10^3$; $10^3 - 10^4$; $10^4 - 10^5$; $10^5 - 10^6$; 10^6

METHOD: DUG; DRIVEN; DRILLED; JETTED; BORED

DEPTH: 0 — 25; 25 — 50; 50 — 100; 100 — 200; 200 — 400; >400

OBSERVATION; ABANDONED; DEVELOPED; SCREEN; PERF. CASING; GRAVEL ENV.; PUMP

TYPE WELL: FLOWING; NON-FLOW ARTESIAN; WATER TABLE; PART CONFINED

ROCK; SPRING

VISIrecord® 12708

SUPPLY AQUIFER		OTHER AQUIFER PRESENT		OTHER AQUIFER PRESENT		CHARACTER OF SUPPLY AQUIFER			WATER USE							RELIABILITY OF DATA		
TENS	UNITS	TENS	UNITS	TENS	UNITS	SAND	GRAVEL	TILL	DOMESTIC	GARDEN	STOCK	COOLING	IRRIGATION	INDUSTRIAL	WATERWORKS	GOOD	FAIR	POOR
																4	4	6

LOG

FROM	TO	DESCRIPTION	NAME
0	12	dirt and boulders	
12	22	silty gravel	
	28	clay layer	
	42	sand medium	
	50	medium and coarse sand	
	54	till	
		pulled back to 50ft. and installed screen	
	s	pumping water level at 10gpm 47ft.	

SAMPLE No. _____ DATE _____

LAB _____

COLIFORM ORGANISMS _____

TOTAL BACTERIA _____

COLOUR _____ ODOUR _____

TASTE _____

PUMPING TEST SUMMARY

TEST BY _____

DATE _____ FILE No _____

SPECIFIC CAPACITY _____ PERMIABILITY _____

STORAGE COEFF _____ TRANSMISSIBILITY _____

REMARKS _____

ANALYSIS

	PPM
Total Hardness	
Carbonate Hard	
Magnesium Hard	
Fe	
SO_2	
Ca	
Mg	
Na	
K	
HCO_3	
CO_3	
Cl	
SO_4	
NO_3	
B	
E	
Total Dis-solids	
Total Alkalinity	
Suspended Solids	
Ph	

OTHER DATA

SIZE ANALYSIS ETC _____

CARD BY EHT DATE MAR/73

SOURCES INFORMATION PACIFIC PUMP & PRESSURE

VISIrecord®
12717

BRITISH COLUMBIA

Well Summary

Well Tag Number: 121104
Well Status: New
Observation Well Number:
Well Identification Plate Number: 43383
Well Class: Water Supply
Observation Well Status:
Owner Name: Regional District of Central Kootenay
Well Subclass: Not Applicable
Environmental Monitoring System (EMS) ID:
Intended Water Use: Private Domestic
Aquifer Number: 1283
Alternative specs submitted: No
Artesian Condition: No
Technical Report: N/A
Drinking Water Area Indicator: No

Licensing Information

Licensed Status: Unlicensed
Licence Number:

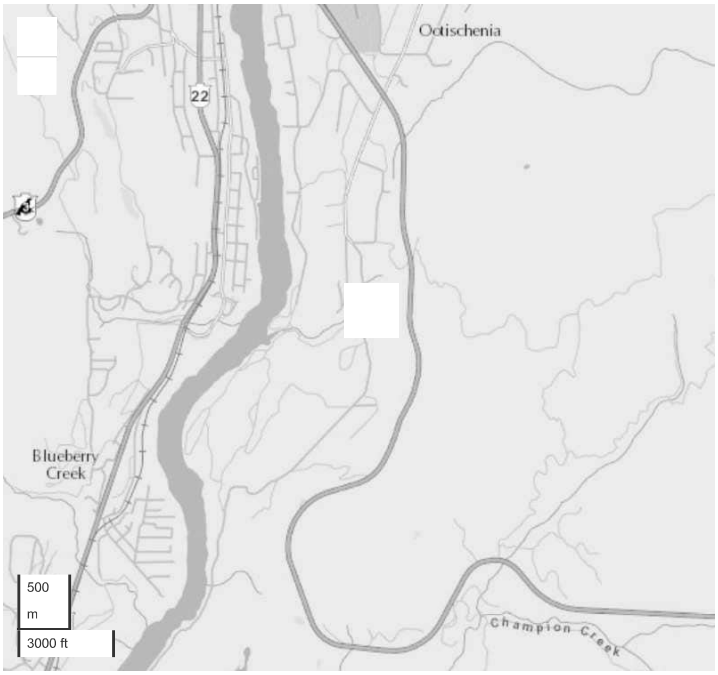
Location Information

Street Address: 671 Columbia Rd
Town/City: Castlegar

Legal Description:

Lot	23
Plan	NEP 34X
District Lot	4598
Block	
Section	
Township	
Range	
Land District	26
Property Identification Description (PID)	017288568

Description of Well Location: Ootischenia Land Fill Pl NEP 34X DL 4598 KD Subsidy Lot 23, (EXC (1) RW PLS 11 & 29 & (2) PLS 6599 & 6690; SEE 07315.151 & 07315.155 Leased Portions



MapBox | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 49.26232
Longitude: -117.63044
UTM Easting: 454131
UTM Northing: 5456809
Zone: 11
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2020-05-20	2020-05-26	Owen's Drilling Ltd.	August 10th 2020 at 11:05 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2020-05-20	2020-05-26				

Well Completion Data

Total Depth Drilled: 350 ft bgl
Estimated Well Yield: 12 USgpm
Static Water Level (BTOC): 210 feet btoc
Finished Well Depth: 345 ft bgl
Well Cap: Bolt On
Artesian Flow:
Final Casing Stick Up: 18 inches
Well Disinfected Status:
Artesian Pressure (head):
Depth to Bedrock: 344 feet bgl
Drilling Method: Air Rotary
Artesian Pressure (PSI):
Ground elevation: 1607 feet
Method of determining elevation: GPS
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	8	fine sand, silt	soft	Dry	brown	Soft	some gravel	
8	90	sand, gravel	medium-grained	Damp	brown	Medium	damp	
90	183	fine sand, silt	soft	Dry	brown	Soft		
183	335	silt, gravel	medium-grained	Dry	grey	Medium	boulders	
335	344	sand, gravel	medium-grained	Damp	grey	Medium	silty	
344	345	fractured bedrock	hard	Damp	green	Hard		
345	350	bedrock	hard	Wet	green	Hard		12

Casing Details

From	To	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0	345	Surface casing	Steel	6	219	Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured
Backfill Depth: 1 feet
Surface Seal Thickness: 2 inches
Surface Seal Depth: 20 feet

Liner Details

Liner Material:
Liner Diameter:
Liner Thickness:
Liner from:
Liner to:
Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:
Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting
Development Total Duration: 4 hours

Well Yield

Estimation Method: Air Lifting
Estimation Rate: 12 USgpm
Estimation Duration: 4 hours
Static Water Level Before Test: 210 ft (btoc)
Drawdown:
Hydrofracturing Performed: No
Increase in Yield Due to Hydrofracturing:

Well Decommission Information

Reason for Decommission:
Method of Decommission:
Sealant Material:
Backfill Material:
Decommission Details:

Pumping Test Information and Aquifer Parameters

Start Date	Description	Test Duration (min)	Boundary Effect	Storativity	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)	Specific Yield	Specific Capacity (L/s/m)	Analysis Method	Comments
There are no records to show										

Comments

No comments submitted

Documents

Well Number	Document Type	Date Of Upload	Document Status	Uploaded Document

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA
Ministry of Environment

☑ **Well Construction Report**
☐ **Well Closure Report**
☐ **Well Alteration Report**

082F 022 421 #6

Owen's Drilling

Stamp company name/address/ phone/fax/e-mail here, if desired.

Ministry Well ID Plate Number: 86983
Ministry Well Tag Number: 93226
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. **See reverse for notes & definitions of abbreviations.**

Owner name: Nola Partington + Doug McLean
Mailing address: 618 Columbia Rd Town Cashegar Prov. BC Postal Code V1J 4K6
Well Location: Address: Street no. ____ Street name Columbia Rd Town Cashegar, BC
(or) Legal description: Lot 1 Plan 6690 D.L. 4598 Block ____ Sec. ____ Twp. ____ Rg. ____ Land District KD
(or) PID: 008-752-330 (and) Description of well location (attach sketch, if nec.): ____

NAD 83: Zone: 11 (see note 2) (and) UTM ~~Northing~~ east: 0454339 m (or) Latitude (see note 3): ____
UTM ~~Easting~~ north: 5456302 m Longitude: ____

Method of drilling: ☑ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): ____
Orientation of well: ☑ vertical ☐ horizontal Ground elevation: 1770 ft (asl) Method (see note 4): GPS
Class of well (see note 5): Water supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☑ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify): ____

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	15	Loose	Brown	Sand + gravel		
15	55	Med	Brown	Sand, gravel + boulders		
55	105	Med	Brown	Sand + clay		
105	115	Med	Grey	Broken bedrock		
115	235	Med	Grey	Bedrock	4	

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	120	6	Steel	.250	✓

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size

Surface seal: Type: Bentonite Depth: 15 ft
Method of installation: ☑ Poured ☐ Pumped Thickness: 2 in
Backfill: Type: ____ Depth: ____ ft
Liner: ☑ PVC ☐ Other (specify): ____
Diameter: 4½ in Thickness: ____ in
From: 95 ft (bgl) To: 235 ft (bgl) Perforated: From: ____ ft (bgl) To: ____ ft (bgl)

Intake: ☐ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☐ Pipe size
Screen material: ☐ Stainless steel ☐ Plastic ☐ Other (specify): ____
Screen opening: ☐ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☐ Plug ☐ Plate ☐ Other (specify): ____
Filter pack: From: ____ ft To: ____ ft Thickness: ____ in
Type and size of material: ____

Developed by:

☑ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): ____ Total duration: 1 hrs
Notes: ____

Well yield estimated by:

☐ Pumping ☑ Air lifting ☐ Bailing ☐ Other (specify): ____
Rate: 4 USgpm Duration: 1 hrs
SWL before test: ____ ft (btoc) Pumping water level: ____ ft (btoc)

Obvious water quality characteristics:

☐ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
Colour/odour: ____ Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): Mike Caldwell
Registration no. (see note 20): WDO5053905
Consultant (if applicable; name and company): ____

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the Water Act and the Ground Water Protection Regulation.

Signature of Driller Responsible: Mike Caldwell

Final well completion data:

Total depth drilled: 235 ft Finished well depth: 235 ft (bgl)
Final stick up: 12 in Depth to bedrock: 115 ft (bgl)
SWL: ____ ft (btoc) Estimated well yield: 4 USgpm
Artesian flow: ____ USgpm, or Artesian pressure: ____ ft
Type of well cap: Welded plate Well disinfected: ☐ Yes ☐ No
Where well ID plate is attached: Top of casing

Well closure information:

Reason for closure: ____
Method of closure: ☐ Poured ☐ Pumped
Sealant material: ____ Backfill material: ____
Details of closure (see note 17): ____

Date of work (YYYY/MM/DD):
Started: 2007/12/30 Completed: 2007/12/04
Comments: ____

PLEASE NOTE: The information recorded in this well report describes the works and hydrologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Sheet 1 of 1

BRITISH COLUMBIA
Ministry of Environment

☑ Well Construction Report
☐ Well Closure Report
☐ Well Alteration Report

082F 022 421 #4

Owen's drilling

Stamp company name/address/ phone/fax/e-mail here, if desired.

Ministry Well ID Plate Number: 36286
Ministry Well Tag Number: 93228
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Nola Partington + Doug McLean
Mailing address: 618 Columbia Rd Town Castlegar Prov. BC Postal Code V1N 4K6
Well Location: Address: Street no. _____ Street name _____ Town _____
(or) Legal description: Lot 1 Plan 6690 D.L. 4598 Block _____ Sec. _____ Twp. _____ Rg. _____ Land District KD
(or) PID: 008-759-330 (and) Description of well location (attach sketch, if nec.): _____

NAD 83: Zone: 11 (see note 2) (and) UTM ~~Northing~~ East: 0454335 m UTM ~~Easting~~ North: 5456266 m (or) Latitude (see note 3): _____ Longitude: _____

Method of drilling: ☑ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): _____
Orientation of well: ☑ vertical ☐ horizontal Ground elevation: 1778 ft (asl) Method (see note 4): GPS
Class of well (see note 5): Water Supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☑ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify): _____

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	15	Med	Brown	Sand + gravel		
15	35	Med	Brown	Sand + gravel		
35	55	Med	Brown	Sand		
55	90	Med	Brown	Sand + gravel		
90	95	Hard	Grey	Cased bedrock		
95	255	Hard	Grey	Bedrock	8	

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	95	6	Steel	.250	✓

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size

Surface seal: Type: Bentonite Depth: 15 ft
Method of installation: ☑ Poured ☐ Pumped Thickness: 3 in
Backfill: Type: _____ Depth: _____ ft
Liner: ☑ PVC ☐ Other (specify): _____
Diameter: 4 in Thickness: _____ in
From: 75 ft (bgl) To: 255 ft (bgl) Perforated: From: 235 ft (bgl) To: 255 ft (bgl)

Intake: ☐ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☐ Pipe size
Screen material: ☐ Stainless steel ☐ Plastic ☐ Other (specify): _____
Screen opening: ☐ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☐ Plug ☐ Plate ☐ Other (specify): _____
Filter pack: From: ____ ft To: ____ ft Thickness: _____ in
Type and size of material: _____

Developed by:

☑ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): _____ Total duration: 1 hrs
Notes: _____

Well yield estimated by:

☐ Pumping ☑ Air lifting ☐ Bailing ☐ Other (specify): _____
Rate: 8 USgpm Duration: 1 hrs
SWL before test: _____ ft (btoc) Pumping water level: _____ ft (btoc)

Obvious water quality characteristics:

☐ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
Colour/odour: _____ Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): Mike Caldwell
Registration no. (see note 20): WB05053905
Consultant (if applicable; name and company): _____

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.

Signature of Driller Responsible: Mike Caldwell

Final well completion data:

Total depth drilled: 255 ft Finished well depth: 255 ft (bgl)
Final stick up: 12 in Depth to bedrock: 90 ft (bgl)
SWL: _____ ft (btoc) Estimated well yield: _____ USgpm
Artesian flow: _____ USgpm, or Artesian pressure: _____ ft
Type of well cap: Welded plate Well disinfected: ☐ Yes ☐ No
Where well ID plate is attached: Top of casing

Well closure information:

Reason for closure: _____
Method of closure: ☐ Poured ☐ Pumped
Sealant material: _____ Backfill material: _____
Details of closure (see note 17): _____

Date of work (YYYY/MM/DD):

Started: 2007/12/17 Completed: 2007/12/18
Comments: _____

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Sheet 1 of 1

WTN 118342

BRITISH COLUMBIA The Best Place on Earth | Ministry of Environment

☑ Well Construction Report
☐ Well Closure Report
☐ Well Alteration Report

Stamp company name/address/ phone/fax/e-mail here, if desired.

Ministry Well ID Plate Number:
Ministry Well Tag Number: 47991
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. **See reverse for notes & definitions of abbreviations.**

Owner name: Roberta Foreman
Mailing address: 598 Baerg Rd Town Castlegar Prov. BC Postal Code V1N 4K6
Well Location: Address: Street no. Street name Town
(or) Legal description: Lot A Plan EPP17103 D.L. 4598 Block Sec. Twp. Rg. Land District Kootenay
(or) PID: (and) Description of well location (attach sketch, if nec.):

NAD 83: Zone: (see note 2) (and) UTM Easting: m UTM Northing: m (or) Latitude (see note 3): Longitude:

Method of drilling: ☑ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify):
Orientation of well: ☑ vertical ☐ horizontal Ground elevation: ft (asl) Method (see note 4):
Class of well (see note 5): Water Supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☑ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	91	Soft	Tan	Clean Sand		
91	96	Soft	Grey	Gravel with Sand		
96	111	Soft	Tan	Clean sand		
111	113	Med	Grey	Fractured Bedrock		
113	320	Med	DK Grey	Bedrock		
	152				Dry.	Large Fracture
	286				.5gpm	
	292				25gpm	
*	pump should be no greater than 10 gpm					

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	117	6 5/8	Steel	.219	HD

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size

Surface seal: Type: Bentonite Depth: 19 ft
Method of installation: ☑ Poured ☐ Pumped Thickness: 4 in
Backfill: Type: Soil Depth: 1 ft
Liner: ☑ PVC ☐ Other (specify):
Diameter: 4.5 in Thickness: .248 in
From: 100 ft (bgl) To: 300 ft (bgl) Perforated: From: 240 ft (bgl) To: 300 ft (bgl)

Intake: ☐ Screen ☐ Open bottom ☑ Uncased hole
Screen type: ☐ Telescope ☐ Pipe size
Screen material: ☐ Stainless steel ☐ Plastic ☐ Other (specify):
Screen opening: ☐ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☑ Bail ☐ Plug ☐ Plate ☐ Other (specify):
Filter pack: From: ft To: ft Thickness: in
Type and size of material:

Developed by:

☑ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): Total duration: 2 hrs
Notes: Water was clear after 53 mins

Well yield estimated by:

☐ Pumping ☑ Air lifting ☐ Bailing ☐ Other (specify):
Rate: 25 USgpm Duration: 2 hrs
SWL before test: 96 ft (btoc) Pumping water level: 290 ft (btoc)

Obvious water quality characteristics:

☑ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
Colour/odour: Clear Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): *Rec Chris Barking
Registration no. (see note 20): WA 0903201
Consultant (if applicable; name and company):

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.
Signature of Driller Responsible

Final well completion data:

Total depth drilled: 320 ft Finished well depth: 300 ft (bgl)
Final stick up: 38 in Depth to bedrock: 111 ft (bgl)
SWL: 96 ft (btoc) Estimated well yield: 25 USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: Rodent Free Well disinfected: ☑ Yes ☐ No
Where well ID plate is attached: Welded side of casing

Well closure information:

Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Date of work (YYYY/MM/DD):

Started: 2017 02 02 Completed: 2017 02 03
Comments: No guarantees for quality or quantity

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Sheet 1 of 1

082F.022.4.2.1

WTN 27110

2

Sheet 3

WATER WELL RECORD

MINISTRY OF ENVIRONMENT AND PARKS, WATER MANAGEMENT BRANCH — VICTORIA, BRITISH COLUMBIA

LEGAL DESCRIPTION: LOT ____ SEC. ____ TP. ____ R. ____ D.L. 1626 or 5163 LAND DISTRICT Kootenay PLAN 6690?

DESCRIPTIVE LOCATION Oatisechenia (L. Papoff) LICENCE NO. ____ DATE ____

Z ____ WELL NO. ____

____ E

____ N

Z ____ X ____ Y ____ NO. ____

NAT. TOPO. SHEET NO. ____

OWNER'S NAME DEPARTMENT OF HIGHWAYS ADDRESS Victoria

DRILLER'S NAME Pacific Pump & Pressure ADDRESS Castlegar DATE COMPLETED 13/10/72

DEPTH 45 ELEVATION OF 109 ☐ ESTIMATED ☐ SURVEYED CASING DIAM. 6" LENGTH ____

METHOD OF CONSTRUCTION Cabletool CASING DIAM ____ LENGTH ____

SCREEN LOCATION ____ SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

SANITARY SEAL YES ☐ NO ☐ SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

PERFORATED CASING ☐ LENGTH ____ PERFORATIONS FROM ____ TO ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

DISTANCE TO WATER DRY ☐ ESTIMATED WATER LEVEL

FROM ____ ☐ MEASURED ELEVATION ____ ARTESIAN PRESSURE ____

DATE OF WATER LEVEL MEASUREMENT ____ WATER USE ____

PRODUCTION TEST SUMMARY

DATE ____

TEST BY ____

BAIL TEST ☐ PUMP TEST ☐ DURATION OF TEST ____

RATE ____ DRAWDOWN ____

WATER LEVEL AT COMPLETION OF TEST ____

AVAILABLE DRAWDOWN ____ SPECIFIC CAPACITY ____

PERMEABILITY ____ STORAGE COEFF. ____

TRANSMISSIVITY ____

ESTIMATED WELL YIELD ____

RECOMMENDED PUMPING RATE ____

RECOMMENDED PUMP SETTING ____

CHEMISTRY

TEST BY ____ DATE ____

TOTAL DISSOLVED SOLIDS ____ mg/l TEMPERATURE ____ °C pH ____ SILICA (SiO_2) ____ mg/l

CONDUCTANCE ____ μmhos/cm AT 25°C TOTAL IRON (Fe) ____ mg/l TOTAL HARDNESS ($CaCO_3$) ____ mg/l

TOTAL ALKALINITY ($CaCO_3$) ____ mg/l PHEN. ALKALINITY ($Ca\ CO_3$) ____ mg/l MANGANESE (Mn) ____ mg/l

COLOUR ____ ODOUR ____ TURBIDITY ____

ANIONS	mg/l	epm	CATIONS	mg/l	epm
CARBONATE (CO_3)			CALCIUM (Ca)		
BICARBONATE (HCO_3)			MAGNESIUM (Mg)		
SULPHATE (SO_4)			SODIUM (Na)		
CHLORIDE (Cl)			POTASSIUM (K)		
$NO_2 + NO_3$ (NITROGEN)			IRON (DISSOLVED)		
• TKN. (NITROGEN)					
PHOSPHORUS (P)					

• TKN = TOTAL KJELDAHL NITROGEN CHEMISTRY SITE NO. ____

NO_2 = NITRITE NO_3 = NITRATE

CHEMISTRY FIELD TESTS

TEST BY ____ DATE ____ EQUIPMENT USED ____

LITHOLOGY

FROM	TO	DESCRIPTION
0	3	Top Soil
	17	Fine Sand
	28	Brown Silt
	44	Cemented Rock Chips & Some Smooth Pebbles
	45	Bedrock
		Dry

CONTENTS OF FOLDER

☐ DRILL LOG ☐ PUMP TEST DATA ☐ CHEMICAL ANALYSIS

☐ SIEVE ANALYSIS ☐ GEOPHYSICAL LOGS ☐ REPORT

OTHER See Other Card.

SOURCES OF INFORMATION ____

082F.022.4.2.1

7 4 2 1	7 4 2 1	6 5 4 C E	2 1	7 4 2 1	2 1	7 4 2 1	NE SE SW NW	4 2 1	7 4 2 1
UNITS	TENS	MUNICIPALITY	TENS	UNITS	TENS	UNITS	QUARTER	TENS	UNITS
			RANGE		SECTION			LAND DISTRICT	

3 Holes 82 F/6 ?

GROUND — WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C.

Sheet 3

LOCATION (COMPLETE LEGAL DESCRIPTION) Lot 1, DL 16260, Pl 6690. WTN 27111 West Kootenay

OWNER'S NAME Dept of Highways or SL 63 ADDRESS Victoria

DRILLER'S NAME P P + P (109) ADDRESS Castlegar DATE OF COMPLETION Oct. 13/72

82 E/5 WTN 27111

DEPTH 60, ~~45~~ ELEVATION OF COLLAR ____ CASING DIAM. 6" LENGTH ____ TYPE ____

METHOD OF DIGGING CABLE TOOL SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

LOCATION OF SCREEN ____ DEVELOPED ☐ DESCRIBE ____

PERFORATED CASING ☐ LENGTH ____ LOCATION OF PERFORATIONS ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

PUMP ☐ TYPE ____ POWER ____

CAPACITY ____ OTHER DATA ____

COSTS WELL ____ PUMP ____ PUMP HOUSE, ETC. ____

MAINTENANCE ____

DISTANCE TO WATER FROM TOP OF CASING DRY ☐ ESTIMATED ☐ MEASURED ELEVATION ____ FLUCTUATION ____

HIGH WATER ____ MONTH ____ LOW WATER ____ MONTH ____ OBSERVATION DATA ☐ FILE No. ____

WATER USE ____

MAX. RATE WITHDRAWAL ☐ ESTIMATED ☐ MEASURED ____

TEMPERATURE ____ PUMPS SAND ☐ ____

CLOGS SCREEN ☐ TYPE DEPOSIT ____ AQUIFER DATA ____

LICENSE No ____ DATE LICENSE ____ AMOUNT ____

DATE APPLICATION ____ USE ____

MAP ATTACHED

LOCATION SKETCH—INDICATE NORTH

N

Location: Ootisehenia (L. Popoff) 49° 117°

SOUTH ~~the~~ of Castlegar

WATER QUALITY: ANALYSIS; SOFT; HARD; HIGH IRON; HIGH SULPHUR; SALTY; ALKALINE; SALINE; POLLUTED; INADEQUATE QUALITY

CAPACITY GPD: DRY HOLE; INADEQUATE QUANTITY; PUMPING TEST; $0 - 10^3$; $10^3 - 10^4$; $10^4 - 10^5$; $10^5 - 10^6$; 10^6

METHOD: DUG; DRIVEN; DRILLED; JETTED; BORED

DEPTH: 0 — 25; 25 — 30; 50 — 100; 100 — 200; 200 — 400; >400

OBSERVATION; ABANDONED; DEVELOPED; SCREEN; PERF. CASING; GRAVEL ENV.; PUMP

TYPE WELL: FLOWING; NON-FLOW ARTESIAN; WATER TABLE; PART CONFINED

SUPPLY AQUIFER		OTHER AQUIFER PRESENT		OTHER AQUIFER PRESENT		CHARACTER OF SUPPLY AQUIFER			WATER USE							RELIABILITY OF DATA			ROCK / SPRING
UNITS	TENS	UNITS	TENS	UNITS	TENS	SAND	GRAVEL	TILL	DOMESTIC	GARDEN	STOCK	COOLING	IRRIGATION	INDUSTRIAL	WATERWORKS	GOOD	FAIR	POOR	
1 2 4 7	1 2 4 7	1 2 4 7	1 2 4 7	1 2 4 7	1 2 4 7														

VISIrecord® 12708

LOG

FROM	TO	DESCRIPTION	NAME
		Hole # 1	
0	2	top soil	
	35	fine brown sand	
	53	hard cemented rock chips (till)	
	55	bed-rock decomposed	
	60	hard solid rock	
		Jole # 2	
0	3	Top soil	
	17	fine sand	
	28	brown silt	
	44	cemented rocks chips some smooth pebbles and boulders	
	45	bedrock	
		pulled casing amd left site thw shallowness and type of overburden are not encouraging at all that water might be found in the area.	
		JUNE 81	
		No L. Popoff in phone book.	
		Asked Double I Drilling & he gave me directions.	
		Mr. Popoff had about 3 or 4 holes drilled.	
		SEE 82.022.4.2.1	
		Presently get water from a spring.	
		Not completely sure about locations pin pointed. Didn't know exactly which holes were which.	

SAMPLE No. _____ DATE _____

LAB _____

COLIFORM ORGANISMS _____

TOTAL BACTERIA _____

COLOUR _____ ODOUR _____

TASTE _____

PUMPING TEST SUMMARY

TEST BY _____

DATE _____ FILE No. _____

SPECIFIC CAPACITY _____ PERMIABILITY _____

STORAGE COEFF _____ TRANSMISSIBILITY _____

REMARKS _____

ANALYSIS

	PPM
Total Hardness	
Carbonate Hard	
Magnesium Hard	
Fe	
SO_2	
Ca	
Mg	
Na	
K	
HCO_3	
CO_3	
Cl	
SO_4	
NO_3	
B	
E	
Total Dis-solids	
Total Alkalinity	
Suspended Solids	
Ph	

OTHER DATA

SIZE ANALYSIS. ETC. _____

CARD BY EHT MAR 173

SOURCES INFORMATION PACIFIC PUMP & PRESSURE

VISIrecord®

12717

Appendix D Site Photographs

Hydrogeology and Hydrology Characterization Report

Ootischenia Landfill

Regional District of Central Kootenay

SLR Project No.: 219.030089.00001

November 29, 2024

Appendix D Site Photographs

Photo 1: Landfill entrance (May 2, 2024)



Photo 2: Main entrance and weigh scale (May 2, 2024)



Photo 3: Landfill boundary fence (May 2, 2024)



Photo 4: Recycling bins in entrance area (May 2, 2024)



Photo 5: View of metal storage and recycling area (May 2, 2024)



Photo 6: Top of active landfill mound (May 2, 2024)



Photo 7: Active landfill face (May 2, 2024)	Photo 8: Primary septic settling pond (May 2, 2024)	Photo 9: Septic settling pond area (May 2, 2024)
		
Photo 10: Lower landfill catchment area (May 2, 2024)	**Photo 11: Lower access road (May 2, 2024)**	**Photo 12: Surface water drainage into catchment (May 2, 2024)**
		

Photo 13: Landfill slope and lower access (SW) (May 2, 2024)	Photo 14: Lower access road (May 2, 2024)	Photo 15: Landfill cover material pit (May 2, 2024)
		
Photo 16: View of MW16-05 (May 2, 2024)	**Photo 17: View of MW1-95 (May 2, 2024)**	**Photo 18: View of landfill mound (S) (May 2, 2024)**
		

Photo 19: View of MW14-3 (May 2, 2024)	Photo 20: View of MW14-2 (May 2, 2024)	Photo 21: MW17-02 (May 2, 2024)
		
Photo 22: Steep embankment near SW1-08 (May 2, 2024)	**Photo 23: Water well and underground septic tank (May 2, 2024)**	**Photo 24: Lower landfill access (May 2, 2024)**
		

Appendix E Parameter Concentrations Over Time

Hydrogeology and Hydrology Characterization Report

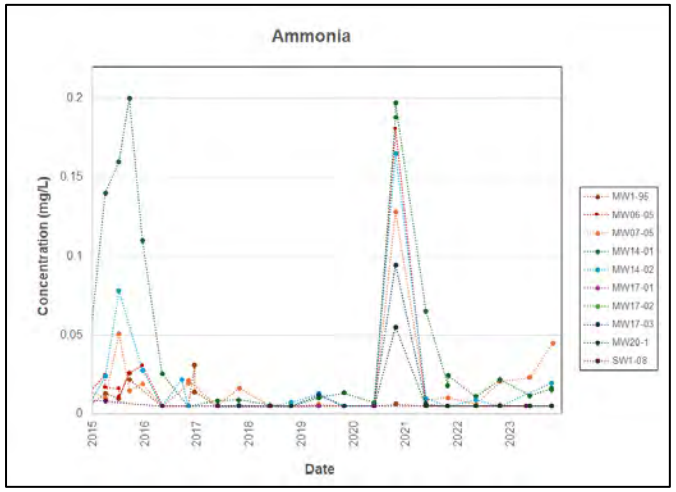
Ootischenia Landfill

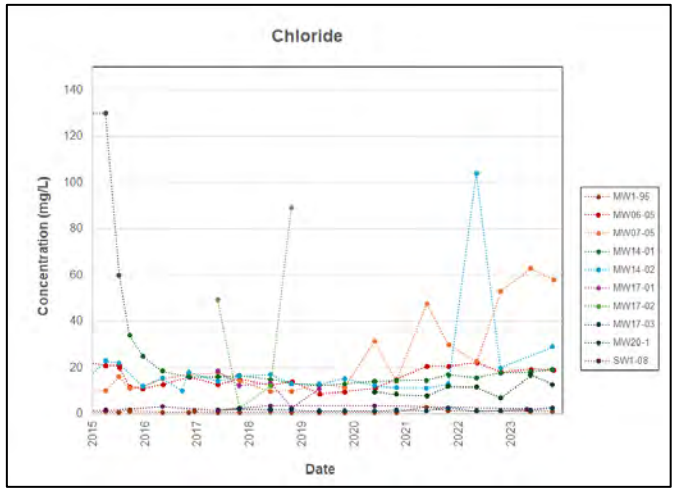
Regional District of Central Kootenay

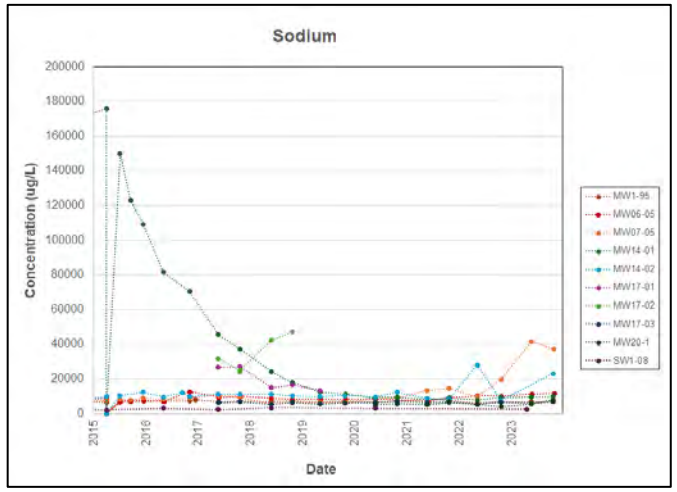
SLR Project No.: 219.030089.00001

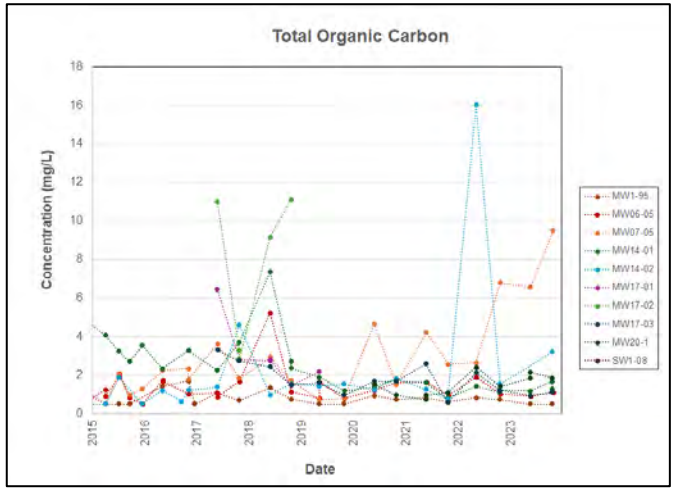
November 29, 2024

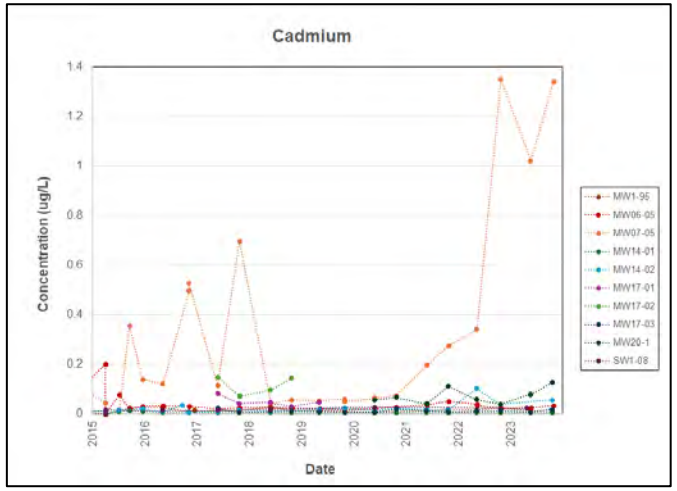
CONCENTRATION VERSUS TIME

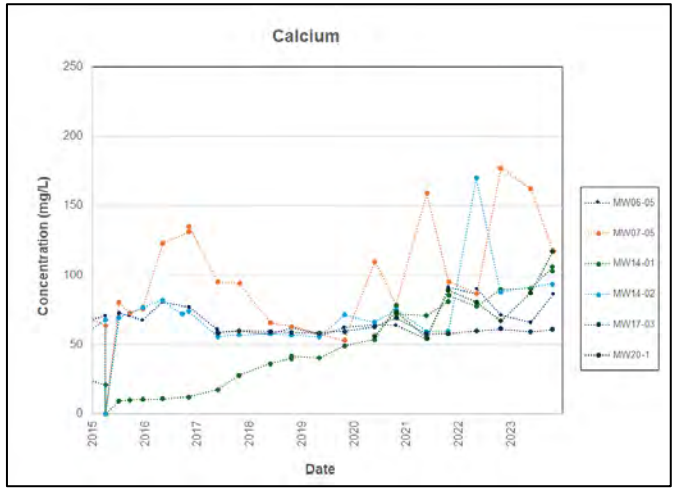




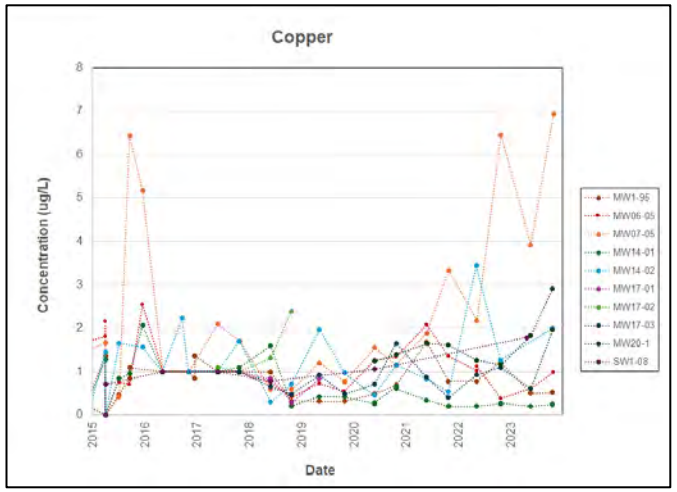


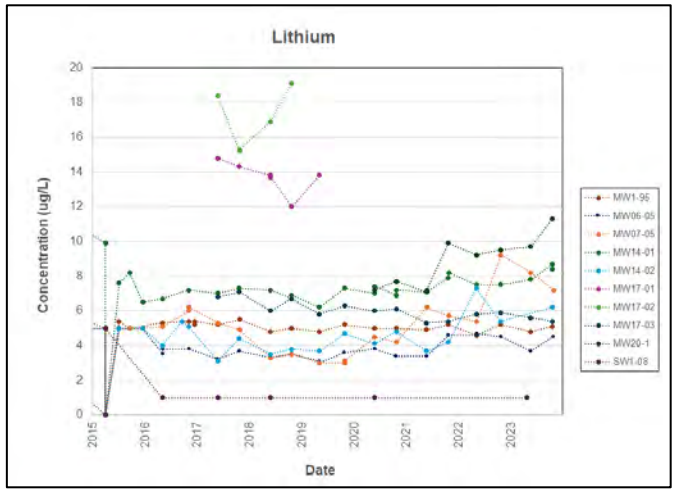


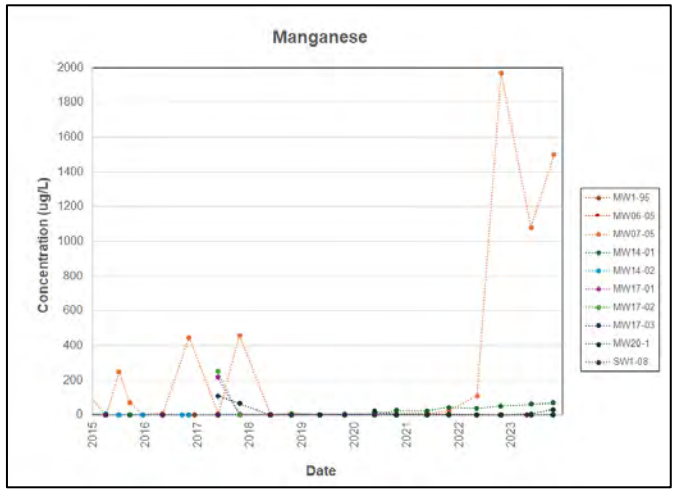


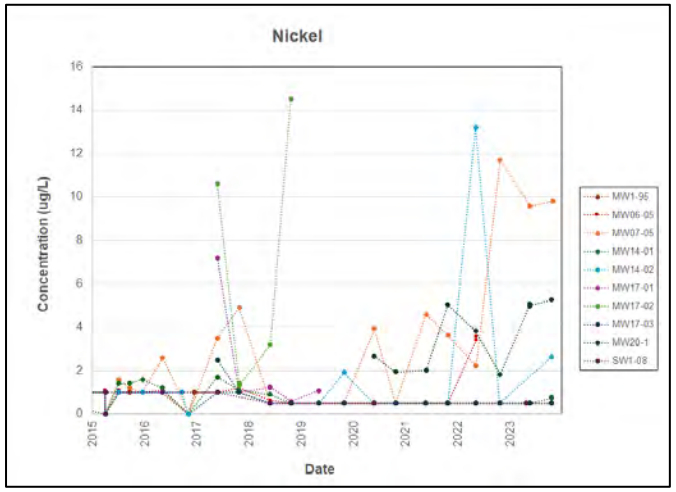


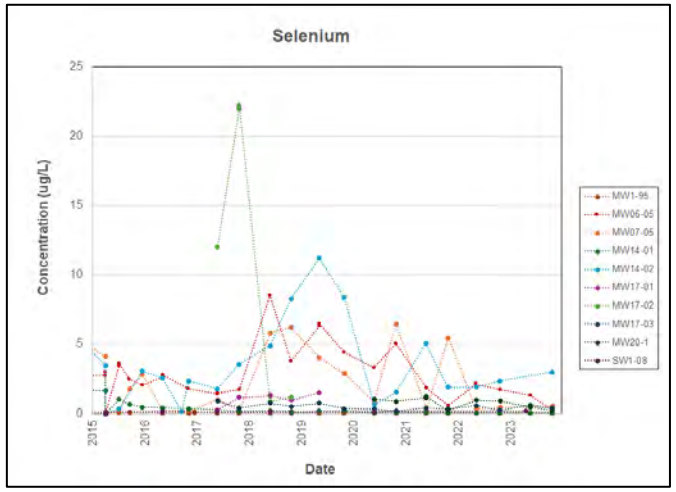
CONCENTRATION VERSUS TIME

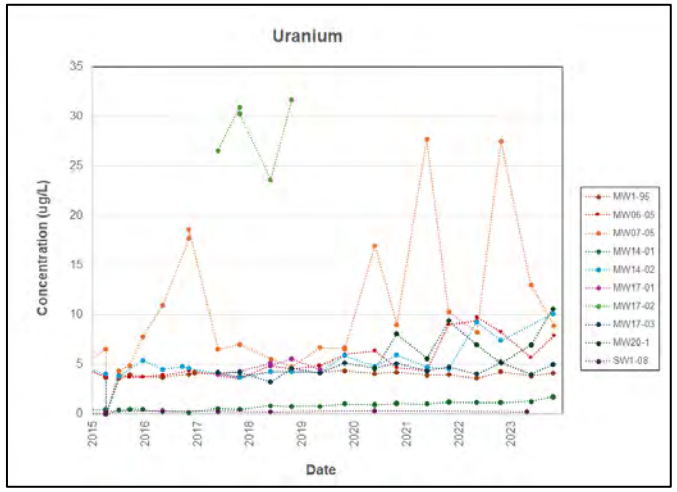














Making Sustainability Happen

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	**41010**	**Requisitions**			**(1,456,039.20)**	**(1,456,039.20)**	(1,601,643.12)	***(1,572,522.34)***	**(1,682,598.90)**	**(1,733,076.87)**	**(1,785,069.17)**	**(1,838,621.25)**	**8% in 2025, 7% in 26 and 3% increase subsequent yrs**
2	41020	Grants in lieu of Taxes	OVR152-100	East RR Subregion Administration	(1,000.00)	(692.00)	(1,000.00)	***(1,000.00)***	(1,000.00)	(1,000.00)	(1,000.00)	(1,000.00)	Varies yr-to-yr
3	**41020**	**Grants in lieu of Taxes**			**(1,000.00)**	**(692.00)**	(1,000.00)	***(1,000.00)***	**(1,000.00)**	**(1,000.00)**	**(1,000.00)**	**(1,000.00)**	
4	42020	Sale of Services	OPR294-100	BOS-Facility O&M	(25,931.13)	(16,825.00)	(18,176.31)	***(18,507.50)***	(19,062.73)	(19,634.61)	(20,223.64)	(20,830.35)	Placeholder, based on projected with 10% increase to ALL tipping fees in 2025
5	42020	Sale of Services	OPR297-100	CRA-Facility O&M	(86,220.96)	(66,657.00)	(67,327.26)	***(73,322.70)***	(75,522.38)	(77,788.05)	(80,121.69)	(82,525.34)	Placeholder, based on projected with 10% increase to ALL tipping fees in 2025
6	42020	Sale of Services	OPR298-100	CRE-Facility O&M	(1,236,136.22)	(1,158,424.00)	(1,188,946.45)	***(1,274,266.40)***	(1,312,494.39)	(1,351,869.22)	(1,392,425.30)	(1,434,198.06)	Placeholder, based on projected with 10% increase to ALL tipping fees in 2025
7	**42020**	**Sale of Services**			**(1,348,288.31)**	**(1,241,906.00)**	(1,274,450.02)	***(1,366,096.60)***	**(1,407,079.50)**	**(1,449,291.88)**	**(1,492,770.64)**	**(1,537,553.76)**	**10% Increase in 2025; 3% all subsequent years**
8	42030	User Fees	OVR152-100	East RR Subregion Administration	(118,542.41)	(118,542.41)	(120,913.26)	***(120,913.26)***	(123,331.52)	(125,798.15)	(128,314.12)	(130,880.40)	Placeholder (WSDA, batteries, septage, metal)
9	**42030**	**User Fees**			**(118,542.41)**	**(118,542.41)**	(120,913.26)	***(120,913.26)***	**(123,331.52)**	**(125,798.15)**	**(128,314.12)**	**(130,880.40)**	
10	42035	User Fees - Specified	OPR589-100	ENV-East MARR Program reimbursement	(2,150.40)	(4,956.25)	(5,104.94)	***(5,104.94)***	(5,258.09)	(5,415.83)	(5,578.30)	(5,745.65)	MARR reimbursement, est based on freon costs, actuals tbd based on metal market flucuations.
11	**42035**	**User Fees - Specified**			**(2,150.40)**	**(4,956.25)**	(5,104.94)	***(5,104.94)***	**(5,258.09)**	**(5,415.83)**	**(5,578.30)**	**(5,745.65)**	
12	43020	Grants	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
13	43025	Grants - Specified	CAP1241-100	EAST - Curbside compost collection	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; OICP grant 2/3 of cost for RDCK portion of Creston; Rural program not proceeding.
14	**43025**	**Grants - Specified**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
15	43100	Proceeds from Borrowing	CAP1100-100	CRE LF-2020-Phase 1E Closure	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Project completed - remove
16	43100	Proceeds from Borrowing	CAP1226-100	CRE Landfill Closure Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	LT borrowing (2030 - $1.7M)
17	43100	Proceeds from Borrowing	CAP1227-100	CRE Landfill development Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; LT borrowing (Moved to Reserve funded)
18	43100	Proceeds from Borrowing	CAP1234-100	Legacy Landfills	0.00	0.00	0.00	***0.00***	0.00	0.00	(2,000,000.00)	0.00	LT borrowing
19	43100	Proceeds from Borrowing	CAP759-100	CRE LF - Phase 1C/D Closure, Stabilizing Berm, and Drainage	0.00	0.00	0.00	***0.00***	(2,031,480.00)	0.00	0.00	0.00	Phase 1C/D - long term
20	43100	Proceeds from Borrowing	CAP1115-100	TOC-2020/21-Septage Receiving Facility	(1,383,942.30)	0.00	(1,730,480.00)	***(1,730,480.00)***	0.00	0.00	0.00	0.00	Septage Receiving Station - Town of Creston WWTP, facility design 2024 and construction asap following funding approval.
21	**43100**	**Proceeds from Borrowing**			**(1,383,942.30)**	**0.00**	(1,730,480.00)	***(1,730,480.00)***	**(2,031,480.00)**	**0.00**	**(2,000,000.00)**	**0.00**	
22	43505	External Contributions & Contracts - Specified	OVR152-100	East RR Subregion Administration	0.00	0.00	(1,500.00)	***(1,500.00)***	(1,500.00)	(1,500.00)	(1,500.00)	(1,500.00)	BCUOMA contribution to HHW event
23	**43505**	**External Contributions & Contracts - Specified**			**0.00**	**0.00**	(1,500.00)	***(1,500.00)***	**(1,500.00)**	**(1,500.00)**	**(1,500.00)**	**(1,500.00)**	
24	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	(183,000.00)	(34,481.00)	(229,300.00)	***(296,300.00)***	(36,000.00)	(57,000.00)	(86,000.00)	(496,250.00)	Regular Reserves - CAP works not funded from borrowing
25	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	(300,000.00)	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Regular Reserves - LKB lands (moved to Stab reserve funded)
26	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	(300,000.00)	0.00	(515,000.00)	***(815,000.00)***	0.00	0.00	0.00	0.00	Stabilization reserves - 2024 $300k economic develop for LKB (rolled in 2025); 2025 $600K for LKB lands (increased value)
27	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	0.00	0.00	(225,000.00)	***(225,000.00)***	0.00	0.00	0.00	0.00	LL Reserves - 2025 - Phase 1C/D/berm design&tender
28	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	(115,399.00)	(19,520.00)	(95,879.00)	***(95,879.00)***	0.00	0.00	0.00	0.00	Growing Communities Fund (GCF) Allocation -CRE Septage Facility.
29	45000	Transfer from Reserves	OVR152-100	East RR Subregion Administration	(200,000.00)	(200,000.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	Transfer in from Reg Reserves for 24 pond cap works.
30	**45000**	**Transfer from Reserves**			**(1,098,399.00)**	**(254,001.00)**	(1,065,179.00)	***(1,432,179.00)***	**(36,000.00)**	**(57,000.00)**	**(86,000.00)**	**(496,250.00)**	

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
31	45500	Transfer from Other Service	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
32	**45500**	**Transfer from Other Service**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
33	45900	Transfer from Provisions	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Landfill Liability Fund
34	**45900**	**Transfer from Provisions**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
35	49100	Prior Year Surplus	OVR152-100	East RR Subregion Administration	(87,265.00)	(769,722.00)	38,632.03	***(35,457.34)***	0.00	0.00	0.00	0.00	Placeholder projected actual surplus/deficit; includes ARO surplus to be transferred to LL Reserve
36	49100	Prior Year Surplus	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Surplus to remain in service to fund carried over work - no surplus to carry over in 24
37	**49100**	**Prior Year Surplus**			**(87,265.00)**	**(769,722.00)**	38,632.03	***(35,457.34)***	**0.00**	**0.00**	**0.00**	**0.00**	
38	**TOTAL REVENUE**				**(5,495,626.62)**	**(3,845,858.86)**	(5,761,638.30)	***(6,265,253.47)***	**(5,288,248.00)**	**(3,373,082.73)**	**(5,500,232.23)**	**(4,011,551.06)**	
39	**TAXATION**				**(1,456,039.20)**	**(1,456,039.20)**	(1,601,643.12)	***(1,572,522.34)***	**(1,682,598.90)**	**(1,733,076.87)**	**(1,785,069.17)**	**(1,838,621.25)**	
40	**TIPPING FEES**				**(1,348,288.31)**	**(1,241,906.00)**	(1,274,450.02)	***(1,366,096.60)***	**(1,407,079.50)**	**(1,449,291.88)**	**(1,492,770.64)**	**(1,537,553.76)**	
41	**GRANTS**				**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
42	**BORROWING**				**(1,383,942.30)**	**0.00**	(1,730,480.00)	***(1,730,480.00)***	**(2,031,480.00)**	**0.00**	**(2,000,000.00)**	**0.00**	
43	**RESERVES**				**(1,098,399.00)**	**(254,001.00)**	(1,065,179.00)	***(1,432,179.00)***	**(36,000.00)**	**(57,000.00)**	**(86,000.00)**	**(496,250.00)**	
44	**CAP FUNDING SUBTOTAL**				**(2,482,341.30)**	**(254,001.00)**	(2,795,659.00)	***(3,162,659.00)***	**(2,067,480.00)**	**(57,000.00)**	**(2,086,000.00)**	**(496,250.00)**	
45	**TOTAL REVENUE (w/o Prior Year Surplus)**				**(5,408,361.62)**	**(3,076,136.86)**	(5,800,270.33)	***(6,229,796.13)***	**(5,288,248.00)**	**(3,373,082.73)**	**(5,500,232.23)**	**(4,011,551.06)**	
46	**TOTAL OPERATING REVENUE**				**(2,926,020.32)**	**(2,822,135.86)**	(3,004,611.33)	***(3,067,137.13)***	**(3,220,768.00)**	**(3,316,082.73)**	**(3,414,232.23)**	**(3,515,301.06)**	
47	51010	Salaries	OPR622-100	East Lead Hand	25,215.65	27,405.06	28,309.42	***28,309.42***	29,158.71	30,033.47	30,934.47	31,862.50	Lead Hand - 30% to allocation service; Based on Salary Worksheet (3% subsequent years); Includes $800 for CA
48	51010	Salaries	OPR650-100	Waste Spotters	53,857.15	39,786.24	0.00	***0.00***	0.00	0.00	0.00	0.00	Waste spotters - Moving to LFA (line below)
49	51010	Salaries	OVR152-100	East RR Subregion Administration	119,557.64	102,856.96	148,305.00	***165,192.63***	164,887.87	169,834.50	174,929.54	180,177.43	Attendants - based on Salaries worksheet (3.3%); 3% thereafter; added onboarding, training, misc hours, and LFA breaks.
50	**51010**	**Salaries**			**198,630.44**	**170,048.26**	176,614.42	***193,502.05***	**194,046.57**	**199,867.97**	**205,864.01**	**212,039.93**	
51	51020	Overtime	OPR622-100	Lead Hand East	2,000.00	1,000.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Reduced
52	51020	Overtime	OVR152-100	East RR Subregion Administration	2,000.00	500.00	500.00	***500.00***	500.00	500.00	500.00	500.00	Reduced
53	**51020**	**Overtime**			**4,000.00**	**1,500.00**	1,500.00	***1,500.00***	**1,500.00**	**1,500.00**	**1,500.00**	**1,500.00**	
54	51030	Benefits	OPR622-100	East Lead Hand	7,312.54	7,847.68	8,106.65	***8,106.65***	8,349.85	8,600.35	8,858.36	9,124.11	Lead Hand - based on salary worksheet
55	51030	Benefits	OPR650-100	East Waste Spotters	15,690.40	7,187.20	0.00	***0.00***	0.00	0.00	0.00	0.00	Waste spotters - Moving to LFA (line below)
56	51030	Benefits	OVR152-100	East RR Subregion Administration	29,889.41	19,403.52	43,008.59	***29,983.02***	30,882.51	31,808.99	32,763.26	33,746.15	Attendants, Based on Salary Worksheet (3.3%), 3% subsequent years
57	**51030**	**Benefits**			**52,892.35**	**34,438.40**	51,115.24	***38,089.67***	**39,232.36**	**40,409.33**	**41,621.61**	**42,870.26**	
58	51050	Employee Health & Safety	OPR294-100	BOS-Facility O&M	125.00	0.00	125.00	***125.00***	125.00	125.00	125.00	125.00	Site specific safety supplies
59	51050	Employee Health & Safety	OPR297-100	CRA-Facility O&M	125.00	0.00	125.00	***125.00***	125.00	125.00	125.00	125.00	Site specific safety supplies
60	51050	Employee Health & Safety	OPR298-100	CRE-Facility O&M	125.00	0.00	125.00	***125.00***	125.00	125.00	125.00	125.00	Site specific safety supplies

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	**Account**	**Account(T)**	**Work Order**	**Work Order(T)**	**2024 Budget**	**2024 Projected YE**	1st DRAFT '25 Budget from Nov '24 Review	***2025 Budget***	**2026 Budget**	**2027 Budget**	**2028 Budget**	**2029 Budget**	**2025 Notes**
61	51050	Employee Health & Safety	OVR152-100	East RR Subregion Administration	4,520.00	4,456.25	4,610.40	***4,610.40***	4,702.61	4,796.66	4,892.59	4,990.45	LFA, LH footwear, jackets, training, safety check-in monitoring, based on 2/3 provided by H&S coord.
62	**51050**	**Employee Health & Safety**			**4,895.00**	**4,456.25**	4,985.40	***4,985.40***	**5,077.61**	**5,171.66**	**5,267.59**	**5,365.45**	
63	51500	Directors - Allowance & Stipend	OVR152-100	East RR Subregion Administration	14,561.08	17,396.25	17,744.18	***17,744.18***	18,099.06	18,461.04	18,830.26	19,206.87	70% (20% to recycling and 10% to compost allocation) Based on up to 14 RR meetings (4 directors) + Chair at 4 other RRC meetings + Chair Stipend.
64	**51500**	**Directors - Allowance & Stipend**			**14,561.08**	**17,396.25**	17,744.18	***17,744.18***	**18,099.06**	**18,461.04**	**18,830.26**	**19,206.87**	
65	51560	Directors - Travel	OVR152-100	East RR Subregion Administration	4,183.22	1,632.00	3,000.00	***3,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	70% (20% recyclng & 10% organics) Based on up to 12 RR meetings (4 directors)
66	**51560**	**Directors - Travel**			**4,183.22**	**1,632.00**	3,000.00	***3,000.00***	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	
67	52010	Travel	OPR622-100	East Lead Hand	11,704.23	9,516.80	11,938.31	***11,938.31***	12,177.08	12,420.62	12,669.03	12,922.42	Lead Hand 70% - cash handling and gen site travel - assess cost vs. fleet
68	52010	Travel	OVR152-100	East RR Subregion Administration	1,000.00	300.00	500.00	***500.00***	500.00	500.00	500.00	500.00	Reduced; Landfill attendant - mileage for staff training/development/out of area shift coverage
69	**52010**	**Travel**			**12,704.23**	**9,816.80**	12,438.31	***12,438.31***	**12,677.08**	**12,920.62**	**13,169.03**	**13,422.42**	
70	52020	Education & Training	OVR152-100	East RR Subregion Administration	1,000.00	200.00	1,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	Field staff training/development; staff incentives
71	**52020**	**Education & Training**			**1,000.00**	**200.00**	1,000.00	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
72	53020	Admin, Office Supplies & Postage	OPR298-101	CRE-Environmental Monitoring	100.00	15.00	100.00	***100.00***	100.00	100.00	100.00	100.00	Limited budget
73	53020	Admin, Office Supplies & Postage	OPR622-100	East Lead Hand	300.00	20.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Limited budget
74	53020	Admin, Office Supplies & Postage	OVR152-100	East RR Subregion Administration	300.00	860.00	800.00	***800.00***	800.00	800.00	800.00	800.00	Limited budget
75	53020	Admin, Office Supplies & Postage	OVR152-302	East Subregion HW Events	300.00	137.50	200.00	***200.00***	200.00	200.00	200.00	200.00	Limited budget
76	**53020**	**Admin, Office Supplies & Postage**			**1,000.00**	**1,032.50**	1,100.00	***1,100.00***	**1,100.00**	**1,100.00**	**1,100.00**	**1,100.00**	
77	53030	Communication	OPR294-100	BOS-Facility O&M	768.77	742.50	764.78	***764.78***	787.72	811.35	835.69	860.76	Based on projected + 3%
78	53030	Communication	OPR297-100	CRA-Facility O&M	1,584.05	1,217.50	1,254.03	***1,254.03***	1,291.65	1,330.40	1,370.31	1,411.42	Based on projected + 3%
79	53030	Communication	OPR298-100	CRE-Facility O&M	1,975.21	3,597.50	3,705.43	***3,705.43***	3,816.59	3,931.09	4,049.02	4,170.49	Based on projected + 3%
80	53030	Communication	OPR622-100	East Lead Hand	97.50	187.50	193.13	***193.13***	198.92	204.89	211.03	217.36	Based on projected + 3%
81	53030	Communication	OPR613-100	CRE Compost Facility O&M	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; miscode should be A119; internet for compost facility
82	53030	Communication	OVR152-100	East RR Subregion Administration	455.00	281.25	289.69	***289.69***	298.38	307.33	316.55	326.05	Based on projected + 3%; LFA cell allowance + Zoleo for LH
83	**53030**	**Communication**			**4,880.52**	**6,026.25**	6,207.04	***6,207.04***	**6,393.25**	**6,585.05**	**6,782.60**	**6,986.08**	
84	53040	Advertising	OVR152-100	East RR Subregion Administration	1,500.00	1,000.00	2,000.00	***2,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Education/communication; 2025 residential cooking oil pilot
85	53040	Advertising	OVR152-302	East Subregion HW Events	1,000.00	500.00	500.00	***500.00***	500.00	500.00	500.00	500.00	Education/communication
86	**53040**	**Advertising**			**2,500.00**	**1,500.00**	2,500.00	***2,500.00***	**1,500.00**	**1,500.00**	**1,500.00**	**1,500.00**	
87	53050	Insurance	OPR294-100	BOS-Facility O&M	57.95	50.00	51.50	***51.50***	53.05	54.64	56.28	57.96	Based on projected + 3%
88	53050	Insurance	OPR297-100	CRA-Facility O&M	110.11	93.75	96.56	***96.56***	99.46	102.44	105.52	108.68	Based on projected + 3%
89	53050	Insurance	OPR298-100	CRE-Facility O&M	125.18	106.25	109.44	***109.44***	112.72	116.10	119.59	123.17	Based on projected + 3%
90	53050	Insurance	OVR152-100	East RR Subregion Administration	3,392.66	3,392.66	3,494.44	***3,494.44***	3,599.28	3,707.25	3,818.47	3,933.03	Based on projected + 3%

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	**Account**	**Account(T)**	**Work Order**	**Work Order(T)**	**2024 Budget**	**2024 Projected YE**	1st DRAFT '25 Budget from Nov '24 Review	***2025 Budget***	**2026 Budget**	**2027 Budget**	**2028 Budget**	**2029 Budget**	**2025 Notes**
91	**53050**	**Insurance**			**3,685.90**	**3,642.66**	3,751.94	***3,751.94***	**3,864.50**	**3,980.44**	**4,099.85**	**4,222.84**	
92	53070	Bad Debts	OVR152-100	East RR Subregion Administration	0.00	121.00	0.00	***0.00***	0.00	0.00	0.00	0.00	placeholder
93	**53070**	**Bad Debts**			**0.00**	**121.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
94	53080	Licence & Permits	OPR298-100	CRE-Facility O&M	600.00	300.00	100.00	***100.00***	100.00	100.00	100.00	100.00	Water licence $100 annually; LoO/wedge permit fees 2024
95	53080	Licence & Permits	OVR152-100	East RR Subregion Administration	3,960.00	4,237.20	4,300.00	***4,300.00***	4,300.00	4,300.00	4,300.00	4,300.00	scale software license (site specific)
96	53080	Licence & Permits	OVR152-100	East RR Subregion Administration	3,000.00	1,738.78	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	Drone software license (1/3)
97	53080	Licence & Permits	OPR298-101	CRE-Environmental Monitoring	800.00	213.65	800.00	***800.00***	800.00	800.00	800.00	800.00	LKB access agreement
98	**53080**	**Licence & Permits**			**8,360.00**	**6,489.63**	7,200.00	***7,200.00***	**7,200.00**	**7,200.00**	**7,200.00**	**7,200.00**	
99	54010	Legal	OVR152-100	East RR Subregion Administration	20,000.00	18,465.00	10,000.00	***10,000.00***	0.00	0.00	0.00	0.00	Land transaction expense
100	**54010**	**Legal**			**20,000.00**	**18,465.00**	10,000.00	***10,000.00***	**0.00**	**0.00**	**0.00**	**0.00**	
101	54040	Consulting Fees	OPR298-100	CRE-Facility O&M	8,000.00	3,600.00	20,000.00	***20,000.00***	8,000.00	8,000.00	20,000.00	8,000.00	Flare inspection, GHG reporting (as required), engineering oversight; landfill gas assessment in 2028
102	54040	Consulting Fees	OPR298-100	CRE-Facility O&M	5,000.00	0.00	5,000.00	***5,000.00***	0.00	0.00	80,000.00	0.00	2025 consultant support with Ministry discussions; Hydrogeo in 28
103	54040	Consulting Fees	OPR298-100	CRE-Facility O&M	80,000.00	0.00	80,000.00	***80,000.00***	0.00	0.00	0.00	0.00	Design, Operations & Closure Plan
104	54041	Consulting Fees	OPR298-101	CRE-Environmental Monitoring	10,000.00	5,000.00	5,000.00	***5,000.00***	0.00	0.00	0.00	0.00	Bentic Study sampling in 2024, some lab and reporting in 25
105	54042	Consulting Fees	OVR152-100	East RR Subregion Administration	0.00	761.50	0.00	***0.00***	0.00	0.00	0.00	0.00	FOI requests for legacy landfills.
106	**54020**	**Professional Fees**			**103,000.00**	**9,361.50**	110,000.00	***110,000.00***	**8,000.00**	**8,000.00**	**100,000.00**	**8,000.00**	
107	54030	Contracted Services	OPR294-100	BOS-Facility O&M	3,881.19	3,966.25	4,085.24	***4,085.24***	4,207.79	4,334.03	4,464.05	4,597.97	Biffy, general mainteance
108	54030	Contracted Services	OPR294-300	BOS Material Processing	150.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Tanks/tires
109	54030	Contracted Services	OPR294-301	BOS Snow Removal	11,786.25	9,880.00	10,176.40	***10,176.40***	10,481.69	10,796.14	11,120.03	11,453.63	Snow removal
110	54030	Contracted Services	OPR294-304	BOS Bin Haul	12,568.50	14,750.00	15,192.50	***16,667.50***	17,167.53	17,682.55	18,213.03	18,759.42	Jan 20 increased additional 10% to account for new WW handling; Subject to volumes; road restrictions, etc.
111	54030	Contracted Services	OPR297-100	CRA-Facility O&M	14,302.29	8,051.25	8,292.79	***8,292.79***	8,541.57	8,797.82	9,061.75	9,333.61	Biffy, fire, general mainteance
112	54030	Contracted Services	OPR297-300	CRA Material Processing	9,964.76	700.00	721.00	***721.00***	742.63	764.91	787.86	811.49	Tanks, wood (alternating years), tires, chip transport to CRE
113	54030	Contracted Services	OPR297-301	CRA Snow Removal	18,053.44	11,212.50	11,548.88	***11,548.88***	11,895.34	12,252.20	12,619.77	12,998.36	Snow removal
114	54030	Contracted Services	OPR297-304	CRA Bin Haul	19,870.20	28,500.00	29,355.00	***32,205.00***	33,171.15	34,166.28	35,191.27	36,247.01	Jan 20 increased additional 10% to account for new WW handling; Subject to volumes; road restrictions, etc.
115	54030	Contracted Services	OPR298-100	CRE-Facility O&M	372,547.76	340,955.00	351,183.65	***351,183.65***	361,719.16	372,570.73	383,747.86	395,260.29	Projected + 3% for annual increases; Landfill Ops, Fire; Septage hauling $16.5k.
116	54030	Contracted Services	OPR298-101	CRE-Environmental Monitoring	32,913.87	36,893.75	40,583.13	***44,500.00***	45,835.00	47,210.05	48,626.35	50,085.14	10% increase in 2025 due to expiry of monitoring and lab contract, then 3% increase per year after.
117	54030	Contracted Services	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***2,110.00***	2,173.30	2,238.50	2,305.65	2,374.82	Cbay & Destiny Bay former landfill environmental monitoring
118	54030	Contracted Services	OPR298-300	CRE Material Processing	97,739.62	97,739.62	100,671.81	***100,671.81***	103,691.96	106,802.72	110,006.80	113,307.00	Tanks, wood, tires
119	54030	Contracted Services	OPR423-100	YAH Facility O&M	10,973.83	9,905.00	10,202.15	***10,202.15***	10,508.21	10,823.46	11,148.16	11,482.61	Based on contract, current hours (2 days/week)
120	54030	Contracted Services	OVR152-100	East RR Subregion Administration	17,000.00	15,942.50	20,000.00	***20,000.00***	15,000.00	15,000.00	15,000.00	15,000.00	CKISS - 2025: $20k for BOS, CRA, CRE LF, New assessment at area surrounding compost facility.

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
121	54030	Contracted Services	OVR152-302	East Subregion HW Events	55,000.00	42,179.00	80,000.00	***80,000.00***	80,000.00	80,000.00	80,000.00	80,000.00	$36K for CRE event (plus $1k for flaggers and 30% EPR); subsequent years $70K for 2 events - or switch to Ecodepot operation contract
122	**54030**	**Contracted Services**			**676,751.70**	**620,674.87**	682,012.54	***692,364.41***	**705,135.34**	**723,439.40**	**742,292.58**	**761,711.36**	
123	55010	Repairs & Maintenance	OPR294-100	BOS-Facility O&M	2,000.00	556.25	1,500.00	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	General repairs, dust($1.2k)
124	55010	Repairs & Maintenance	OPR294-302	BOS Civil/Structural Repairs	2,000.00	0.00	2,000.00	***2,000.00***	0.00	0.00	0.00	0.00	Move recycle area up to top deferred to 25; Placeholder
125	55010	Repairs & Maintenance	OPR297-100	CRA-Facility O&M	3,300.00	6,903.75	3,000.00	***3,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	General repairs, dust ($2.3k)
126	55010	Repairs & Maintenance	OPR297-302	CRA Civil/Structural Repairs	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
127	55010	Repairs & Maintenance	OPR298-100	CRE-Facility O&M	5,000.00	6,620.00	5,000.00	***15,000.00***	5,000.00	5,000.00	5,000.00	5,000.00	General repairs; 2025 iron grizzly repairs on plates to be maintained
128	55010	Repairs & Maintenance	OPR298-301	CRE Civil/Structural Repairs	26,500.00	821.00	19,500.00	***500.00***	0.00	0.00	0.00	0.00	Placeholder
129	55010	Repairs & Maintenance	OVR152-100	East RR Subregion Administration	9,000.00	175.00	6,200.00	***6,200.00***	6,200.00	6,200.00	6,200.00	6,200.00	Fire extinguisher maintenance/replacement $200; Road surface grading at various sites $2k Reuse shed repairs $2K; FireSmart Recommendations $2K.
130	55010	Repairs & Maintenance	OPR516-100	East Subregion Bin Maintenance	1,000.00	2,171.00	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	Budget used for winches and gen repairs on bins
131	**55010**	**Repairs & Maintenance**			**48,800.00**	**17,247.00**	39,200.00	***30,200.00***	**17,700.00**	**17,700.00**	**17,700.00**	**17,700.00**	
132	55020	Operating Supplies	OPR294-100	BOS-Facility O&M	200.00	268.75	100.00	***100.00***	100.00	100.00	100.00	100.00	Site signs, gen supplies
133	55020	Operating Supplies	OPR297-100	CRA-Facility O&M	1,000.00	66.25	100.00	***100.00***	100.00	100.00	100.00	100.00	Site signs, gen supplies
134	55020	Operating Supplies	OPR298-100	CRE-Facility O&M	17,000.00	725.00	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	General site supplies/signs $15k litter fence in 24 moved to CAP in 25
135	55020	Operating Supplies	OVR152-100	East RR Subregion Administration	8,000.00	1,987.50	500.00	***500.00***	500.00	500.00	500.00	500.00	New branding site signage (entrance signs x3 @ $2k ea); General supplies; Lead Hand supplies
136	55020	Operating Supplies	OVR152-302	East Subregion HW Events	300.00	200.00	125.00	***125.00***	125.00	125.00	125.00	125.00	General supplies
137	**55020**	**Operating Supplies**			**26,500.00**	**3,247.50**	2,825.00	***2,825.00***	**2,825.00**	**2,825.00**	**2,825.00**	**2,825.00**	
138	55030	Equipment	OPR298-100	CRE-Facility O&M	7,000.00	0.00	7,000.00	***7,000.00***	500.00	500.00	500.00	500.00	Small equipment $500; Scale software equip - Plate reader, portable devices ($5k); Scale weight display ($1.5k)
139	**55030**	**Equipment**			**7,000.00**	**0.00**	7,000.00	***7,000.00***	**500.00**	**500.00**	**500.00**	**500.00**	
140	55040	Utilities	OPR294-100	BOS-Facility O&M	550.26	560.00	576.80	***576.80***	594.10	611.93	630.28	649.19	Based on projected + 3%
141	55040	Utilities	OPR297-100	CRA-Facility O&M	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
142	55040	Utilities	OPR298-100	CRE-Facility O&M	2,302.23	1,638.75	1,687.91	***1,687.91***	1,738.55	1,790.71	1,844.43	1,899.76	Based on projected + 3%
143	**55040**	**Utilities**			**2,852.50**	**2,198.75**	2,264.71	***2,264.71***	**2,332.65**	**2,402.63**	**2,474.71**	**2,548.95**	
144	55060	Rentals	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
145	**55060**	**Rentals**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
146	55900	Provisions	OVR152-100	East RR Subregion Administration	280,947.80	280,947.80	0.00	***0.00***	0.00	0.00	0.00	0.00	Moving to 59000 LL Reserve contribution
147	**55900**	**Provisions**			**280,947.80**	**280,947.80**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
148	56010	Debenture Interest	CAP759-100	CRE LF - Phase 1C/D Closure, Stabilizing Berm, and Drainage	0.00	0.00	0.00	***0.00***	93,448.00	93,448.00	93,448.00	93,448.00	Placeholder LT loan for Phase 1C ; updated 25 yr 4.5%
149	56010	Debenture Interest	CAP1115-100	TOC-2020/21-Septage Receiving Facility	0.00	0.00	31,138.50	***31,138.50***	62,277.00	62,277.00	62,277.00	62,277.00	Placeholder LT for septage facility - to be covered by septage tipping fees; updated 25 yr 4.5%

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
150	56010	Debenture Interest	CAP1226-100	CRE Landfill Closure Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder LT borrowing for Phase 2 closure works; updated 25 yr 4.5% - $82K to start in 2030 pending project advancement
151	56010	Debenture Interest	CAP1227-100	CRE Landfill development Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Placeholder LT borrowing for landfill development works - moved to Stab Reserves
152	56010	Debenture Interest	CAP1234-100	Legacy Landfills	0.00	0.00	0.00	***0.00***	0.00	0.00	90,000.00	90,000.00	Placeholder LT borrowing for legacy landfill closure ; updated 25 yr 4.5%
153	56010	Debenture Interest	OVR152-100	East RR Subregion Administration	85,247.96	85,247.96	85,247.96	***85,247.96***	85,247.96	85,247.96	85,247.96	85,247.96	Based on all existing LT loans repayment schedule
154	**56010**	**Debenture Interest**			**85,247.96**	**85,247.96**	116,386.46	***116,386.46***	**240,972.96**	**240,972.96**	**330,972.96**	**330,972.96**	
155	56110	Short-Term Financing Interest	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
156	**56110**	**Short-Term Financing Interest**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
157	56020	Debenture Principal	CAP759-100	CRE LF - Phase 1C/D Closure, Stabilizing Berm, and Drainage	0.00	0.00	0.00	***0.00***	52,156.00	52,156.00	52,156.00	52,156.00	Placeholder LT loan for Phase 1C
158	56020	Debenture Principal	CAP1115-100	TOC-2020/21-Septage Receiving Facility	0.00	0.00	0.00	***0.00***	34,596.00	34,596.00	34,596.00	34,596.00	Placeholder LT for septage facility - to be covered by septage tipping fees
159	56020	Debenture Principal	CAP1226-100	CRE Landfill Closure Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder LT borrowing for Phase 2 closure works - $45k to start in 2030
160	56020	Debenture Principal	CAP1227-100	CRE Landfill development Phase 2	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Placeholder LT borrowing for landfill development works - moved to Stab Reserves
161	56020	Debenture Principal	CAP1234-100	Legacy Landfills	0.00	0.00	0.00	***0.00***	0.00	0.00	49,997.00	49,997.00	Placeholder LT borrowing for legacy landfill closure
162	56020	Debenture Principal	OVR152-100	East RR Subregion Administration	92,444.29	92,444.29	92,444.29	***92,444.29***	92,444.29	92,444.29	92,444.29	92,444.29	Placeholder - Based on all existing LT loans repayment schedule
163	**56020**	**Debenture Principal**			**92,444.29**	**92,444.29**	92,444.29	***92,444.29***	**179,196.29**	**179,196.29**	**229,193.29**	**229,193.29**	
164	56120	Short-Term Financing Principal	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
165	**56120**	**Short-Term Financing Principal**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
166	57010	Grants	OVR152-100	East RR Subregion Administration	300,000.00	0.00	0.00	***300,000.00***	0.00	0.00	0.00	0.00	Payment to LKB for economic development; deferred to 2025
167	57010	Grants	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove: Transfer to Town of Creston for OICP (bins,etc)
168	**57010**	**Grants**			**300,000.00**	**0.00**	0.00	***300,000.00***	**0.00**	**0.00**	**0.00**	**0.00**	
169	59000	Contribution to Reserve	OVR152-100	East RR Subregion Administration	69,794.77	69,794.77	77,572.51	***256,287.25***	205,299.01	406,463.56	205,112.84	339,281.52	Transfer to regular reserves
170	59000	Contribution to Reserve	OVR152-100	East RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Growing Communities Fund (GCF) Allocation to GCF Reserve (For CRE septage project)
171	59000	Contribution to Reserve	OVR152-100	East RR Subregion Administration	0.00	624,164.47	280,947.80	***280,947.80***	280,947.80	280,947.80	280,947.80	280,947.80	2024 FP amendment to transfer ARO surplus from 23; Placeholder, transfer to NEW Landfill Closure Reserve; Provisions 55900 moved here after 2025
172	59000	Contribution to Reserve	OVR152-100	East RR Subregion Administration	0.00	72,778.77	0.00	***17,728.67***	0.00	0.00	0.00	0.00	Placeholder, transfer to stabilization reserves (1/2 of prior year´s surplus)
173	**59000**	**Contribution to Reserve**			**69,794.77**	**766,738.01**	358,520.31	***554,963.72***	**486,246.81**	**687,411.36**	**486,060.64**	**620,229.32**	
174	59500	Transfer to Other Service	OVR152-100	East RR Subregion Administration	2,000.00	275.00	10,000.00	***10,000.00***	5,000.00	0.00	10,000.00	10,000.00	A112, PM fees
175	59500	Transfer to Other Service	OPR424-300	East Subregion Recycling	364,426.24	364,426.24	316,309.97	***359,023.35***	366,507.42	378,643.55	391,171.38	404,103.35	Reduced with new RBC incentives; Transfer to A116 East Recycling Allocation Service
176	59500	Transfer to Other Service	OVR152-100	East RR Subregion Administration	2,009.00	2,009.00	2,009.00	***2,009.00***	2,009.00	2,009.00	2,009.00	2,009.00	Transfer to S187 for HHW depot Reso # 785/21, remove once ecodepot est
177	59500	Transfer to Other Service	OPR613-100	CRE Compost Facilty O&M	684,400.85	684,400.85	477,400.11	***478,434.94***	459,016.93	306,162.20	310,079.75	313,765.49	Placeholder; Transfer to subsidize A119 East Compost Allocation Service for compost facility, 2024 included $200k for A119 CAP works from reserves.
178	59500	Transfer to Other Service	OVR152-100	East RR Subregion Administration	389,011.24	389,011.24	309,474.97	***290,982.00***	299,711.46	308,702.80	317,963.89	327,502.80	A102 Resource Recovery Placeholder 3.35 in 24, 3% subsequent yrs, 70% (20% to A116 recycling allocation service and 10% to A119 compost allocation

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	**Account**	**Account(T)**	**Work Order**	**Work Order(T)**	**2024 Budget**	**2024 Projected YE**	1st DRAFT '25 Budget from Nov '24 Review	***2025 Budget***	**2026 Budget**	**2027 Budget**	**2028 Budget**	**2029 Budget**	**2025 Notes**
179	**59500**	**Transfer to Other Service**			**1,441,847.34**	**1,440,122.34**	1,115,194.05	***1,140,449.29***	**1,132,244.81**	**995,517.55**	**1,031,224.02**	**1,057,380.65**	
180	59510	Transfer to Other Service - General Admin. Fee	OVR152-100	East RR Subregion Administration	86,880.00	86,880.00	88,617.60	***79,682.00***	82,072.46	84,534.63	87,070.67	89,682.79	General Admin Placeholder
181	**59510**	**Transfer to Other Service - General Admin. Fee**			**86,880.00**	**86,880.00**	88,617.60	***79,682.00***	**82,072.46**	**84,534.63**	**87,070.67**	**89,682.79**	
182	59520	Transfer to Other Service - IT Fee	OVR152-100	East RR Subregion Administration	14,610.00	14,610.00	6,643.00	***5,549.00***	5,715.47	5,886.93	6,063.54	6,245.45	IT - reduced, based on new license based costing
183	**59520**	**Transfer to Other Service - IT Fee**			**14,610.00**	**14,610.00**	6,643.00	***5,549.00***	**5,715.47**	**5,886.93**	**6,063.54**	**6,245.45**	
184	59550	Transfer to Other Service - Environmental Services Fee	OVR152-100	East RR Subregion Administration	59,915.51	59,915.51	61,113.82	***60,326.00***	62,135.78	63,999.85	65,919.85	67,897.44	Placeholder A100 80% (10% to recycling allocation service and 10% to compost allocation service)
185	**59550**	**Transfer to Other Service - Environmental Services Fee**			**59,915.51**	**59,915.51**	61,113.82	***60,326.00***	**62,135.78**	**63,999.85**	**65,919.85**	**67,897.44**	
186	60000	Capital Expenditures	CAP1020-100	CRE LF - 2019 Asbestos Area	50,000.00	0.00	50,000.00	***50,000.00***	0.00	0.00	0.00	0.00	Development of separate Asbestos area - advance once wedge lease obtained
187	60000	Capital Expenditures	CAP1241-100	EAST - Curbside compost collection	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Not proceeding at this time
188	60000	Capital Expenditures	CAP1100-100	CRE LF-2020-Phase 1E Closure	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Project completed
189	60000	Capital Expenditures	CAP1115-100	TOC-2020/21-Septage Receiving Facility	1,382,742.00	19,520.00	1,730,480.00	***1,730,480.00***	0.00	0.00	0.00	0.00	2024 portion of detailed design completed, 2025 updated cost provided by Town; RDCK finance full cost to be repaid by user fees; decom old pits following construction.
190	60000	Capital Expenditures	CAP268-100	ENV - RR - Purchase of Land	300,000.00	0.00	515,000.00	***515,000.00***	0.00	0.00	0.00	0.00	Moved to 2025
191	60000	Capital Expenditures	CAP759-100	CRE LF - Phase 1C/D Closure, Stabilizing Berm, and Drainage	0.00	0.00	225,000.00	***225,000.00***	0.00	0.00	0.00	0.00	1C/D & Berm design to proceed once LKB land transfer completed
192	60000	Capital Expenditures	CAP759-101	CRE LF - Phase 1C/D Closure, Stabilizing Berm, and Drainage - Construction	0.00	0.00	0.00	***0.00***	2,031,480.00	0.00	0.00	0.00	1C/D & Berm construction deferred to 2026 (with 20% inflaction)
193	60000	Capital Expenditures	CAP1226-100	CRE Landfill Closure Phase 2A	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	100,000.00	Closure planned for post - 2029 design (closure construction cost est$ 1.7M)
194	60000	Capital Expenditures	CAP1227-100	CRE Landfill development Phase 2B	0.00	0.00	0.00	***0.00***	0.00	0.00	50,000.00	396,250.00	Landfill development for Phase 2B, design in 28, construction in 2029
195	60000	Capital Expenditures	CAP976-100	RR - East Subregion - Ecodepot Infrastructure	35,000.00	0.00	0.00	***35,000.00***	0.00	0.00	0.00	0.00	Previous estimate of $35K was for costs for site prep/containers/supplies/training. Move to Contracted Services, unless ERRC elects to develop eco-depot in house
196	60000	Capital Expenditures	CAP1234-100	Legacy Landfills	38,000.00	0.00	120,000.00	***120,000.00***	0.00	0.00	0.00	0.00	CRA & BOS Stage 1's in 2025. Added $8k to 2025 for Kitchener Stage 1 (likely very simplified report, stating there was nothing landfilled there ever so the permit can be removed). Remaining assessment (drilling, phase 2) in 2026.
197	60000	Capital Expenditures	CAP1530-100	RR - EAST - Legacy Landfill Closures	0.00	0.00	0.00	***0.00***	0.00	0.00	2,000,000.00	0.00	Place holder CRA & BOS closure 2028; new WO to separate phases of project
198	60000	Capital Expenditures	CAP977-100	BOS TS - 2019 Washroom	0.00	0.00	0.00	***0.00***	0.00	57,000.00	0.00	0.00	Well/septic/washroom install - or new contained unit PM is investigating; deferred
199	60000	Capital Expenditures	CAP978-100	CRA TS - 2019 Washroom	0.00	0.00	44,300.00	***44,300.00***	0.00	0.00	0.00	0.00	Washroom with well/septic Possibly creek source or new contained unit PM is investigating
200	60000	Capital Expenditures	CAP1537-100	CRE - Waste Spotter Building	0.00	0.00	15,000.00	***15,000.00***	0.00	0.00	0.00	0.00	Purchase of KOK shack from CRRC - est value $10K value (includes transport & power hook-up cost)
201	60000	Capital Expenditures		CRE Iron Grizzly Plates	0.00	0.00	0.00	***32,000.00***	16,000.00	0.00	16,000.00	0.00	Replacement Iron Gizzly Plates used for alternate daily cover on landfill active face (used instead of soil - saves airspace and cost); 4 plates in 2025, 2 in 26/28: rolling stock replacement
202	60000	Capital Expenditures	CAP1321-100	Roll off bins	60,000.00	34,481.00	0.00	***0.00***	20,000.00	0.00	20,000.00	0.00	rolling stock roll off bins (CAP 1323 in 25)
203	**60000**	**Capital Expenditures**			**1,865,742.00**	**54,001.00**	2,699,780.00	***2,766,780.00***	**2,067,480.00**	**57,000.00**	**2,086,000.00**	**496,250.00**	

S186 - East Resource Recovery - 5 Year Financial Plan (2025-2029)													
No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
204	**TOTAL EXPENSES**				**5,495,626.62**	**3,810,401.52**	5,681,158.31	***6,265,253.47***	**5,288,248.00**	**3,373,082.73**	**5,500,232.23**	**4,011,551.06**	
205	**TOTAL CAP EXPENDITURES**				**1,865,742.00**	**54,001.00**	2,699,780.00	***2,766,780.00***	**2,067,480.00**	**57,000.00**	**2,086,000.00**	**496,250.00**	
206	**TOTAL OPERATING EXPENSES (no CAP)**				**3,629,884.62**	**3,756,400.52**	2,981,378.31	***3,498,473.47***	**3,220,768.00**	**3,316,082.73**	**3,414,232.23**	**3,515,301.06**	
207	**BORROWING**				**177,692.25**	**177,692.25**	208,830.75	***208,830.75***	**420,169.25**	**420,169.25**	**560,166.25**	**560,166.25**	
208	**CONT TO RESERVES**				**69,794.77**	**766,738.01**	358,520.31	***554,963.72***	**486,246.81**	**687,411.36**	**486,060.64**	**620,229.32**	
209	**TIPPING FEES**				**(1,348,288.31)**	**(1,241,906.00)**	(1,274,450.02)	***(1,366,096.60)***	**(1,407,079.50)**	**(1,449,291.88)**	**(1,492,770.64)**	**(1,537,553.76)**	
210	**TAXATION**				**(1,456,039.20)**	**(1,456,039.20)**	(1,601,643.12)	***(1,572,522.34)***	**(1,682,598.90)**	**(1,733,076.87)**	**(1,785,069.17)**	**(1,838,621.25)**	
211	**TOTAL REVENUE**				**(5,495,626.62)**	**(3,845,858.86)**	(5,761,638.30)	***(6,265,253.47)***	**(5,288,248.00)**	**(3,373,082.73)**	**(5,500,232.23)**	**(4,011,551.06)**	
212	**SURPLUS/DEFICIT**				**0.00**	**(35,457.34)**	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
214				Opening Regular Reserve Balance	(876,562.33)	(492,136.51)	(796,412.28)	***(796,412.28)***	(756,399.53)	(925,698.53)	(1,275,162.10)	(1,394,274.94)	
215				Transfer From Regular Reserves	483,000.00	234,481.00	229,300.00	***296,300.00***	36,000.00	57,000.00	86,000.00	496,250.00	
216				Contribution to Regular Reserves	(69,794.77)	(69,794.77)	(77,572.51)	***(256,287.25)***	(205,299.01)	(406,463.56)	(205,112.84)	(339,281.52)	
217				Net Change for Year	413,205.23	164,686.23	151,727.49	***40,012.75***	(169,299.01)	(349,463.56)	(119,112.84)	156,968.48	
218				Year End Regular Reserve	(463,357.10)	(796,412.28)	(644,684.79)	***(756,399.53)***	(925,698.53)	(1,275,162.10)	(1,394,274.94)	(1,237,306.46)	
219													
220				Opening Landfill Closure Reserve Balar	(995,368.00)	(1,043,612.97)	(1,043,612.97)	***(1,043,612.97)***	(1,099,560.77)	(1,380,508.57)	(1,661,456.37)	(1,661,456.37)	
221				Transfer From LC Reserves	0.00	0.00	225,000.00	***225,000.00***	0.00	0.00	0.00	0.00	
222				Contribution to LC Reserves	0.00	(682,457.00)	(280,947.80)	***(280,947.80)***	*(280,947.80)*	*(280,947.80)*	*(280,947.80)*	*(280,947.80)*	
223				Net Change for Year	0.00	0.00	(55,947.80)	***(55,947.80)***	(280,947.80)	(280,947.80)	0.00	0.00	
224				Year End LC Reserve	(995,368.00)	(1,043,612.97)	(1,099,560.77)	***(1,099,560.77)***	(1,380,508.57)	(1,661,456.37)	(1,661,456.37)	(1,661,456.37)	
225													
226				Opening Stabillizatio Reserve Balance	(1,112,702.92)	(1,043,612.97)	(233,552.52)	***(1,116,391.74)***	(319,120.40)	(319,120.40)	(319,120.40)	(319,120.40)	
227				Transfer From Stabilization Reserves	300,000.00	0.00	515,000.00	***815,000.00***	0.00	0.00	0.00	0.00	
228				Contribution to Stabilization Reserves	0.00	(72,778.77)	0.00	***(17,728.67)***	0.00	0.00	0.00	0.00	
229				Net Change for Year	300,000.00	(72,778.77)	515,000.00	***797,271.33***	0.00	0.00	0.00	0.00	
230				Year End Stabilization Reserve	(812,702.92)	(1,116,391.74)	281,447.48	***(319,120.40)***	(319,120.40)	(319,120.40)	(319,120.40)	(319,120.40)	
231				Total Reserves	(2,271,428.02)	(2,956,416.99)	(1,462,798.08)	***(2,175,080.70)***	(2,625,327.51)	(3,255,738.87)	(3,374,851.71)	(3,217,883.24)	
232				*CGF*	(120,902.28)								

A116 - East Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	42035	User Fees - Specified	OPR639-100	East Recycling - General	(86,544.69)	(85,405.50)	(188,667.43)	***(186,183.99)***	(189,907.67)	(193,705.82)	(197,579.94)	(201,531.54)	RBC Financial Incentive, 2025 new incentive rates 118% increase
2	42035	User Fees - Specified	OPR641-100	West Recycling - General	(24,552.50)	(24,552.50)	(24,552.50)	***(24,552.50)***	(24,552.50)	(24,552.50)	(24,552.50)	(24,552.50)	Placeholder - transfer of RBC Incentives for SR equalization
3	**42035**	**User Fees - Specified**			**(111,097.19)**	**(109,958.00)**	(213,219.93)	***(210,736.49)***	**(214,460.17)**	**(218,258.32)**	**(222,132.44)**	**(226,084.04)**	
4	43025	Grants - Specified	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
5	**43025**	**Grants - Specified**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
6	43100	Proceeds from Borrowing	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
7	**43100**	**Proceeds from Borrowing**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
8	43200	Proceeds from Equipment Financing	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
9	**43200**	**Proceeds from Equipment Financing**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
10	43505	External Contributions & Contracts - Specified	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	GFL -Adjust for Satellite and ICI Contracts
11	**43505**	**External Contributions & Contracts - Specified**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
12	45000	Transfer from Reserves	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
13	**45000**	**Transfer from Reserves**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
14	45500	Transfer from Other Service	OPR639-100	East Recycling - General	(389,011.24)	(389,011.24)	(316,309.97)	***(359,023.35)***	(366,507.42)	(378,643.55)	(391,171.38)	(404,103.35)	Taxation Revenue from S186
15	**45500**	**Transfer from Other Service**			**(389,011.24)**	**(389,011.24)**	(316,309.97)	***(359,023.35)***	**(366,507.42)**	**(378,643.55)**	**(391,171.38)**	**(404,103.35)**	
16	49100	Prior Year Surplus	OPR639-100	East Recycling - General	(75,804.19)	(79,232.00)	(39,316.33)	***(39,316.33)***	0.00	0.00	0.00	0.00	Prior year surplus/deficit
17	**49100**	**Prior Year Surplus**			**(75,804.19)**	**(79,232.00)**	(39,316.33)	***(39,316.33)***	**0.00**	**0.00**	**0.00**	**0.00**	
18	**TOTAL REVENUE**				**(575,912.63)**	**(578,201.24)**	(568,846.23)	***(609,076.17)***	**(580,967.59)**	**(596,901.87)**	**(613,303.82)**	**(630,187.39)**	
19	51010	Salaries	OPR639-100	East Recycling - General	182,488.17	170,123.52	182,500.56	***183,252.87***	188,750.46	194,412.97	200,245.36	206,252.72	RWE Based on Salary worksheet (1% in 25 and 3% subsequent yrs); decreased from projected 2025 by ~$6k with ops review of worksheet; If remove RIO can reduce by $9365 for salary and benefits
20	51010	Salaries	OPR622-100	East Lead Hand	10,806.71	11,469.00	11,847.48	***11,847.48***	12,202.90	12,568.99	12,946.06	13,334.44	Lead Hand - 30% of S186 service; Based on Salary Worksheet (3% subsequent yrs)
21	**51010**	**Salaries**			**193,294.88**	**181,592.52**	194,348.04	***195,100.35***	**200,953.36**	**206,981.96**	**213,191.42**	**219,587.16**	
22	51020	Overtime	OPR639-100	East Recycling - General	1,200.00	300.00	800.00	***800.00***	800.00	800.00	800.00	800.00	limited budget for emerg coverage; reduced from 1200 to 800
23	**51020**	**Overtime**			**1,200.00**	**300.00**	800.00	***800.00***	**800.00**	**800.00**	**800.00**	**800.00**	
24	51030	Benefits	OPR639-100	East Recycling - General	43,482.86	44,300.80	45,625.00	***45,813.22***	46,958.55	48,132.51	49,335.83	50,569.22	RWEs; Based on Salary Worksheet
25	51030	Benefits	OPR622-100	East Lead Hand	3,133.94	3,133.94	3,237.36	***3,237.36***	3,318.29	3,401.25	3,486.28	3,573.44	Lead Hand - 30% of S186; Based on Salary Worksheet
26	**51030**	**Benefits**			**46,616.80**	**47,434.74**	48,862.36	***49,050.58***	**50,276.84**	**51,533.77**	**52,822.11**	**54,142.66**	
27	51050	Employee Health & Safety	OPR639-100	East Recycling - General	2,000.00	500.00	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	RWE footwear, jackets, training, safety check-in monitoring, based estimate provided by H&S coord
28	**51050**	**Employee Health & Safety**			**2,000.00**	**500.00**	2,000.00	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
29	51500	Directors - Allowance & Stipend	OPR639-100	East Recycling - General	4,160.49	4,160.49	4,297.79	***4,297.79***	4,383.74	4,471.42	4,560.85	4,652.06	20% Based on up to 14 RR meetings (4 directors)
30	**51500**	**Directors - Allowance & Stipend**			**4,160.49**	**4,160.49**	4,297.79	***4,297.79***	**4,383.74**	**4,471.42**	**4,560.85**	**4,652.06**	
31	51560	Directors - Travel	OPR639-100	East Recycling - General	1,000.00	1,000.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Increased travel with more in-person meetings
32	**51560**	**Directors - Travel**			**1,000.00**	**1,000.00**	1,000.00	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	

A116 - East Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
33	52010	Travel	OPR639-100	East Recycling - General	500.00	100.00	300.00	***300.00***	300.00	300.00	300.00	300.00	RWE - mileage for field staff training/development/out of area shift coverage; reduced from 500-300
34	52010	Travel	OPR639-100	East Recycling - General	5,000.00	5,000.00	5,035.67	***5,035.67***	5,287.45	5,551.82	5,829.42	6,120.89	30% Lead Hand
35	**52010**	**Travel**			**5,500.00**	**5,100.00**	5,335.67	***5,335.67***	**5,587.45**	**5,851.82**	**6,129.42**	**6,420.89**	
36	52020	Education & Training	OPR639-100	East Recycling - General	500.00	50.00	500.00	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	RWE training/development; staff incentives
37	**52020**	**Education & Training**			**500.00**	**50.00**	500.00	***1,500.00***	**1,500.00**	**1,500.00**	**1,500.00**	**1,500.00**	
38	53020	Admin, Office Supplies & Postage	OPR639-100	East Recycling - General	200.00	17.50	100.00	***100.00***	100.00	100.00	100.00	100.00	gen supplies
39	**53020**	**Admin, Office Supplies & Postage**			**200.00**	**17.50**	100.00	***100.00***	**100.00**	**100.00**	**100.00**	**100.00**	
40	53030	Communication	OPR639-100	East Recycling - General	3,094.00	1,593.75	2,024.06	***2,024.06***	2,064.54	2,105.83	2,147.95	2,190.91	RWE cell allowance
41	**53030**	**Communication**			**3,094.00**	**1,593.75**	2,024.06	***2,024.06***	**2,064.54**	**2,105.83**	**2,147.95**	**2,190.91**	
42	53040	Advertising	OPR639-100	East Recycling - General	1,000.00	100.00	2,172.00	***2,172.00***	2,172.00	2,172.00	2,172.00	2,172.00	Ads, brochures - increased from $1K determined based on 2 core depots
43	**53040**	**Advertising**			**1,000.00**	**100.00**	2,172.00	***2,172.00***	**2,172.00**	**2,172.00**	**2,172.00**	**2,172.00**	
44	53050	Insurance	OPR639-100	East Recycling - General	500.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, not included in statement of assets due to deductible
45	**53050**	**Insurance**			**500.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
46	54020	Professional Fees	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
47	**54020**	**Professional Fees**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
48	54030	Contracted Services	OPR639-100	East Recycling - General	95,830.19	73,007.50	75,197.73	***97,910.00***	100,847.30	103,872.72	106,988.90	110,198.57	New hauling contracts (Sept 24) 3% increases annually; Satellite hauling; ICI contract
49	54030	Contracted Services	OPR615-100	EAST - RBC Depot Maintenance	0.00	0.00	0.00	***6,031.00***	6,211.93	6,398.29	6,590.24	6,787.94	Garbage, portable toilets
50	54030	Contracted Services	OPR615-100	EAST - RBC Depot Maintenance	0.00	0.00	0.00	***15,000.00***	15,450.00	15,913.50	16,390.91	16,882.63	Snow removal services
51	**54030**	**Contracted Services**			**95,830.19**	**73,007.50**	75,197.73	***118,941.00***	**122,509.23**	**126,184.51**	**129,970.04**	**133,869.14**	
52	55010	Repairs & Maintenance	OPR639-100	East Recycling - General	1,000.00	1,385.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	General repairs
53	**55010**	**Repairs & Maintenance**			**1,000.00**	**1,385.00**	1,000.00	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
54	55020	Operating Supplies	OPR639-100	East Recycling - General	2,000.00	1,823.75	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	General site supplies & signage
55	**55020**	**Operating Supplies**			**2,000.00**	**1,823.75**	2,000.00	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
56	55030	Equipment	OPR639-100	East Recycling - General	1,250.00	1,000.00	500.00	***500.00***	500.00	500.00	500.00	500.00	General equip
57	**55030**	**Equipment**			**1,250.00**	**1,000.00**	500.00	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
58	55040	Utilities	OPR639-100	East Recycling - General	3,300.00	5,944.00	3,399.00	***3,399.00***	3,500.97	3,606.00	3,714.18	3,825.60	Power, propane; 24 CCW generator should have been coded to 55030
59	**55040**	**Utilities**			**3,300.00**	**5,944.00**	3,399.00	***3,399.00***	**3,500.97**	**3,606.00**	**3,714.18**	**3,825.60**	
60	55060	Rentals	OPR639-100	East Recycling - General	40,000.00	40,000.00	39,556.00	***39,556.00***	40,347.12	41,154.06	41,977.14	42,816.69	Based on depot lease CCW & RIO ($1K annual)
61	**55060**	**Rentals**			**40,000.00**	**40,000.00**	39,556.00	***39,556.00***	**40,347.12**	**41,154.06**	**41,977.14**	**42,816.69**	
62	56110	Short-Term Financing Interest	OVR152-100	East RR Subregion Administration	4,200.27	4,609.66	1,678.72	***1,678.72***	0.00	0.00	0.00	0.00	Repayment of short term loan for RBC infrastructure
63	**56110**	**Short-Term Financing Interest**			**4,200.27**	**4,609.66**	1,678.72	***1,678.72***	**0.00**	**0.00**	**0.00**	**0.00**	
64	56120	Short-Term Financing Principal	OVR152-100	East RR Subregion Administration	55,910.00	55,910.00	55,910.00	***55,910.00***	0.00	0.00	0.00	0.00	Repayment of short term loan for RBC infrastructure
65	**56120**	**Short-Term Financing Principal**			**55,910.00**	**55,910.00**	55,910.00	***55,910.00***	**0.00**	**0.00**	**0.00**	**0.00**	

A116 - East Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
66	59000	Contribution to Reserve	OPR639-100	East Recycling - General	4,000.00	4,000.00	4,000.00	***4,000.00***	18,000.00	18,000.00	18,000.00	18,000.00	Regular reserve - for asset replacement
67	**59000**	**Contribution to Reserve**			**4,000.00**	**4,000.00**	4,000.00	***4,000.00***	**18,000.00**	**18,000.00**	**18,000.00**	**18,000.00**	
68	59500	Transfer to Other Service	OPR639-100	East Recycling - General	74,897.00	74,897.00	76,394.94	***83,138.00***	85,632.14	88,201.10	90,847.14	93,572.55	A102 Resource Recovery Placeholder; 20% of S186 transfer to A102
69	**59500**	**Transfer to Other Service**			**74,897.00**	**74,897.00**	76,394.94	***83,138.00***	**85,632.14**	**88,201.10**	**90,847.14**	**93,572.55**	
70	59510	Transfer to Other Service - General Admin. Fee	OPR639-100	East Recycling - General	26,970.00	26,970.00	27,509.40	***25,445.00***	26,208.35	26,994.60	27,804.44	28,638.57	General Admin Placeholder
71	**59510**	**Transfer to Other Service -**			**26,970.00**	**26,970.00**	27,509.40	***25,445.00***	**26,208.35**	**26,994.60**	**27,804.44**	**28,638.57**	
72	59520	Transfer to Other Service - IT Fee	OPR639-100	East Recycling - General	0.00	0.00	3,720.00	***2,587.00***	2,664.61	2,744.55	2,826.88	2,911.69	IT Placeholder - NEW based on license based costing
73	**59520**	**Transfer to Other Service - IT**			**0.00**	**0.00**	3,720.00	***2,587.00***	**2,664.61**	**2,744.55**	**2,826.88**	**2,911.69**	
74	59550	Transfer to Other Service - Environmental Services Fee	OPR639-100	East Recycling - General	7,489.00	7,489.00	7,638.78	***7,541.00***	7,767.23	8,000.25	8,240.25	8,487.46	A100 Enviro Services Placeholder 10% of S186 transfer to A100
75	**59550**	**Transfer to Other Service - Environmental Services Fee**			**7,489.00**	**7,489.00**	7,638.78	***7,541.00***	**7,767.23**	**8,000.25**	**8,240.25**	**8,487.46**	
76	60000	Capital Expenditures	OPR639-100	East Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder, new bins, site works
77	**60000**	**Capital Expenditures**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
78	**TOTAL EXPENSES**				**575,912.63**	**538,884.91**	559,944.49	***609,076.17***	**580,967.59**	**596,901.87**	**613,303.82**	**630,187.39**	
79	**TOTAL REVENUE**				**(575,912.63)**	**(578,201.24)**	(568,846.23)	***(609,076.17)***	**(580,967.59)**	**(596,901.87)**	**(613,303.82)**	**(630,187.39)**	
80	**SURPLUS/DEFICIT**				**0.00**	**(39,316.33)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
82				Regular Reserve	(8,029.79)	(8,026.79)	(12,229.32)	***(12,229.32)***	(16,229.32)	(34,229.32)	(52,229.32)	(70,229.32)	
83				Transfer From Reserve	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	
84				Contribution to Reserve	(4,000.00)	(4,000.00)	(4,000.00)	***(4,000.00)***	(18,000.00)	(18,000.00)	(18,000.00)	(18,000.00)	
85				Net Change for Year	(4,000.00)	(4,000.00)	(4,000.00)	***(4,000.00)***	(18,000.00)	(18,000.00)	(18,000.00)	(18,000.00)	
86				Year End Reserve	(12,029.79)	(12,229.32)	(16,229.32)	***(16,229.32)***	(34,229.32)	(52,229.32)	(70,229.32)	(88,229.32)	
87													

A119 - East Compost - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	42020	Sale of Services	OPR642-100	East Organics - General	(40,595.92)	(22,822.00)	(29,249.00)	***(29,668.60)***	(44,502.90)	(48,953.19)	(53,848.51)	(59,233.36)	Placeholder compost tipping fees - Creston curbside and minimal self haul (little to no ICI/AG yet and subsidized low TF for organics)
2	**42020**	**Sale of Services**			**(40,595.92)**	**(22,822.00)**	(29,249.00)	***(29,668.60)***	**(44,502.90)**	**(48,953.19)**	**(53,848.51)**	**(59,233.36)**	
3	42030	User Fees	OPR642-100	East Organics - General	(1,071.00)	0.00	(2,163.42)	***(2,163.42)***	(1,114.27)	(1,136.56)	(1,159.29)	(1,182.47)	Placeholder, Sales of finished compost; 2025 is 2024+2025 amounts, due to sales of accumulated 2022-2024 material in 2025.
4	**42030**	**User Fees**			**(1,071.00)**	**0.00**	(2,163.42)	***(2,163.42)***	**(1,114.27)**	**(1,136.56)**	**(1,159.29)**	**(1,182.47)**	
5	43025	Grants - Specified	CAP1114-100	CRE LF-2020/21 Composting Facility	0.00	(262,211.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	$262k is final payment for OIP grant. Final report submitted in May 24, so claim covers 22-23 costs. (reflected in 2023 deficit)
6	**43025**	**Grants - Specified**			**0.00**	**(262,211.00)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
7	43100	Proceeds from Borrowing	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
8	**43100**	**Proceeds from Borrowing**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
9	45000	Transfer from Reserves	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Regular Reserves - CAP works not funded from borrowing
10	**45000**	**Transfer from Reserves**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
11	45500	Transfer from Other Service	OPR642-100	East Organics - General	(684,400.85)	(684,400.85)	(477,400.11)	***(478,434.94)***	(459,016.93)	(306,162.20)	(310,079.75)	(313,765.49)	Placeholder Transfer from S186 - organics (subsidization) ; 2024 include $200k (from S186 reserves for CAP works)
12	**45500**	**Transfer from Other Service**			**(684,400.85)**	**(684,400.85)**	(477,400.11)	***(478,434.94)***	**(459,016.93)**	**(306,162.20)**	**(310,079.75)**	**(313,765.49)**	
13	49100	Prior Year Surplus	OPR642-100	East Organics - General	38,166.69	299,826.00	(163,165.50)	***(163,165.50)***	0.00	0.00	0.00	0.00	Placeholder projected actual surplus/deficit of previous year; deficit in 24 is offset by carry over from 2024 into 25 is for CAP works (if not
14	**49100**	**Prior Year Surplus**			**38,166.69**	**299,826.00**	(163,165.50)	***(163,165.50)***	**0.00**	**0.00**	**0.00**	**0.00**	
15	**TOTAL REVENUE**				**(687,901.08)**	**(669,607.85)**	(671,978.03)	***(673,432.46)***	**(504,634.10)**	**(356,251.95)**	**(365,087.55)**	**(374,181.32)**	
16	**TIPPING FEES**				**(40,595.92)**	**(22,822.00)**	(29,249.00)	***(29,668.60)***	**(44,502.90)**	**(48,953.19)**	**(53,848.51)**	**(59,233.36)**	
17	**CAP FUNDING SUBTOTAL**				**0.00**	**(262,211.00)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
18	51010	Salaries	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Contracted
19	**51010**	**Salaries**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
20	51020	Overtime	OPR642-100	East Organics - General	0.00	3.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Contracted
21	**51020**	**Overtime**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
22	51030	Benefits	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Contracted
23	**51030**	**Benefits**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
24	51050	Employee Health & Safety	OPR642-100	East Organics - General	100.00	100.00	100.00	***100.00***	100.00	100.00	100.00	100.00	General H&S site supplies
25	**51050**	**Employee Health & Safety**			**100.00**	**100.00**	100.00	***100.00***	**100.00**	**100.00**	**100.00**	**100.00**	
26	51500	Directors - Allowance & Stipend	OPR642-100	East Organics - General	2,080.25	2,080.25	2,121.85	***2,121.85***	2,164.29	2,207.57	2,251.72	2,296.76	Based on 10% up to 14 RR meetings (4 directors) + 4 Chair meetings
27	**51500**	**Directors - Allowance & Stipend**			**2,080.25**	**2,080.25**	2,121.85	***2,121.85***	**2,164.29**	**2,207.57**	**2,251.72**	**2,296.76**	
28	51560	Directors - Travel	OPR642-100	East Organics - General	500.00	500.00	500.00	***500.00***	500.00	500.00	500.00	500.00	Based on 10% up to 14 RR meetings (4 directors)
29	**51560**	**Directors - Travel**			**500.00**	**500.00**	500.00	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
30	52010	Travel	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
31	**52010**	**Travel**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
32	52020	Education & Training	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
33	**52020**	**Education & Training**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	

A119 - East Compost - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
34	52030	Memberships, Dues & Subscriptions	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
35	**52030**	**Memberships, Dues & Subscriptions**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
36	53020	Admin, Office Supplies & Postage	OPR642-100	East Organics - General	300.00	0.00	300.00	***300.00***	300.00	300.00	300.00	300.00	Shipping samples, sampling supplies, etc
37	**53020**	**Admin, Office Supplies & Postage**			**300.00**	**0.00**	300.00	***300.00***	**300.00**	**300.00**	**300.00**	**300.00**	
38	53030	Communication	OPR642-100	East Organics - General	802.93	771.00	794.13	***794.13***	825.90	858.93	893.29	929.02	Internet for facility ~$64/month
39	**53030**	**Communication**			**802.93**	**771.00**	794.13	***794.13***	**825.90**	**858.93**	**893.29**	**929.02**	
40	53040	Advertising	OPR642-100	East Organics - General	1,000.00	1,061.25	1,500.00	***1,500.00***	1,000.00	1,000.00	1,000.00	1,000.00	On-going Education/Communciation costs
41	**53040**	**Advertising**			**1,000.00**	**1,061.25**	1,500.00	***1,500.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
42	53050	Insurance	OPR642-100	East Organics - General	1,020.00	1,020.00	1,040.40	***1,040.40***	1,061.21	1,082.43	1,104.08	1,126.16	Compost facility
43	**53050**	**Insurance**			**1,020.00**	**1,020.00**	1,040.40	***1,040.40***	**1,061.21**	**1,082.43**	**1,104.08**	**1,126.16**	
44	53080	Licence & Permits	OPR642-100	East Organics - General	204.00	0.00	208.08	***208.08***	212.24	216.49	220.82	225.23	GW license annual rent. Still do not have license acceptance from province. Estimating its received in 2025.
45	53080	Licence & Permits	OPR642-100	East Organics - General	500.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	placeholder for $500 annually, Investigating in-house remote viewing software
46	53080	Licence & Permits	OPR642-100	East Organics - General	300.00	0.00	300.00	***300.00***	300.00	300.00	300.00	300.00	ReoTemp software subscription
47	**53080**	**Licence & Permits**			**1,004.00**	**0.00**	508.08	***508.08***	**512.24**	**516.49**	**520.82**	**525.23**	
48	54042	Consulting Fees	OPR642-100	East Organics - General	1,500.00	1,842.50	0.00	***0.00***	0.00	0.00	0.00	0.00	Compost facility virtual operations support with Transform Compost Systems, requested GFL pay for 1/2
49	**54020**	**Professional Fees**			**1,500.00**	**1,842.50**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
50	54030	Contracted Services	OPR642-100	East Organics - General	157,590.00	195,743.00	192,000.00	***192,000.00***	197,760.00	203,692.80	209,803.58	216,097.69	$15.8k/mo + 3% subsequent yrs; 2024 had large annual contract price adjustment (FP amendment request); 2025 new contract
51	54030	Contracted Services	OPR642-100	East Organics - General	56,020.00	48,766.00	45,000.00	***46,000.00***	30,000.00	30,600.00	31,212.00	31,836.24	2025 onward: OMRR requireed sampling; $3k for lab samples and collection, $3k contingency for quality failure retesting, $6k for water monitoring based on 3 wells to sample 2x/yr, leachate pond sampling, reporting etc. Added 2% annual adjustment for increases to lab sampling costs and analysis etc. Draining Leachate Pond: Assumes 3 pond draining events in 2025, then with pond expansion 2 per year after.
52	**54030**	**Contracted Services**			**213,610.00**	**244,509.00**	237,000.00	***238,000.00***	**227,760.00**	**234,292.80**	**241,015.58**	**247,933.93**	
53	55010	Repairs & Maintenance	OPR642-100	East Organics - General	3,000.00	1,700.00	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	Facility/equipment
54	**55010**	**Repairs & Maintenance**			**3,000.00**	**1,700.00**	2,000.00	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
55	55020	Operating Supplies	OPR642-100	East Organics - General	1,000.00	0.00	500.00	***500.00***	500.00	500.00	500.00	500.00	General supplies - reduced to $500/yr
56	**55020**	**Operating Supplies**			**1,000.00**	**0.00**	500.00	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
57	55030	Equipment	OPR642-100	East Organics - General	1,000.00	0.00	500.00	***500.00***	250.00	250.00	250.00	250.00	Sampling & testing equipment; Ring camera for pond level gauge monitorin $250;
58	**55030**	**Equipment**			**1,000.00**	**0.00**	500.00	***500.00***	**250.00**	**250.00**	**250.00**	**250.00**	
59	55040	Utilities	OPR642-100	East Organics - General	10,400.00	1,700.00	1,870.00	***1,870.00***	2,057.00	2,098.14	2,140.10	2,182.90	Power. Assumes 10% increase in 2025 from 2024 actual, and further 10% in 2026 due to increased tonnages, then 2% thereafter
60	**55040**	**Utilities**			**10,400.00**	**1,700.00**	1,870.00	***1,870.00***	**2,057.00**	**2,098.14**	**2,140.10**	**2,182.90**	

A119 - East Compost - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Nov '24 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
61	56110	Short-Term Financing Interest	CAP1384-100	CRE LF-2022 Composting Facility	20,072.55	20,647.00	14,961.00	***14,961.00***	5,012.98	0.00	0.00	0.00	Repayment of short term 5 yr loan for compost facility ($834K)
62	**56110**	**Short-Term Financing Interest**			**20,072.55**	**20,647.00**	14,961.00	***14,961.00***	**5,012.98**	**0.00**	**0.00**	**0.00**	
63	56120	Short-Term Financing Principal	CAP1384-100	CRE LF-2022 Composting Facility	166,954.00	166,954.00	166,954.00	***166,954.00***	166,954.00	0.00	0.00	0.00	Repayment of short term 5 yr loan for compost facility ($834K)
64	**56120**	**Short-Term Financing Principal**			**166,954.00**	**166,954.00**	166,954.00	***166,954.00***	**166,954.00**	**0.00**	**0.00**	**0.00**	
65	59000	Contribution to Reserve	OPR642-100	East Organics - General	5,000.00	5,000.00	5,000.00	***5,000.00***	5,000.00	45,000.00	45,000.00	45,000.00	Transfer to regular reserves - for asset replacement - consider increasing depending on AMP
66	**59000**	**Contribution to Reserve**			**5,000.00**	**5,000.00**	5,000.00	***5,000.00***	**5,000.00**	**45,000.00**	**45,000.00**	**45,000.00**	
67	59500	Transfer to Other Service	CAP1384-100	CRE LF-2022 Composting Facility	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder, A112 PM fees
68	59500	Transfer to Other Service	OPR642-100	East Organics - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, For funds transfer in 2022 in error (intended for A116)
69	59500	Transfer to Other Service	OPR642-100	East Organics - General	37,448.36	37,448.36	38,684.15	***41,569.00***	42,816.07	44,100.55	45,423.57	46,786.28	A102 Resource Recovery Placeholder; 10% of S186 transfer to A102
70	**59500**	**Transfer to Other Service**			**37,448.36**	**37,448.36**	38,684.15	***41,569.00***	**42,816.07**	**44,100.55**	**45,423.57**	**46,786.28**	
71	59510	Transfer to Other Service - General Admin. Fee	OPR642-100	East Organics - General	7,887.00	7,887.00	8,147.27	***7,803.00***	8,037.09	8,278.20	8,526.55	8,782.35	General Admin Placeholde
72	**59510**	**Transfer to Other Service -**			**7,887.00**	**7,887.00**	8,147.27	***7,803.00***	**8,037.09**	**8,278.20**	**8,526.55**	**8,782.35**	
73	59520	Transfer to Other Service - IT Fee	OPR642-100	East Organics - General	5,733.00	5,733.00	4,669.00	***4,870.00***	5,016.10	5,166.58	5,321.58	5,481.23	Placeholder, based on new license based costing
74	**59520**	**Transfer to Other Service -**			**5,733.00**	**5,733.00**	4,669.00	***4,870.00***	**5,016.10**	**5,166.58**	**5,321.58**	**5,481.23**	
75	59550	Transfer to Other Service - Environmental Services Fee	OPR642-100	East Organics - General	7,489.00	7,489.00	7,736.14	***7,541.00***	7,767.23	8,000.25	8,240.25	8,487.46	A100 Enviro Services Placeholder 10% of S186 transfer to A100
76	**59550**	**Transfer to Other Service - Environmental Services Fee**			**7,489.00**	**7,489.00**	7,736.14	***7,541.00***	**7,767.23**	**8,000.25**	**8,240.25**	**8,487.46**	
77	60000	Capital Expenditures	CAP1384-100	CRE LF-2022 Composting Facility	175,000.00	0.00	175,000.00	***175,000.00***	0.00	0.00	0.00	0.00	Larger leachate pond (transfer from S186 to fund from Reg Reserves)
78	60000	Capital Expenditures	CAP1384-100	CRE LF-2022 Composting Facility	25,000.00	0.00	0.00	***0.00***	25,000.00	0.00	0.00	0.00	Irrigation system, defered to 26
79	**60000**	**Capital Expenditures**			**200,000.00**	**0.00**	175,000.00	***175,000.00***	**25,000.00**	**0.00**	**0.00**	**0.00**	
80	**TOTAL EXPENSES**				**687,901.08**	**506,442.35**	669,886.02	***673,432.46***	**504,634.10**	**356,251.95**	**365,087.55**	**374,181.32**	
81	**Operating expenses**				**487,901.08**	**506,442.35**	494,886.02	***498,432.46***	**479,634.10**	**356,251.95**	**365,087.55**	**374,181.32**	
82	**TOTAL REVENUE**				**(687,901.08)**	**(669,607.85)**	(671,978.03)	***(673,432.46)***	**(504,634.10)**	**(356,251.95)**	**(365,087.55)**	**(374,181.32)**	
83	**SURPLUS/DEFICIT**				**0.00**	**(163,165.50)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
85				Regular Reserve	(9,702.36)	(9,699.36)	(14,940.73)	***(14,940.73)***	(19,940.73)	(24,940.73)	(69,940.73)	(114,940.73)	
86				Transfer From Reserve	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	1.00	
87				Contribution to Reserve	(5,000.00)	(5,000.00)	(5,000.00)	***(5,000.00)***	(5,000.00)	(45,000.00)	(45,000.00)	(45,000.00)	
88				Net Change for Year	(5,000.00)	(5,000.00)	(5,000.00)	***(5,000.00)***	(5,000.00)	(45,000.00)	(45,000.00)	(44,999.00)	
89				Year End Reserve	(14,702.36)	(14,940.73)	(19,940.73)	***(19,940.73)***	(24,940.73)	(69,940.73)	(114,940.73)	(159,939.73)	
90													

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	**41010**	**Requisitions**			**(3,693,027)**	**(3,693,027)**	(3,997,340)	***(3,988,469)***	***(4,197,207)***	***(4,323,123)***	***(4,452,817)***	***(4,586,401)***	**8% increase in 2025 & 2026, 3% subsequent years; in 24 budget was 8% 25, 6% in 26**
2	41020	Grants in lieu of Taxes	OVR153-100	Central RR Subregion Administration	(12,270)	(36,533)	(10,725)	***(10,725)***	(10,725)	(10,725)	(10,725)	(10,725)	Placeholder
3	**41020**	**Grants in lieu of Taxes**			**(12,270)**	**(36,533)**	(10,725)	***(10,725)***	**(10,725)**	**(10,725)**	**(10,725)**	**(10,725)**	
4	42020	Sale of Services	OPR293-100	BAL Facility O&M	(199,184)	(185,191)	(207,888)	***(203,710)***	(209,821)	(216,116)	(222,600)	(229,278)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025
5	42020	Sale of Services	OPR296-100	CEN Facility O&M	(156,362)	(115,315)	(142,220)	***(126,847)***	(130,652)	(134,571)	(138,609)	(142,767)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025; organics directly coded to A120
6	42020	Sale of Services	OPR300-100	KAS-Facility O& M	(198,581)	(168,844)	(188,017)	***(185,728)***	(191,300)	(197,039)	(202,950)	(209,039)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025
7	42020	Sale of Services	OPR301-100	MAR-Facility O&M	(42,992)	(43,660)	(49,347)	***(48,026)***	(49,467)	(50,951)	(52,479)	(54,054)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025
8	42020	Sale of Services	OPR303-100	GRO Facility O&M	(1,543,934)	(1,466,077)	(1,627,650)	***(1,612,685)***	(1,661,065)	(1,710,897)	(1,762,224)	(1,815,091)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025; remove organics starting 2024
9	42020	Sale of Services	OPR614-100	GRO - Compost	0	(1,002)	(1,102)	***(1,102)***	(2,204)	(20,000)	(20,000)	(20,000)	Placeholder GRO compost.
10	42020	Sale of Services	OPR418-100	YMR TF Ymir TS	(24,707)	(15,311)	(17,018)	***(16,842)***	(17,347)	(17,868)	(18,404)	(18,956)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025
11	**42020**	**Sale of Services**			**(2,165,760)**	**(1,995,400)**	*(2,233,242)*	***(2,194,940)***	**(2,261,857)**	**(2,347,443)**	**(2,417,266)**	**(2,489,184)**	**10% increase in 2025; 3% subsequent years**
12	42030	User Fees	OVR153-100	Central RR Subregion Administration	(50,000)	(32,740)	(33,395)	***(33,395)***	(33,395)	(33,395)	(33,395)	(33,395)	Estimate - waste soil disposal app fees; scrap metal rebates (metal prices high), 2023 $5k MARR reimbursement incorrectly coded here.
13	**42030**	**User Fees**			**(50,000)**	**(32,740)**	(33,395)	***(33,395)***	**(33,395)**	**(33,395)**	**(33,395)**	**(33,395)**	
14	42035	User Fees - Specified	OPR590-100	ENV-Central MARR Program reimbursement	(10,000)	(8,705)	(14,256)	***(14,256)***	(14,399)	(14,543)	(14,688)	(14,835)	Placeholder MARR reimbursement
15	**42035**	**User Fees - Specified**			**(10,000)**	**(8,705)**	(14,256)	***(14,256)***	**(14,399)**	**(14,543)**	**(14,688)**	**(14,835)**	
16	43020	Grants	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Remove; Growing Communities Fund ($100K) in 2023
17	43020	Grants	OVR153-100	Central RR Subregion Administration	(20,000)	(3,805)	(16,000)	***(16,000)***	0	0	0	0	MIABC Grant for GRO railings (24 prep; 25 painting)
18	43025	Grants - Specified	CAP1242-100	Regional curbside program development	(87,298)	0	(7,000)	***(7,000)***	0	0	0	0	Rural curbside not to proceed;$7k in 2025 OICP spending for diversion improvements and contamination reduction before funding deadline in March.
19	**43025**	**Grants - Specified**			**(107,298)**	**(3,805)**	(23,000)	***(23,000)***	**0**	**0**	**0**	**0**	
20	43100	Proceeds from Borrowing	CAP1235-100	CEN - Legacy Landfills	0	0	0	***0***	0	0	(4,000,000)	0	Legacy landfills - Nelson, Balfour, Kaslo, Marblehead and Salmo Landfills, both assessment and closure works deferred by 1 year (less remaining GCF grant reserve); Work in 24 funded by GCF and reserves; work in 2026 was moved to reserve funded
21	43100	Proceeds from Borrowing	CAP1317-100	CEN RR -Subregion - Hauling Building	0	0	0	***0***	(1,500,000)	0	0	0	CEN fleet building; Increased by $1M see note in CAP expense
22	43100	Proceeds from Borrowing	CAP1242-100	Regional curbside program development	(98,483)	0	0	***0***	0	0	0	0	Remove; Rural curbside not to proceed
23	43100	Proceeds from Borrowing	CAP767-100	NEL TS - Nelson Landfill Closure	0	0	0	***0***	(747,000)	0	0	0	70 Lakeside drive landfill closure, 2025 plan costs moved to reserves
24	43100	Proceeds from Borrowing	OPR417-301	HBD Facility O&M	(449,827)	(449,827)	0	***0***	0	0	0	0	HB - short term borrowing for HB CAP works due to low reserves (all borrowed late 2024)
25	**43100**	**Proceeds from Borrowing**			**(548,310)**	**(449,827)**	0	***0***	**(2,247,000)**	**0**	**(4,000,000)**	**0**	
26	43200	Proceeds from Equipment Financing	CAP970-100	ENV - RR - Roll Off Truck & Bin Replacement	0	0	(400,000)	***(400,000)***	0	0	0	0	Truck and winch system
27	43200	Proceeds from Equipment Financing	CAP972-100	ENV - RR - Waste Hauling Tractor Truck	0	0	(350,000)	***(350,000)***	0	0	0	0	Tractor
28	43200	Proceeds from Equipment Financing	CAP1400-100	Central Loader	(325,000)	0	0	***0***	0	0	0	0	Moved to Reserve funded at end of 2024

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
29	43200	Proceeds from Equipment Financing	CAP1526-100	RO bin trailer	(220,000)	0	0	***0***	0	0	0	0	Roll off trailer - cost est reduced to $75K; moved to reserve funded in 2025
30	43200	Proceeds from Equipment Financing	CAP1403-100	GRO fleet unit	(60,000)	0	0	***0***	0	0	0	0	moved to Reserve funded in 2025
31	43200	Proceeds from Equipment Financing	OVR153-100	Central RR Subregion Administration	(250,000)	0	(270,000)	***(300,000)***	***(300,000)***	0	0	0	Compacting trailers; deferred 2024 unit to 2025; another replacement planned for 26/27
32	**43200**	**Proceeds from Equipment Financing**			**(855,000)**	**0**	*(1,020,000)*	***(1,050,000)***	**(300,000)**	**0**	**0**	**0**	
33	43300	Proceeds from Asset Disposal	OVR153-100	Central RR Subregion Administration	(5,000)	0	(75,000)	***(75,000)***	(30,000)	0	0	0	Placeholder- sale of KAS (25) and BAL (26) loaders; Assess sale of RO Truck (May keep for GRO), Tractor (~$50K) and/or compacting trailers (~20K) as replaced
34	**43300**	**Proceeds from Asset Disposal**			**(5,000)**	**0**	(75,000)	***(75,000)***	**(30,000)**	**0**	**0**	**0**	
35	43500	External Contributions & Contracts	OVR153-100	Central RR Subregion Administration	(7,900)	0	(4,345)	***(4,345)***	(4,432)	(4,521)	(4,611)	(4,703)	2025-2029: assumes full Teck repayment for ML/ARD assessment in HB borrow, with 1 sampling event completed per year (2024 assumed 2). Assumes a 10% increase in ML/ARD assessment costs in 2025 due to expiry of monitoring contract, and new contract being established, then a 2% increase
36	43500	External Contributions & Contracts	OVR153-302	CEN Central Subregion HHW Events	(3,000)	(3,000)	(3,000)	***(3,000)***	(3,000)	(3,000)	(3,000)	(3,000)	BCUOMA contribution to HHW events ($1500/event)
37	**43500**	**External Contributions & Contracts**			**(10,900)**	**(3,000)**	(7,345)	***(7,345)***	**(7,432)**	**(7,521)**	**(7,611)**	**(7,703)**	
38	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	(196,000)	(393,811)	(453,000)	***(500,296)***	(658,276)	(245,676)	(173,819)	(67,135)	CAP works not funded from borrowing; includes some HB Professional Fees
39	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	***0***	***0***	***0***	***0***	Placeholder ARO Landfill Closure Reserve (post closure costs)
40	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	0	0	(208,591)	***(208,591)***	0	0	0	0	Remaining 2024 HB Loan carried into 2025
41	45000	Transfer from Reserves	CAP1317-100	CEN RR -Subregion - Hauling Building	(60,000)	(6,398)	(60,000)	***(60,000)***	(35,182)	0	0	0	Growing Communities Fund (GCF) Allocation - Fleet Hauling Buidling
42	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	(50,000)	0	(50,000)	***(50,000)***	0	0	0	0	Central Septage Reserve
43	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Placeholder: Stabilization reserve
44	**45000**	**Transfer from Reserves**			**(306,000)**	**(400,209)**	*(771,591)*	***(818,887)***	**(693,458)**	**(245,676)**	**(173,819)**	**(67,135)**	
45	45500	Transfer from Other Service	OPR619-100	OOT - Compost Hauling to CEN	(49,030)	(49,030)	(80,000)	***(80,000)***	(88,000)	(96,800)	(106,480)	(117,128)	Transfer from S188 for hauling of organics from OOT to CEN
46	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(8,000)	(8,000)	0	***0***	0	0	0	0	Transfer from A120 for 40Ft SeaCan
47	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(7,500)	0	(11,000)	***(11,000)***	0	0	0	0	Transfer from A120 for 1/2 of auto kiosk
48	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(1,519)	(1,519)	(1,519)	***(1,519)***	0	0	0	0	Transfer from S186 for HHW depot Reso # 785/21, remove once CRE ecodepot established.
49	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(9,701)	(9,701)	(9,701)	***(9,701)***	0	0	0	0	transfer from S188 for HHW Reso # 845/21, remove once Cgar ecodepot established.
50	**45500**	**Transfer from Other Service**			**(75,749)**	**(68,249)**	(102,219)	***(102,219)***	**(88,000)**	**(96,800)**	**(106,480)**	**(117,128)**	
51	45900	Transfer from Provisions	OVR153-102	Central RR Subregion Administration - HB Mine	0	0	0	***0***	0	0	0	0	HB
52	45900	Transfer from Provisions	OVR153-103	Central RR Subregion Administration - Nelson	0	0	0	***0***	0	0	0	0	70 Lakeside
53	**45900**	**Transfer from Provisions**			**0**	**0**	0	***0***	**0**	**0**	**0**	**0**	
54	49100	Prior Year Surplus	OVR153-100	Central RR Subregion Administration	(274,257)	2,845,020	0	***0***	0	0	0	0	Placeholder prior year surplus/deficit; 2024 value under review
55	49100	Prior Year Surplus	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	portion of surplus carried into next year to fund work carried over
56	49100	Prior Year Surplus	OVR153-100	Central RR Subregion Administration	0	(469,386)	0	***0***	0	0	0	0	ARO - landfill closure

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
57	49100	Prior Year Surplus	OVR153-102	Central RR Subregion Administration - HB Mine	0	3,659,627	0	***0***	0	0	0	0	HB
58	49100	Prior Year Surplus	OVR153-103	Central RR Subregion Administration - Nelson	0	740,000	0	***0***	0	0	0	0	70 Lakeside
59	**49100**	**Prior Year Surplus**			**(274,257)**	**6,775,261**	0	***0***	**0**	**0**	**0**	**0**	
60	**TOTAL REVENUE**				**(8,113,571)**	**83,766**	*(8,288,114)*	***(8,318,236)***	**(9,883,473)**	**(7,079,225)**	**(11,216,801)**	**(7,326,507)**	
61	**TAXATION**				**(3,693,027)**	**(3,693,027)**	*(3,997,340)*	***(3,988,469)***	**(4,197,207)**	**(4,323,123)**	**(4,452,817)**	**(4,586,401)**	
62	**TIPPING FEES**				**(2,165,760)**	**(1,995,400)**	*(2,233,242)*	***(2,194,940)***	**(2,261,857)**	**(2,347,443)**	**(2,417,266)**	**(2,489,184)**	
63	**CAP FUNDING SUBTOTAL**				**(1,709,310)**	**(850,036)**	(1,791,591)	**(1,868,887)**	**(3,240,458)**	**(245,676)**	**(4,173,819)**	**(67,135)**	
64	**TOTAL REVENUE (w/o Prior Year Surplus)**				**(7,839,314)**	**(6,691,495)**	*(8,288,114)*	***(8,318,236)***	**(9,883,473)**	**(7,079,225)**	**(11,216,801)**	**(7,326,507)**	
65	**TOTAL OPERATING REVENUE**				**(6,009,805)**	**(5,837,654)**	*(6,394,178)*	***(6,347,004)***	**(6,608,583)**	**(6,829,029)**	**(7,038,371)**	**(7,254,669)**	
66	51010	Salaries	OPR417-301	HBD Facility O&M	33,757	36,178	51,891	***51,891***	41,513	31,135	32,069	25,945	2025 increased to 50% HB Tech for increased First Nations engagement and legal activities - based on Salary Worksheet (1% CPI); continued reduction in coming years (40% in 2026; 30% in 2027, 30% in
67	51010	Salaries	OVR153-100	Waste Spotter	38,605	0	0	***0***	0	0	0	0	Moving to LFA shifts; Remove in 2026
68	51010	Salaries	OPR623-100	CEN - Lead Hand	35,302	31,562	40,345	***40,345***	41,555	42,802	44,086	45,409	Lead Hand - 70% (other 30% to allocation service); Based on Salary Worksheet (CA est 3.3%)
69	51010	Salaries	OPR621-100	CEN-Drivers	0	0	0	***0***	0	0	0	0	New WOs to track Drivers - based on Salary Worksheet (1%); to be split out in 2025
70	51010	Salaries	OPR625-100	CEN - Operators	432,205	544,171	562,129	***549,613***	566,101	583,084	600,577	618,594	New WO to track Operators; 70% RMOSS; based on Salary Worksheet (1%); drivers to be split out in 2025
71	51010	Salaries	OVR153-100	Central RR Subregion Administration	264,246	378,710	298,159	***298,159***	291,501	300,246	309,254	318,531	Attendants - Based on projected salary worksheet (3.3%); increase in 2025 due to waste spotter role moving to LFA; CA payout 4% in 2025
72	**51010**	**Salaries**			**804,115**	**990,620**	*952,524*	***940,008***	**940,671**	**957,267**	**985,985**	**1,008,479**	
73	51020	Overtime	OPR417-301	HBD Facility O&M	500	0	0	***0***	0	0	0	0	Based on previous budgets
74	51020	Overtime	OPR623-100	CEN - Lead Hand	1,000	604	500	***500***	500	500	500	500	Lead Hand
75	51020	Overtime	OVR153-100	Central RR Subregion Administration	10,000	21,112	5,000	***5,000***	5,000	5,000	5,000	5,000	Based on previous budgets; 2024 lack of drivers was $18k
76	**51020**	**Overtime**			**11,500**	**21,716**	5,500	***5,500***	**5,500**	**5,500**	**5,500**	**5,500**	
77	51030	Benefits	OPR417-301	HBD Facility O&M	9,789	15,913	15,567	***15,567***	9,952	7,464	7,465	7,466	HB Tech - based on Salary Worksheet
78	51030	Benefits	OVR153-100	Waste Spotter	14,348	0	0	***0***	0	0	0	0	Moving to LFA shifts
79	51030	Benefits	OPR623-100	CEN - Lead Hand	10,238	5,808	10,442	***10,442***	10,651	10,864	11,081	11,303	Lead Hand - 70% (other 30% to allocation service); Based on Salary Worksheet
80	51030	Benefits	OPR621-100	CEN-Drivers	0	0	0	***0***	0	0	0	0	New WOs to track Drivers - based on Salary Worksheet (1%); to be split out in 2025
81	51030	Benefits	OPR625-100	CEN - Operators	125,339	144,118	127,846	***191,587***	197,334	203,254	209,352	215,632	New WO to track Operators; 70% RMOSS; based on Salary Worksheet (1%); drivers to be split out in 2025
82	51030	Benefits	OVR153-100	Central RR Subregion Administration	66,062	67,371	69,334	***69,334***	71,414	73,556	75,763	78,036	Attendants - Based on salary worksheet; increase in 2025 due to waste spotter role moving to LFA
83	**51030**	**Benefits**			**225,776**	**233,210**	*223,189*	***286,930***	**289,351**	**295,139**	**303,661**	**312,437**	
84	51050	Employee Health & Safety	OPR293-100	BAL Facility O&M	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
85	51050	Employee Health & Safety	OPR296-100	CEN Facility O&M	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
86	51050	Employee Health & Safety	OPR300-100	KAS-Facility O& M	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
87	51050	Employee Health & Safety	OPR301-100	MAR-Facility O&M	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
88	51050	Employee Health & Safety	OPR303-100	GRO Facility O&M	300	318	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
89	51050	Employee Health & Safety	OPR415-300	Vehicle Operations	300	239	300	***300***	300	300	300	300	Specific H&S supplies for hauling vehicles
90	51050	Employee Health & Safety	OPR417-301	HBD Facility O&M	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
91	51050	Employee Health & Safety	OPR418-100	YMR TF Ymir TS	300	0	300	***300***	300	300	300	300	Coded to gen WO; Site specific H&S supplies
92	51050	Employee Health & Safety	OPR623-100	CEN - Lead Hand	100	1,943	100	***100***	100	100	100	100	Coded to gen WO; General subregion supplies
93	51050	Employee Health & Safety	OVR153-100	Central RR Subregion Administration	10,812	7,758	11,028	***11,028***	11,249	11,530	11,818	12,114	LFA, Driver, Operators, LH footwear, jackets, training, safety check-in monitoring, based on 2/3 H&S coordinator estimate
94	**51050**	**Employee Health & Safety**			**13,312**	**10,256**	13,528	***13,528***	**13,749**	**14,030**	**14,318**	**14,614**	
95	51500	Directors - Allowance & Stipend	OVR153-100	Central RR Subregion Administration	25,744	25,744	26,141	***26,141***	26,664	27,197	27,741	28,296	70% (other 20% A117, 10% A120) Based on up to 14 RR meetings for 6 Directors - 4 additional Chair meetings; Chair stipend.
96	**51500**	**Directors - Allowance & Stipend**			**25,744**	**25,744**	26,141	***26,141***	**26,664**	**27,197**	**27,741**	**28,296**	
97	51560	Directors - Travel	OVR153-100	Central RR Subregion Administration	1,500	1,500	2,205	***2,205***	2,315	2,431	2,553	2,680	Mix of remote or Board room.
98	**51560**	**Directors - Travel**			**1,500**	**1,500**	2,205	***2,205***	**2,315**	**2,431**	**2,553**	**2,680**	
99	52010	Travel	OPR417-301	HBD Facility O&M	0	0	3,000	***3,000***	0	0	0	0	HB Tech training. 2025 increase due to $1.5 k for hotel/travel in Vancouver for Tailings conference, $1.5k for attending in-person First Nations engagement activities.
100	52010	Travel	OPR623-100	CEN - Lead Hand	9,303	3,174	9,768	***9,768***	10,256	10,769	11,307	11,873	70% Lead Hand - cash handling and gen site travel; utilizing fleet from head office to reduce mileage
101	52010	Travel	OVR153-100	Central RR Subregion Administration	5,542	3,031	6,469	***6,469***	6,793	7,133	7,489	7,864	Landfill attendant - mileage for staff training/development/out of area shift coverage (10% increase).
102	52010	Travel	OVR153-302	CEN Central Subregion HHW Events	0	0	300	***300***	300	300	300	300	Staff travel to HHW events
103	**52010**	**Travel**			**14,845**	**6,205**	19,537	***19,537***	**17,349**	**18,202**	**19,097**	**20,036**	
104	52020	Education & Training	OPR417-301	HBD Facility O&M	0	0	1,500	***1,500***	0	0	0	0	HB Tech training. 2025 tailings conference registration.
105	52020	Education & Training	OVR153-100	Central RR Subregion Administration	1,000	280	2,000	***4,000***	4,000	4,000	4,000	4,000	Attendant training; staff incentives
106	**52020**	**Education & Training**			**1,000**	**280**	*3,500*	***5,500***	**4,000**	**4,000**	**4,000**	**4,000**	
107	52030	Memberships, Dues & Subscriptions	OPR417-301	HBD Facility O&M	90	110	110	***110***	110	110	110	110	CDA membership
108	**52030**	**Memberships, Dues & Subscriptions**			**90**	**110**	110	***110***	**110**	**110**	**110**	**110**	
109	53020	Admin, Office Supplies & Postage	OPR303-100	GRO Facility O&M	250	288	200	***200***	200	200	200	200	Gen supplies
110	53021	Admin, Office Supplies & Postage	OPR300-100	KAS-Facility O&M	100	0	100	***100***	100	100	100	100	Gen supplies
111	53021	Admin, Office Supplies & Postage	OPR296-100	CEN Facility O&M	150	164	150	***150***	150	150	150	150	Gen supplies
112	53020	Admin, Office Supplies & Postage	OPR417-301	HBD Facility O&M	100	100	300	***300***	100	100	100	100	Gen supplies. 2025 increase for letters/postage, additional supplies needed for FN engagement activities.
113	53020	Admin, Office Supplies & Postage	OVR153-100	Central RR Subregion Administration	500	276	200	***200***	200	200	200	200	Gen supplies
114	53020	Admin, Office Supplies & Postage	OVR153-302	CEN Central Subregion HHW Events	150	150	300	***300***	300	300	300	300	hand-outs, event lunch for volunteers
115	**53020**	**Admin, Office Supplies & Postage**			**1,250**	**978**	1,250	***1,250***	**1,050**	**1,050**	**1,050**	**1,050**	
116	53030	Communication	OPR293-100	BAL Facility O&M	3,312	1,789	1,842	***1,842***	1,879	1,917	1,955	1,994	Based on projected + 3%

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
117	53030	Communication	OPR296-100	CEN Facility O&M	3,033	5,000	5,150	***5,150***	5,253	5,358	5,465	5,575	Based on projected + 3%; 2024 had $2.6k network & internet upgrades
118	53030	Communication	OPR300-100	KAS-Facility O& M	1,302	2,379	2,450	***2,450***	2,499	2,549	2,600	2,652	Based on projected + 3%
119	53030	Communication	OPR301-100	MAR-Facility O&M	3,894	4,774	4,917	***4,917***	5,015	5,116	5,218	5,322	Based on projected + 3%
120	53030	Communication	OPR303-100	GRO Facility O&M	1,592	1,346	1,387	***1,387***	1,414	1,443	1,472	1,501	Based on projected + 3%
121	53030	Communication	OPR415-300	Vehicle Operations	1,000	0	0	***0***	0	0	0	0	radios, Zoleo for drivers (one for lake run)
122	53030	Communication	OPR418-100	YMR TF Ymir TS	188	166	171	***171***	176	182	187	193	new cell
123	53030	Communication	OVR153-100	Central RR Subregion Administration	9,880	6,193	6,316	***6,316***	6,443	6,572	6,703	6,837	Based on projected +3%; Zoleo for lead hands
124	**53030**	**Communication**			**24,200**	**21,646**	22,234	***22,234***	**22,680**	**23,135**	**23,600**	**24,074**	
125	53040	Advertising	OVR153-100	Central RR Subregion Administration	3,000	200	1,500	***2,500***	1,500	1,500	1,500	1,500	As per RRP improved education/communication; Ads, brochures; $1k for ICI pilot 2025
126	53040	Advertising	OVR153-302	CEN Central Subregion HHW Events	1,000	0	1,000	***1,000***	1,000	1,000	1,000	1,000	As per RRP improved education/communication
127	**53040**	**Advertising**			**4,000**	**200**	*2,500*	***3,500***	**2,500**	**2,500**	**2,500**	**2,500**	
128	53050	Insurance	OPR293-100	BAL Facility O&M	502	502	517	***517***	532	548	565	582	projected + 3%
129	53050	Insurance	OPR296-100	CEN Facility O&M	791	791	815	***815***	840	865	891	918	projected + 3%
130	53050	Insurance	OPR300-100	KAS-Facility O& M	373	373	384	***384***	396	408	420	433	projected + 3%
131	53050	Insurance	OPR301-100	MAR-Facility O&M	48	48	49	***49***	50	52	53	55	projected + 3%
132	53050	Insurance	OPR303-100	GRO Facility O&M	960	960	989	***989***	1,018	1,049	1,080	1,113	projected + 3%
133	53050	Insurance	OPR415-154	Roll Off Trailers (154,155,156)	0	0	0	***0***	0	0	0	0	projected + 3%
134	53050	Insurance	OPR415-160	Cat Loader NTS	932	932	960	***960***	989	1,019	1,049	1,081	projected + 3%
135	53050	Insurance	OPR415-164	2006 Hyundai Loader Central	1,288	1,288	1,327	***1,327***	1,367	1,408	1,450	1,493	projected + 3%
136	53050	Insurance	OPR415-172	2012 Hyundai Loader Grohman	1,043	1,043	1,074	***1,074***	1,106	1,139	1,173	1,209	projected + 3%
137	53050	Insurance	OPR415-175	2014 Universal Compacting Trailer-PTO Drive	1,442	1,442	1,485	***1,485***	1,529	1,575	1,623	1,671	projected + 3%
138	53050	Insurance	OPR415-176	2014 Universal Compacting Trailer-Diesel	1,442	1,442	1,485	***1,485***	1,529	1,575	1,623	1,671	projected + 3%
139	53050	Insurance	OPR415-177	2015 Western Star Highway Tractor	3,407	3,407	3,510	***3,510***	3,615	3,723	3,835	3,950	projected + 3%
140	53050	Insurance	OPR415-178	2016 Compacting Trailer	924	924	952	***952***	981	1,010	1,040	1,072	projected + 3%
141	53050	Insurance	OPR415-183	2020 Western Star Highway Tractor	5,664	5,664	5,834	***5,834***	6,009	6,189	6,375	6,566	projected + 3%
142	53050	Insurance	OPR415-184	2020 Western Star Highway Tractor	5,664	5,664	5,834	***5,834***	6,009	6,189	6,375	6,566	projected + 3%
143	53050	Insurance	OPR415-185	2022 Western Star Highway Tractor	2,560	2,560	2,636	***2,636***	2,716	2,797	2,881	2,967	projected + 3%
144	53050	Insurance	OPR415-186	2022 Western Star Highway Tractor	2,748	2,748	2,831	***2,831***	2,916	3,003	3,093	3,186	projected + 3%
145	53050	Insurance	OPR418-302	YMR Facility O&M	36	36	37	***37***	38	39	40	42	projected + 3%

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
146	53050	Insurance	OVR153-100	Central RR Subregion Administration	5,071	5,071	5,223	***5,223***	5,380	5,541	5,707	5,879	projected + 3%
147	**53050**	**Insurance**			**34,895**	**34,895**	35,942	***35,942***	**37,020**	**38,130**	**39,274**	**40,453**	
148	53080	Licence & Permits	OPR293-100	BAL Facility O&M	750	0	750	***750***	750	750	750	750	BAL water fees, may drop with meter
149	53080	Licence & Permits	OVR153-100	Central RR Subregion Administration	250	0	250	***250***	200	200	200	200	water license fees for scale shack well
150	53080	Licence & Permits	OVR153-100	Central RR Subregion Administration	4,000	3,478	4,000	***4,000***	4,000	4,000	4,000	4,000	Drone software
151	53080	Licence & Permits	OVR153-100	Central RR Subregion Administration	11,940	12,776	12,776	***12,776***	12,776	12,776	12,776	12,776	Scale software license - site specific; some costs previous coded to A102 allocated to services based on use.
152	53080	Licence & Permits	OPR417-303	HBD - Remediation and Closure	5,000	10,660	1,500	***1,500***	0	20,000	0	0	2024: HB permit amendment fee $10k, meeting with ENV $660. 2025: ENV costs for potential meetings around Site Disclosure Statements (Scenario 1 release). HB release of mines permit for compost area - EMLI fees for permit amendment application review, ENV fees for meetings around future site management. 2027 - $20k for HB Reclamation Permit Amendment for EMLI fees to submit 5 year reclamation plan to reduce monitoring frequencies.
153	53080	Licence & Permits	OPR417-303	HBD - Remediation and Closure	0	0	0	***0***	0	0	0	0	Remove; moved into line above
154	**53080**	**Licence & Permits**			**21,940**	**26,913**	19,276	***19,276***	**17,726**	**37,726**	**17,726**	**17,726**	
155	54010	Legal	OPR417-303	HBD - Remediation and Closure	60,000	28,000	50,000	***50,000***	30,000	0	0	0	Teck negotations
156	**54010**	**Legal**			**60,000**	**28,000**	50,000	***50,000***	**30,000**	**0**	**0**	**0**	
157	54040	Consulting Fees	OPR296-100	CEN Facility O&M	80,000	63,000	55,000	***55,000***	0	0	0	81,150	2024 Hydrogeo, Benthic Assessment start in 2024 with lab & reporting in 2025; 2025 $10k for 5 yr plan, $5k for OMEP, $10K survey, $15k DO update/Permit assessment; 2029 Hydrogeo/Benth repeat
158	54040	Consulting Fees	OPR296-101	CEN-Environmental Monitoring	5,000	0	5,000	***5,000***	5,000	5,000	5,000	5,000	$5K placeholder for engineering oversight
159	54040	Consulting Fees	OPR417-301	HBD Facility O&M	196,722	175,000	327,000	***327,000***	119,000	121,380	60,690	141,904	2025: $10k DSR, $8k EPRP facilitated test, Enviro Monitor ($14.4k new HSRC reports, $3k d/s channel and flume inspection and memo, $7k Annual Reclamation report assistance, $5.5k OMS/EPRP assistance and EPRP test participation, $2k participate in ITRB meetings, $4k DSR participation, $8K legal), EOR Tasks ($59.9k Routine EOR, $18.1k PM & meetings, $7k DSR review, $30.3k Stability Analysis, $1.8k ML report review, $88k New HSRC reports), $20k for EOR/EM consultant support for permit amendments/SDS process, $40k for ITRB general review and DSR review involvement. 2026 - 2028: EOR ($55k for DSI, mon oversight, OMS, risk register, PM), Enviro Monitor ($50k meetings, reports/plan reviews, inspections), $14k ITRB regular review. Assumes 2%/yr increase. 2028: assumes permit for reduced Mines Act requirements is obtained, which halves routine O&M tasks (50% of 2027 costs for $60k) 2029: 2% increase on 2028, plus DSR is required $80k
160	54040	Consulting Fees	OVR153-100	Central RR Subregion Administration	2,000	420	9,000	***9,000***	0	0	0	0	2024 FOI requests for historical landfills ($500/site) 2025: desktop AOA arch assessments on legacy sites and sites with upcoming CAP works $1.8k/site
161	**54020**	**Professional Fees**			**283,722**	**238,420**	396,000	***396,000***	**124,000**	**126,380**	**65,690**	**228,054**	
162	54030	Contracted Services	OPR293-100	BAL Facility O&M	6,440	13,563	14,010	***14,010***	14,430	14,863	15,309	15,768	Gen maint contract; projected x 3.3%
163	54030	Contracted Services	OPR293-300	BAL Material Processing	44,194	28,444	29,382	***29,382***	30,264	31,172	32,107	33,070	3.3% increase; mini propane $2000, tires $500, wood $10k
164	54030	Contracted Services	OPR293-301	BAL Snow Removal	11,909	7,613	7,864	***7,864***	8,100	8,343	8,593	8,851	Based on projected x 3.3%
165	54030	Contracted Services	OPR296-100	CEN Facility O&M	5,904	6,000	6,198	***6,198***	6,384	6,575	6,773	6,976	Placeholder; projected x 3.3%
166	54030	Contracted Services	OPR296-101	CEN-Environmental Monitoring	24,265	24,554	23,000	***23,000***	23,690	24,401	25,133	25,887	2025 Contract change 10%, 3% thereafter.
167	54030	Contracted Services	OPR296-300	CEN Material Processing	163,532	115,000	118,795	***118,795***	122,359	126,030	129,811	133,705	Tires $500, mini propane $500, wood $95k

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
168	54030	Contracted Services	OPR296-301	CEN Snow Removal	12,188	19,169	19,801	***19,801***	20,395	21,007	21,637	22,287	Based on projected x 3.3%
169	54030	Contracted Services	OPR300-100	KAS-Facility O& M	16,268	10,798	11,154	***11,154***	8,923	5,577	5,688	5,802	Biffy $3590 (remove after washroom install 26), fire $200, est maint $12k; projected x 3.3%
170	54030	Contracted Services	OPR300-300	KAS Material Processing	3,100	17,419	1,200	***1,200***	17,941	1,200	18,480	1,200	mini propane $800, tires $400, wood $15k (alternating years)
171	54030	Contracted Services	OPR300-301	KAS Snow Removal	23,848	17,379	17,952	***17,952***	18,491	19,046	19,617	20,205	Based on projected x 3.3%
172	54030	Contracted Services	OPR301-100	MAR-Facility O&M	10,700	7,899	8,159	***8,159***	8,404	8,656	8,916	9,183	Biffy $3654, General Maint contract; projected x 3.3%
173	54030	Contracted Services	OPR301-300	MAR Material Processing	6,437	1,800	3,859	***3,859***	3,975	4,094	4,217	4,344	Hauling wood $2000, tires $300, mini propane $1000
174	54030	Contracted Services	OPR301-301	MAR Snow Removal	12,745	8,876	9,169	***9,169***	9,444	9,728	10,019	10,320	Based on projected x 3.3%
175	54030	Contracted Services	OPR303-100	GRO Facility O&M	11,834	7,190	7,427	***7,427***	7,650	7,880	8,116	8,359	Added B&L pick up $7k, DHC, highway cleanup $1500; projected x 3.3%
176	54030	Contracted Services	OPR303-101	GRO Environmental Monitoring	570	570	700	***700***	721	743	765	788	Pacific Insight GW monitoring
177	54030	Contracted Services	OPR303-301	GRO Snow Removal	7,248	17,744	18,329	***18,329***	18,879	19,446	20,029	20,630	Based on projected x 3.3%
178	54030	Contracted Services	OPR303-305	GRO - Material Processing	19,614	2,783	2,874	***2,874***	2,961	3,049	3,141	3,235	Based on projected X 3.3% Mini propane, tires
179	54030	Contracted Services	OPR417-302	HBD Environmental Monitoring	14,816	15,865	17,461	***17,461***	17,811	18,167	9,083	9,265	Routine EMP sampling, reporting and lab costs, includes 2 events per year. 2025 Contract change 10% increase then 2% thereafter until 2027. 2027 assumes 50% reduction in monitoring due to permit amendment and reduced monitoring; HB project related costs for increased monitoring (additional 2 events per year) are allocated to 54040.
180	54030	Contracted Services	OPR418-300	YMR Snow Removal	3,863	2,725	2,815	***2,815***	2,899	2,986	3,076	3,168	Based on projected x 3.3%
181	54030	Contracted Services	OPR418-302	YMR Facility O&M	6,852	2,888	2,983	***2,983***	3,072	3,164	3,259	3,357	Biffy $2k, fire $100; projected x 3.3%
182	54030	Contracted Services	OPR578-100	CEN Central Subregion HHW Depot Operation	161,117	161,117	166,434	***166,434***	171,427	176,570	181,867	187,323	Nelson Leafs depot, dependant on volume of HHW collected
183	54030	Contracted Services	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Remove; New scale software/support (moved to A102)
184	54030	Contracted Services	OVR153-100	Central RR Subregion Administration	3,000	17,096	17,660	***17,660***	18,190	18,736	19,298	19,877	Site surveillance oversight (SAL/GRO/BAL)
185	54030	Contracted Services	OVR153-100	Central RR Subregion Administration	16,000	16,000	20,000	***20,000***	20,000	16,000	16,000	16,000	CKISS / invasives management - 2025-2026 HB, CEN, BAL, KAS, assumes costs for all sites except HB increase due to possible switching to mechanical/hand removal. Assumes minor decrease in effort
186	54030	Contracted Services	OVR153-302	CEN Central Subregion HHW Events	15,000	22,244	15,000	***15,000***	24,468	16,500	26,915	18,150	Updated to alternate Salmo event every 2 yrs; Based on events in Kas & Salmo and 30% of EPR - Recycling Reg to include more HHW by 2024.
187	**54030**	**Contracted Services**			**601,448**	**544,733**	542,229	***542,229***	**580,880**	**563,932**	**597,850**	**587,751**	
188	55010	Repairs & Maintenance	OPR293-100	BAL Facility O&M	10,000	2,861	9,100	***9,100***	9,100	9,100	9,100	9,100	Gen repairs; dust control ($6.5K), scale maint, transtors, fire
189	55010	Repairs & Maintenance	OPR293-302	BAL Civil/Structural Repairs	8,000	0	0	***0***	0	0	0	0	Placeholder
190	55010	Repairs & Maintenance	OPR296-100	CEN Facility O&M	12,000	4,731	18,000	***18,000***	3,000	3,000	3,000		Gen repairs; dust control ($7.5k), scale maint, transtor, fire; 2025 rodent control additional $15k (addressing population, backfilling burrows)
191	55010	Repairs & Maintenance	OPR296-302	CEN Civil/Structural Repairs	8,500	0	8,500	***8,500***	0	0	0	0	Placeholder; Resurface scale & repair/replace traffic light, snow guardm deferred to 2025
192	55010	Repairs & Maintenance	OPR300-100	KAS-Facility O& M	14,000	1,686	12,000	***12,000***	10,500	10,500	10,500	10,500	Gen repairs; transtor maint, generator maintenace, dust ($7.5k); Flooring in shack ($1500)
193	55010	Repairs & Maintenance	OPR300-302	KAS Civil/Structural Repairs	2,000	0	30,000	***30,000***	0	0	0	0	Placeholder; 2025 bin wall repair $30K
194	55010	Repairs & Maintenance	OPR301-100	MAR-Facility O&M	9,400	21	11,000	***11,000***	4,000	4,000	4,000	4,000	Gen Repairs, dust ($4k); Brushing $5K
195	55010	Repairs & Maintenance	OPR301-302	MAR Civil/Structural Repairs	5,000	0	0	***0***	0	0	0	0	Brushing moved to O&M above

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
196	55010	Repairs & Maintenance	OPR303-100	GRO Facility O&M	32,000	14,561	8,000	***8,000***	8,000	8,000	8,000	8,000	Gen repairs, Dust ($3k), 2024 Railing painting $20k
197	55010	Repairs & Maintenance	OPR303-302	GRO Civil/Structural Repairs	5,000	0	5,000	***5,000***	5,000	5,000	5,000	5,000	Transtor bin repairs; scale maintenance
198	55010	Repairs & Maintenance	OPR415-100	Bin Maintenance	15,000	11,405	13,000	***13,000***	13,000	13,000	13,000	13,000	Gen repairs
199	55010	Repairs & Maintenance	OPR415-154	Roll Off Trailers (154,155,156)	1,000	2,691	1,000	***1,000***	1,000	1,000	1,000	1,000	Gen repairs
200	55010	Repairs & Maintenance	OPR415-160	Cat Loader NTS	2,000	4,808	1,000	***1,000***	0	0	0	0	Gen repairs (Balfour loader); sell after purchase of new loader - BAL will inhert loader from CEN
201	55010	Repairs & Maintenance	OPR415-161	Cat Loader Kaslo	500	0	0	***0***	0	0	0	0	Sell unit
202	55010	Repairs & Maintenance	OPR415-164	2006 Hyundai Loader Central	8,000	7,651	8,000	***8,000***	8,000	8,000	8,000	8,000	Gen Repairs - moving to BAL
203	55010	Repairs & Maintenance	OPR415-170	2011 Hyundai Excavator	8,000	674	5,000	***5,000***	5,000	5,000	5,000	5,000	Gen Repairs
204	55010	Repairs & Maintenance	OPR415-171	1998 International Dump Truck	3,000	13,478	3,000	***3,000***	3,000	3,000	3,000	3,000	Gen Repairs
205	55010	Repairs & Maintenance	OPR415-172	2012 Hyundai Loader Grohman	8,000	10,176	10,000	***10,000***	10,000	10,000	10,000	10,000	Gen Repairs - moving to CEN
206	55010	Repairs & Maintenance	OPR678-100	CEN - 2024 - Loader	0	0	1,000	***1,000***	1,000	1,000	3,000	3,000	gen repairs - warranty/service package?
207	55010	Repairs & Maintenance	OPR415-175	2014 Universal Compacting Trailer-PTO Drive	9,000	12,986	9,000	***9,000***	9,000	9,000	9,000	9,000	Gen Repairs
208	55010	Repairs & Maintenance	OPR415-176	2014 Universal Compacting Trailer-Diesel	12,000	22,350	12,000	***12,000***	12,000	12,000	12,000	12,000	Gen Repairs
209	55010	Repairs & Maintenance	OPR415-177	2015 Western Star Highway Tractor	7,000	25,891	7,000	***7,000***	7,000	7,000	7,000	7,000	Gen Repairs
210	55010	Repairs & Maintenance	OPR415-178	2016 Compacting Trailer	6,000	688	6,000	***6,000***	6,000	6,000	6,000	6,000	Gen Repairs
211	55010	Repairs & Maintenance	OPR415-183	2020 Western Star Highway Tractor	8,000	14,585	8,000	***8,000***	8,000	8,000	8,000	8,000	Gen Repairs
212	55010	Repairs & Maintenance	OPR415-184	2020 Western Star Highway Tractor	8,000	16,503	8,000	***8,000***	8,000	8,000	8,000	8,000	Gen Repairs
213	55010	Repairs & Maintenance	OPR415-185	2022 Western Star	8,000	9,233	5,000	***5,000***	5,000	5,000	5,000	5,000	Gen Repairs
214	55010	Repairs & Maintenance	OPR415-186	2022 Western Star	8,000	11,785	5,000	***5,000***	5,000	5,000	5,000	5,000	Gen Repairs
215	55010	Repairs & Maintenance	OPR415-300	Vehicle Operations	10,000	14,599	5,000	***5,000***	5,000	5,000	5,000	5,000	Maintenance supplies for all units
216	55010	Repairs & Maintenance	OPR417-300	HBD Civil/Structural Repairs	1,600	1,600	1,000	***1,000***	1,000	1,000	1,000	1,000	Gen Repairs - piezos require some welding, added $600 extra in 2024
217	55010	Repairs & Maintenance	OPR418-302	YMR Facility O&M	5,000	1,075	1,000	***1,000***	1,000	1,000	1,000	1,000	Gen Repairs; 2024 gate/fence repairs
218	55010	Repairs & Maintenance	OVR153-100	Central RR Subregion Administration	13,000	1,778	9,000	***9,000***	4,000	4,000	4,000	4,000	Road surface grading at various sites and Gate repairs $2k; Reuse shed repairs $2K; FireSmart Recommendations est @$5k.
219	**55010**	**Repairs & Maintenance**			**247,000**	**207,815**	219,600	***219,600***	**151,600**	**151,600**	**153,600**	**150,600**	
220	55020	Operating Supplies	OPR293-100	BAL Facility O&M	1,000	449	800	***800***	800	800	800	800	General supplies
221	55020	Operating Supplies	OPR296-100	CEN Facility O&M	1,200	1,165	11,200	***11,200***	1,200	1,200	1,200	1,200	General supplies; 2024 include $10k for site gravel
222	55020	Operating Supplies	OPR300-100	KAS-Facility O& M	1,500	720	800	***800***	800	800	800	800	General supplies
223	55020	Operating Supplies	OPR301-100	MAR-Facility O&M	1,000	123	500	***500***	500	500	500	500	General supplies
224	55020	Operating Supplies	OPR303-100	GRO Facility O&M	5,000	7,006	6,000	***6,000***	6,000	6,000	6,000	6,000	General supplies

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
225	55020	Operating Supplies	OPR415-300	Vehicle Operations	1,500	519	1,000	***1,000***	1,000	1,000	1,000	1,000	supplies for all units
226	55020	Operating Supplies	OPR417-301	HBD Facility O&M	400	916	400	***400***	400	400	400	400	General supplies
227	55020	Operating Supplies	OPR418-302	YMR Facility O&M	900	9	500	***500***	500	500	500	500	General supplies
228	55020	Operating Supplies	OVR153-100	Central RR Subregion Administration	19,000	3,749	2,000	***2,000***	2,000	2,000	2,000	2,000	New site signage (entrance signs x6 @$2k ea); General supplies; bulk purchase of winter salt; sandwich boards.
229	55020	Operating Supplies	OVR153-302	CEN Central Subregion HHW Events	150	150	150	***150***	150	150	150	150	General supplies
230	**55020**	**Operating Supplies**			**31,650**	**14,805**	23,350	***23,350***	**13,350**	**13,350**	**13,350**	**13,350**	
231	55030	Equipment	OPR296-100	CEN Facility O&M	1,200	0	500	***500***	0	0	0	0	desk/chair, water cooler
232	55030	Equipment	OVR153-100	Central RR Subregion Administration	5,550	4,965	6,000	***6,000***	1,000	1,000	1,000	1,000	Scale software equipment Plate readers, portable devices; general equipment ($1k); $1k for RFID cards.
233	55030	Equipment	OPR293-100	BAL Facility O&M	1,500	0	0	***0***	0	0	0	0	Scale weight display BAL; completed, coded 153-100
234	55030	Equipment	OPR303	Grohman Narrows Transfer	0	270	0	***0***	0	0	0	0	gate fobs
235	55030	Equipment	OPR300-100	KAS-Facility O& M	1,650	0	5,000	***5,000***	0	0	0	0	desk/chair
236	**55030**	**Equipment**			**9,900**	**5,235**	11,500	***11,500***	**1,000**	**1,000**	**1,000**	**1,000**	
237	55040	Utilities	OPR293-100	BAL Facility O&M	1,433	1,831	1,881	***1,881***	1,918	1,957	1,996	2,036	Based on projected (2.7%)
238	55040	Utilities	OPR296-100	CEN Facility O&M	2,784	2,000	2,054	***2,054***	2,095	2,137	2,180	2,223	Based on projected (2.7%)
239	55040	Utilities	OPR300-100	KAS-Facility O& M	1,005	479	492	***492***	502	512	522	532	propane
240	55040	Utilities	OPR301-100	MAR-Facility O&M	337	510	524	***524***	534	545	556	567	Based on projected (2.7%)
241	55040	Utilities	OPR303-100	GRO Facility O&M	4,659	4,016	4,125	***4,125***	4,207	4,291	4,377	4,465	Based on projected (2.7%)
242	55040	Utilities	OPR418-302	YMR Facility O&M	1,233	1,729	1,775	***1,775***	1,811	1,847	1,884	1,922	Based on projected (2.7%)
243	**55040**	**Utilities**			**11,451**	**10,565**	10,850	***10,850***	**11,067**	**11,289**	**11,514**	**11,745**	
244	55050	Vehicles	OPR293-100	BAL Facility O&M	752	0	1,705	***1,705***	1,705	1,705	1,705	1,705	Loader fuel
245	55050	Vehicles	OPR296-100	CEN Facility O&M	3,324	131	3,411	***3,411***	3,411	3,411	3,411	3,411	Gasoline for pump, on-site equipment
246	55050	Vehicles	OPR300-100	KAS-Facility O& M	3,657	0	3,752	***3,752***	3,752	3,752	3,752	3,752	Generator fuel
247	55050	Vehicles	OPR618-100	GRO - Compost Hauling	32,748	0	0	***0***	0	0	0	0	Remove; divided amongst other account (i.e. Salaries) and line below; was intended to be a Placeholder for the cost of hauling from GRO to CEN in house
248	55050	Vehicles	OPR415-300	Vehicle Operations	167,004	156,108	168,351	***168,351***	173,401	178,603	183,961	189,480	Fuel for GRO hauling fleet and loaders based on projected +3% (most other fuel coded here rather than sites). Includes $630/month for 2024 Loader service package
249	**55050**	**Vehicles**			**207,484**	**156,239**	177,219	***177,219***	**182,269**	**187,471**	**192,829**	**198,348**	
250	55900	Provisions	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Remove; moving to Legacy Landfill contribution - Central closed no new contributions
251	55900	Provisions	OVR153-103	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	70 LAK CSR liability
252	55900	Provisions	OVR153-103	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	HB CSR liability

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
253	**55900**	**Provisions**			**0**	**0**	0	***0***	**0**	**0**	**0**	**0**	
254	56110	Short-Term Financing Interest	CAP1242-100	Regional curbside program development	0	0	0	***0***	0	0	0	0	Remove, curbside not proceeding
255	56110	Short-Term Financing Interest	CAP1235-100	CEN - Legacy Landfills	0	0	0	***0***	0	0	0	0	Moved to Reserve funded; Short term borrowing repayment for legacy landfills assessments 5 yr 4.33% (payments would be 2.5k, 14k, 11k, 8k)
256	56110	Short-Term Financing Interest	CAP809-100	HBD - Remediation and Closure	2,078	0	23,590	***23,590***	18,534	13,478	8,422	8,422	(Estimated) Late 2024 ST for portion of HB works; borrowed due to lack of reserves; updated 5.61%
257	56110	Short-Term Financing Interest	CAP809-100	HBD - Remediation and Closure	72,000	74,373	72,000	***72,000***	60,000	34,492	0	0	Short term borrowimg repayment for HB legal/design/permitting
258	**56110**	**Short-Term Financing Interest**			**74,078**	**74,373**	95,590	***95,590***	**78,534**	**47,970**	**8,422**	**8,422**	
259	56010	Debenture Interest	OVR153-100	Central RR Subregion Administration	328,905	328,905	334,278	***334,278***	334,278	334,278	334,278	334,278	Based on repayment schedule for all existing long term loans
260	56010	Debenture Interest	CAP1529-100-	RR - CEN - Legacy Landfill Closures	0	0	0	***0***	0	0	184,000	184,000	CEN - Legacy Landfills closure works 25 yr 4.5%
261	56010	Debenture Interest	CAP1317-100	CEN RR -Subregion - Hauling Building	0	0	0	***0***	69,800	69,800	69,800	69,800	Increased cost for building reflected in increased borrowing cost- GRO Fleet Building 25yr 4.5% - deferred to 2026
262	56010	Debenture Interest	CAP767-100	NEL TS - Nelson Landfill Closure	0	0	0	***0***	33,615	33,615	33,615	33,615	Lakeside Closure - Updated 25yr 4.5%
263	**56010**	**Debenture Interest**			**328,905**	**328,905**	334,278	***334,278***	**437,693**	**437,693**	**621,693**	**621,693**	
264	56120	Short-Term Financing Principal	CAP1242-100	Regional curbside program development	0	0	0	***0***	0	0	0	0	Remove, curbside not proceeding
265	56120	Short-Term Financing Principal	CAP1235-100	CEN - Legacy Landfills	0	0	0	***0***	0	0	0	0	Moved to Reserve funded; Short term borrowing repayment for legacy landfills assessments 5 yr 4.33% ($70K/per)
266	56120	Short-Term Financing Principal	CAP809-100	HBD - Remediation and Closure	89,965	0	89,965	***89,965***	89,965	89,965	89,965	89,965	Late 2024 ST for portion of HB works; borrowed due to lack of reserves
267	56120	Short-Term Financing Principal	CAP809-100	HBD - Remediation and Closure	0	0	477,667	***477,667***	477,667	477,667	0	0	Short term borrowing repayment for HB legal/design/permitting (split over 3yrs starting in 25 - deferred principal payments due to low funding).
268	**56120**	**Short-Term Financing Principal**			**89,965**	**0**	567,632	***567,632***	**567,632**	**567,632**	**89,965**	**89,965**	
269	56020	Debenture Principal	OVR153-100	Central RR Subregion Administration	348,007	348,007	350,808	***350,808***	350,808	350,808	350,808	350,808	Based on repayment schedule for all existing long term loans
270	56020	Debenture Principal	CAP1529-100-	RR - CEN - Legacy Landfill Closures	0	0	0	***0***	0	0	102,696	102,696	CEN - Legacy Landfills closure works 25 yr
271	56020	Debenture Principal	CAP1317-100	CEN RR -Subregion - Hauling Building	0	0	0	***0***	38,511	38,511	38,511	38,511	Increased cost for building reflected in increased borrowing cost- GRO Fleet Building 25yr - deferred to 2026
272	56020	Debenture Principal	CAP767-100	NEL TS - Nelson Landfill Closure	0	0	0	***0***	18,674	18,674	18,674	18,674	Lakeside Closure -25 yr
273	**56020**	**Debenture Principal**			**348,007**	**348,007**	350,808	***350,808***	**407,993**	**407,993**	**510,689**	**510,689**	
274	56610	Equipment Financing Interest	CAP970-100	ENV - RR - Roll Off Truck & Bin Replacement (replaces Unit 165-	8,418	8,265	5,698	***5,698***	2,920	0	0	0	Interest- 5yr repayment for 2 trucks & winch system $480k
275	56610	Equipment Financing Interest	CAP972-100	ENV - RR - Waste Hauling Tractor Truck	6,305	6,429	2,779	***2,779***	0	0	0	0	Interest - 5yr repayment for 2 tractors $360k
276	56610	Equipment Financing Interest	CAP1412-100	RR - CEN - Tractor truck 2025 - VI	0	0	15,240	***15,240***	12,410	9,187	5,831	2,276	Interest - 5yr repayment for Tractor truck $350k; (4.63%)
277	56610	Equipment Financing Interest	CAP1411-100	RR - CEN - Roll off truck 2025 - VIN #TBD	0	0	16,981	***16,981***	13,828	10,236	6,498	2,536	Interest - 5yr repayment for RO truck $400k; (4.63%)
278	56610	Equipment Financing Interest	CAP972-100	GRO fleet unit	2,000	0	0	***0***	0	0	0	0	Moved to reserve funded; Interest - 5yr repayment for GRO fleet $60k
279	56610	Equipment Financing Interest	CAP1400-100	Central Loader	13,432	0	12,073	***0***	0	0	0	0	Moved to Reserve Funded at end of 2024 - (~$10K annually); Interest - 5yr repayment for loader $285k; (4.63%)
280	56610	Equipment Financing Interest	CAP1526-100	RO bin trailer	9,092	0	0	***0***	0	0	0	0	Moved to Reserve funded; Interest - 5yr repayment for trailer $73K; (4.63%)
281	56610	Equipment Financing Interest	CAP1122-100	ENV - RR - Compacting Trailer	10,273	0	12,735	***12,735***	10,372	7,678	4,873	1,902	Interest - 5yr repayment for compacting trailer $300K

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
282	**56610**	**Equipment Financing Interest**			**49,519**	**14,694**	*65,506*	***53,433***	**39,529**	**27,100**	**17,202**	**6,714**	
283	56620	Equipment Financing Principal	CAP970-100	ENV - RR - Roll Off Truck & Bin Replacement (replaces Unit 165-	53,058	42,965	55,778	***55,778***	86,683	0	0	0	Prinicipal - 5yr repayment for 2 trucks & winch system $480k
284	56620	Equipment Financing Principal	CAP972-100	ENV - RR - Waste Hauling Tractor Truck	69,685	56,896	90,496	***90,496***	0	0	0	0	Prinicial - 5yr repayment for 2 tractors $360k
285	56620	Equipment Financing Principal	CAP1412-100	RR - CEN - Tractor truck 2025 - VI	0	0	59,799	***59,799***	68,159	71,382	74,738	78,293	Principal- 5yr repayment for Tractor truck $350k
286	56620	Equipment Financing Principal	CAP1411-100	RR - CEN - Roll off truck 2025 - VIN #TBD	0	0	66,628	***66,628***	75,943	79,535	83,273	87,235	Principal- 5yr repayment for RO truck $400k
287	56610	Equipment Financing Interest	CAP972-100	GRO fleet unit	12,000	0	0	***0***	0	0	0	0	Moved to Reserve funded; Prinicial - 5yr repayment for GRO fleet $60k
288	56620	Equipment Financing Principal	CAP1400-100	Central Loader	43,087	0	47,373	***0***	0	0	0	0	Moved to Reserve Funded at end of 2024 - (~$50K annually); Prinicial - 5yr repayment for loader $285k
289	56620	Equipment Financing Principal	CAP1526-100	RO bin trailer	29,167	0	0	***0***	0	0	0	0	Moved to Reserve funded; Prinicial - 5yr repayment for trailer
290	56620	Equipment Financing Principal	CAP1122-100	ENV - RR - Compacting Trailer	32,959	0	49,971	***49,971***	56,956	59,650	62,455	65,426	Prinicial - 5yr repayment for compacting trailer $300K
291	**56620**	**Equipment Financing Principal**			**239,956**	**99,861**	*370,045*	***322,672***	**287,741**	**210,567**	**220,466**	**230,953**	
292	57010	Grants	OVR153-100	Central RR Subregion Administration	39,796	0	0	***47,296***	0	0	0	0	2025 ICI pilot for bins; 2024 Funds for City of Nelson community bins for FC material - previously budgeted in CAP rolled in 2025.
293	**57010**	**Grants**			**39,796**	**0**	*0*	***47,296***	**0**	**0**	**0**	**0**	
294	59000	Contribution to Reserve	OVR153-100	Central RR Subregion Administration	575,079	575,081	170,881	***251,207***	662,036	929,960	1,441,081	1,437,048	Regular reserve
295	59000	Contribution to Reserve	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Remove; Growing Communities Fund (GCF) Allocation to GCF Reserve - 2024 Fleet Building
296	59000	Contribution to Reserve	OVR153-100	Central RR Subregion Administration	0	469,386	0	***0***	0	0	0	0	2024 transition from provision to ARO calculation for Legacy Landfill reserve
297	59000	Contribution to Reserve	OVR153-100	Central RR Subregion Administration	0	208,591	0	***0***	0	0	0	0	Funds remaining from 2024 HB borrowing to be carried into 2025 to pay for remaining works
298	59000	Contribution to Reserve	OVR153-100	Central RR Subregion Administration	0	0	0	***0***	0	0	0	0	Cont to stabilization reserves, 1/2 of prior year surplus
299	**59000**	**Contribution to Reserve**			**575,079**	**1,253,058**	*170,881*	***251,207***	**662,036**	**929,960**	**1,441,081**	**1,437,048**	
300	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administration	10,000	22,894	20,000	***20,000***	20,000	0	40,000	40,001	A112 PM fees - all combined see notes
301	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administration	343,108	343,108	354,431	***380,388***	391,800	403,554	415,660	428,130	A102 Resource Recovery Placeholder: 70% (20% to A118 recycling allocation service and 10% to A120 C-W Compost allocation service).
302	59500	Transfer to Other Service	OVR153-303	Contribution to West	202,632	202,632	202,632	***270,826***	243,743	219,369	197,432	177,689	Placeholder, cont to West for OOT landfill, (reduction expected from organics diversion - delayed due to low organics from Central)
303	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administra	311,567	569,060	73,392	***59,347***	61,766	61,953	16,567	16,918	Placeholder Transfer to A120 - tax subidization - missed $258k transfer in 23 added to $312k in 24; Current tax split 50/50 with S188
304	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administra	20,000	20,000	174,855	***174,855***	164,042	164,930	74,650	75,818	Transfer to A120 - in lieu of tipping fees based on CAP & fixed operating costs
305	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administra	752,234	752,234	401,675	***282,360***	548,384	572,163	595,944	622,957	Transfer to Central Recycling Allocation Service A117 (remove KOK; increased RBC Incentives in 2025, new LT Loan repayment to start in 2026)
306	**59500**	**Transfer to Other Service**			**1,639,542**	**1,909,929**	*1,226,985*	***1,187,776***	**1,429,735**	**1,421,968**	**1,340,252**	**1,361,513**	
307	59510	Transfer to Other Service - General Admin. Fee	OVR153-100	Central RR Subregion Administration	182,783	182,783	188,815	***169,054***	174,126	179,349	184,730	190,272	Gen Admin Placeholder
308	**59510**	**Transfer to Other Service - General Admin. Fee**			**182,783**	**182,783**	*188,815*	***169,054***	**174,126**	**179,349**	**184,730**	**190,272**	
309	59520	Transfer to Other Service - IT Fee	OVR153-100	Central RR Subregion Administration	34,090	34,090	36,673	***36,018***	37,099	38,211	39,358	40,539	IT Placeholder - based on new license based costing
310	**59520**	**Transfer to Other Service - IT Fee**			**34,090**	**34,090**	*36,673*	***36,018***	**37,099**	**38,211**	**39,358**	**40,539**	

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
311	59550	Transfer to Other Service - Environmental Services	OVR153-100	Central RR Subregion Administration	78,422	78,422	81,010	***78,862***	81,228	83,665	86,175	88,760	A100 Enviro Services Placeholder; 80% A100 (10% to recycling allocation service and 10% to C-W Compost allocation service)
312	**59550**	**Transfer to Other Service - Environmental Services**			**78,422**	**78,422**	*81,010*	***78,862***	**81,228**	**83,665**	**86,175**	**88,760**	
313	60000	Capital Expenditures	CAP1412-100	RR - CEN - Tractor truck 2025 - VIN #TBD	0	0	350,000	***350,000***	0	0	0	0	Waste Hauling Tractor Truck asset replacement; Investigate alternative fuel
314	60000	Capital Expenditures	CAP1411-100	RR - CEN - Roll off truck 2025 - VIN #TBD	0	0	400,000	***400,000***	0	0	0	0	Roll off truck asset replacement; Investigate alternate fuel; Look at overhaul of dempster system.
315	60000	Capital Expenditures	CAP1242-100	Regional curbside program development	185,781	3,716	0	***0***	0	0	0	0	Rural curbside program not proceeding; Moved funds for Nelson containers to Grants 57070
316	60000	Capital Expenditures	CAP1117-100	GRO TS-2021-Compost Upgrades	0	0	0	***0***	0	0	0	0	Remove
317	60000	Capital Expenditures	CAP1401-100	GRO Organics Bins	20,000	20,469	10,000	***10,000***	0	0	0	0	Purchase shared bin and adapt bin lids; deferred to 2025
318	60000	Capital Expenditures	CAP1403-100	GRO fleet unit	60,000	0	60,000	***60,000***	0	0	0	0	purchase of fleet unit for GRO/CEN ops (SUV or small truck)
319	60000	Capital Expenditures	CAP1399-100	Central Gravel stockpile	0	0	0	***0***	0	0	0	0	Remove: 2023 was $20k for large stockpile; 2025 moved to Operating Supplies - Stockpile of gravel for road maintenance
320	60000	Capital Expenditures	CAP1398-100	Central Auto Kiosk	22,000	0	22,000	***22,000***	0	0	0	0	Replacement of former card scanner to allow for septage and other materials deposit outside regular hours (Wed/Sat) to work with new scale software; A120 to pay half for organcis; added $7k for install.
321	60000	Capital Expenditures	CAP1228-100	Ymir building	0	0	0	***0***	0	0	0	0	Remove; Replacement of attendant shack
322	60000	Capital Expenditures	CAP1122-100	ENV - RR - 2021 - Compacting Trailer	250,000	0	270,000	***300,000***	300,000	0	0	0	Price updated Jan 20; compacting trailer 2025 & 2026
323	60000	Capital Expenditures	CAP1526-100	RO bin trailer	175,000	0	73,000	***73,000***	0	0	0	0	Intended for tandem RO bin hauling - triaxle to haul organics/weight restrictions
324	60000	Capital Expenditures	CAP1535-100	Central Monitoring Well Drilling	0	0	20,000	***20,000***	0	0		0	New monitoring well installed d/s of septage pits, as per hydrogeo recommendation. Will look to share mob costs with HB drilling.
325	60000	Capital Expenditures	CAP1400-100	Central Loader	325,000	261,626	0	***0***	0	0	0	0	Loader for replacing 2006 Central Loader
326	60000	Capital Expenditures	CAP1326-100	Roll off bins	45,000	39,823	0	***0***	40,000	0	40,000	0	Rolling stock roll offs bin ($20k ea; 2024 CAP1327; 2025 CAP1328; 2026 CAP1329), looking to transition away from Dempster system
327	60000	Capital Expenditures	CAP767-100	NEL TS - Nelson Landfill Closure	29,000	8,409	148,000	***148,000***	747,000	0	0	0	2025: $5k finalizing DSI with some info from 80 Lakeside data (will be separate DSI's), $4.8k CP doc review and inclusion in DSI/RA, $2.8k stakeholder meetings, $59,8k risk assess and $26,8 remediation plan, $10k contingency, $48k abandonment of permit and landfill closure plan. 2026 Closure $747k RRP estimate, but could be in the $900k to $1M range in 26 (est from 2018).
328	60000	Capital Expenditures	CAP809-100	HBD - Remediation and Closure	273,827	120,466	232,400	***234,400***	0	0	0	0	2025: $91.4k piezo install (eng design, procurement support, field oversight, as-builts), $76k for 5 additional piezometers (drilling and materials) best estimate (SRK estimates could be up to $126k), $5k EM inspections during drilling, $50k for post construction event driven EM and repairs, added $10k for EM recommendations; $2k drilling
329	60000	Capital Expenditures	CAP809-101	HBD - Remediation and Closure - Construction	176,000	120,770	223,800	***223,800***	263,276	245,676	65,819	67,135	2025-2027: $30k water monitoring, $7.5k for reveg monitoring, $10k for wildlife monitoring (2 events per year), $2.5k settlement monitoring, $4k for updates to EMA and WQMMP, $10K for Reclamation Research Program monitoring, $15k for summary reports/memos for all monitoring work, $5k ML/ARD monitoring/reporting. 2025 extras: $5k consultant participation in EMLI reclamation inspection and reponses (if needed), $5k enviro review of WQ prediction model, EOR (WQ Model Update $42.7k, Geochem updates $9.9k, CMM $30k, RCP update $37.2k, RCP regulatory support $10k). 2026 extra: $35k for permit amendment process (meetings with EMLI, closure plan amendments, additional studies). 2027 extras: $17.4k for vegetation metals uptake study, 2028: assumes permit for reduced Mines Act requirements is obtained, which elimates 75% of monitoring and permit related tasks. Pending $20k for borrow pit assessment may be needed 26/27.
330	60000	Capital Expenditures	CAP1397-100	BAL - road improvements / paving	60,000	59,768	0	***0***	0	0	0	0	Placeholder; Paving did not occur before season change - rolled into 2024
331	60000	Capital Expenditures	CAP1230-100	CEN - Surveillance Install/Upgrades	0	0	0	***0***	0	0	0	0	Remove; Project completed in Q3 of 2023

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
332	60000	Capital Expenditures	CAP1317-100	CEN RR -Subregion - Hauling Building	60,000	6,398	60,000	***60,000***	1,500,000	0	0	0	2024 - Prelim Design $15k for full project (including recycling area expansion), start of Detailed Design for site expansion in Oct; 2025 Site expansion works and detailed design for fleet building; 2026 building construction - prelim design estimate $1.4M for 2-3 bay building with services for possible mechanical shop/office space
333	60000	Capital Expenditures	CAP979-100	CEN TS - 2019 Washroom	0	0	0	***0***	0	0	0	0	Remove; Project completed in Q3 of 2023
334	60000	Capital Expenditures	CAP981-100	KAS TS - 2019 Washroom	0	0	0	***0***	0	0	68,000	0	Well, septic $20k, Washroom $2k, power $22k
335	60000	Capital Expenditures	CAP1235-100	CEN - Legacy Landfills	60,000	0	60,000	***60,000***	355,000	0	0	0	2025 Phase 1 Assessments; 2026 Phase 2 - Balfour, Kaslo, Marblehead and Salmo Landfills.
336	60000	Capital Expenditures	CAP1529-100-	RR - CEN - Legacy Landfill Closures	0	0	0	***0***	0	0	4,000,000	0	Placeholder Legacy Landfill closure works - Balfour, Kaslo, Marblehead and Salmo Landfills.
337	60000	Capital Expenditures	CAP1402-100	CEN Septage	50,000	0	50,000	***50,000***	0	0	0	0	Assessment and design for septage& possibly compost leachate - use CEN Septage reserve to fund
338	60000	Capital Expenditures	CAP1304-100	CEN Bin Wall	5,000	0	0	***0***	0	0	0	0	Remove; Minor regrading may be required to adjust bin level; move to R&M
339	**60000**	**Capital Expenditures**			**1,796,608**	**641,445**	*1,979,200*	***2,011,200***	**3,205,276**	**245,676**	**4,173,819**	**67,135**	

S187 - Central Resource Recovery - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
340	**TOTAL EXPENSES**				**8,113,571**	**7,545,651**	*8,225,610*	***8,318,236***	**9,883,473**	**7,079,225**	**11,216,801**	**7,326,507**	
341	**TOTAL CAP REVENUE**				**(1,709,310)**	**(850,036)**	*(1,791,591)*	***(1,868,887)***	**(3,240,458)**	**(245,676)**	**(4,173,819)**	**(67,135)**	
342	**TOTAL CAP (no HB)**				**1,346,781**	**400,209**	*1,523,000*	***1,553,000***	**2,942,000**	**0**	**4,108,000**	**0**	
343	**TOTAL OPERATING EXPENSES (no CAP or HB)**				**6,021,929**	**6,629,206**	*5,457,152*	***5,517,779***	**5,936,583**	**6,159,954**	**6,889,694**	**7,112,024**	
344	**TIPPING FEES**				**(2,165,760)**	**(1,995,400)**	*(2,233,242)*	***(2,194,940)***	**(2,261,857)**	**(2,347,443)**	**(2,417,266)**	**(2,489,184)**	
345	**TAXATION**				**(3,693,027)**	**(3,693,027)**	*(3,997,340)*	***(3,988,469)***	**(4,197,207)**	**(4,323,123)**	**(4,452,817)**	**(4,586,401)**	
346	**HB EXPENSES (OPs & CAP)**				**943,272**	**692,945**	*1,578,068*	***1,580,068***	**1,125,000**	**1,041,762**	**280,907**	**357,497**	
347	**TOTAL REVENUE**				**(8,113,571)**	**83,766**	*(8,288,114)*	***(8,318,236)***	**(9,883,473)**	**(7,079,225)**	**(11,216,801)**	**(7,326,507)**	
348					**8,311,983**	**7,722,361**	*8,558,220*	***8,650,846***	**10,003,583**	**7,201,715**	**11,278,601**	**7,469,521**	
349	**SURPLUS/DEFICIT**				**0**	**7,629,417**	0	***0***	0	**0**	**0**	**0**	
350				Opening Regular Reserve Balance	(242,119)	(242,119)	*(630,906)*	***(630,906)***	(381,817)	(385,577)	(1,069,861)	(2,337,123)	
351				Transfer From Regular Reserves	196,000	393,811	*453,000*	***500,296***	658,276	245,676	173,819	67,135	
352				Contribution to Regular Reserves	(575,079)	(366,490)	*(170,881)*	***(251,207)***	(662,036)	(929,960)	(1,441,081)	(1,437,048)	
353				Net Change for Year	(379,079)	27,321	*282,119*	***249,089***	(3,760)	(684,284)	(1,267,262)	(1,369,913)	
354				Year End Regular Reserve	(621,197)	(630,906)	*(348,787)*	***(381,817)***	(385,577)	(1,069,861)	(2,337,123)	(3,707,036)	
355													
356				Opening Landfill Closure Reserve Balance	0	0	(469,386)	***(469,386)***	(469,386)	(469,386)	(469,386)	(469,386)	
357				Transfer From LC Reserves	0	0	0	***0***	***0***	***0***	***0***	***0***	
358				Contribution to LC Reserves	0	(469,386)	0	***0***	0	0	0	0	
359				Net Change for Year	0	(469,386)	0	***0***	0	0	0	0	
360				Year End LC Reserve	0	(469,386)	(469,386)	***(469,386)***	(469,386)	(469,386)	(469,386)	(469,386)	
361													
362				Opening Stabillizatio Reserve Balance	(3,739)	(3,739)	*(3,739)*	***(3,863)***	(3,863)	(3,863)	(3,863)	(3,863)	
363				Transfer From Stabilization Reserves	0	0	*0*	***0***	0	0	0	0	
364				Contribution to Stabilization Reserves	0	0	*0*	***0***	0	0	0	0	
365				Net Change for Year	0	0	*0*	***0***	0	0	0	0	
366				Year End Stabilization Reserve	(3,739)	(3,863)	*(3,739)*	***(3,863)***	(3,863)	(3,863)	(3,863)	(3,863)	
367				Total Reserves	(624,937)	(634,769)	*(352,526)*	***(385,680)***	(389,440)	(1,073,724)	(2,340,986)	(3,710,899)	
372				*Central Septage Reserve*	(52,445)								
373				*GCF*	(95,182)								
374				*HB 2024 borrowing*	(208,591)	*added to Regular Reserve*							

A117 - Central Recycling - 5 year Financial Plan (2025-2029)

	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	42035	User Fees - Specified	OPR640-100	Central Recycling - General	(180,020.62)	(192,337.97)	(338,619.40)	***(419,296.77)***	(423,489.74)	(427,724.64)	(432,001.89)	(436,321.91)	RBC Financial Incentive, 2025 new incentive rates 118% increase
2	42035	User Fees - Specified	OPR641-100	West Recycling - General	(29,859.03)	(29,859.03)	(29,859.03)	***(29,859.03)***	(29,859.03)	(29,859.03)	(29,859.03)	(29,859.03)	Placeholder - transfer of RBC Incentives for SR equalization
3	**42035**	**User Fees - Specified**			**(209,879.65)**	**(222,197.00)**	*(368,478.43)*	***(449,155.80)***	**(453,348.77)**	**(457,583.67)**	**(461,860.92)**	**(466,180.94)**	
4	43025	Grants - Specified	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Growing Communities Fund (GCF) Allocation - Groman Depot Expansion
5	**43025**	**Grants - Specified**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
6	43100	Proceeds from Borrowing	CAP1239-100	Nelson Recycling Depot	(94,149.96)	0.00	(2,000,000.00)	***(2,000,000.00)***	0.00	0.00	0.00	0.00	2024 GRO recycling depot expansion design/tender; 2025 construction; combine project with fleet building - less $142k CGF grant
7	**43100**	**Proceeds from Borrowing**			**(94,149.96)**	**0.00**	(2,000,000.00)	***(2,000,000.00)***	**0.00**	**0.00**	**0.00**	**0.00**	
8	43200	Proceeds from Equipment Financing	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
9	**43200**	**Proceeds from Equipment Financing**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
10	45000	Transfer from Reserves	OPR640-100	Central Recycling - General	(142,875.00)	(24,792.00)	(118,083.00)	***(118,083.00)***	0.00	0.00	0.00	0.00	GCF grant funds for A117 GRO depot, 2024 design; 2025 remaining design and consulting
11	45000	Transfer from Reserves	OVR153-100	Central RR Subregion Administration	0.00	0.00	0.00	***0.00***	(10,000.00)	0.00	0.00	0.00	Placeholder; CAP works
12	**45000**	**Transfer from Reserves**			**(142,875.00)**	**(24,792.00)**	(118,083.00)	***(118,083.00)***	**(10,000.00)**	**0.00**	**0.00**	**0.00**	
13	45500	Transfer from Other Service	OPR640-100	Central Recycling - General	(752,234.50)	(752,234.50)	(401,674.79)	***(282,359.69)***	(548,383.97)	(572,162.75)	(595,943.57)	(622,957.18)	Revenue from S187
14	**45500**	**Transfer from Other Service**			**(752,234.50)**	**(752,234.50)**	*(401,674.79)*	***(282,359.69)***	**(548,383.97)**	**(572,162.75)**	**(595,943.57)**	**(622,957.18)**	
15	49100	Prior Year Surplus	OPR640-100	Central Recycling - General	(35,602.89)	(25,692.80)	(113,716.66)	***(113,716.66)***	0.00	0.00	0.00	0.00	Prior year surplus/deficit
16	**49100**	**Prior Year Surplus**			**(35,602.89)**	**(25,692.80)**	(113,716.66)	***(113,716.66)***	**0.00**	**0.00**	**0.00**	**0.00**	
17	**TOTAL REVENUE**				**(1,234,742.00)**	**(1,024,916.30)**	*(3,001,952.88)*	***(2,963,315.15)***	**(1,011,732.74)**	**(1,029,746.42)**	**(1,057,804.48)**	**(1,089,138.12)**	
18	**TOTAL OPERATING REVENUE**				**(897,717.04)**	**(900,124.30)**	*(783,869.88)*	***(745,232.15)***	**(1,001,732.74)**	**(1,029,746.42)**	**(1,057,804.48)**	**(1,089,138.12)**	
19	**CAP FUNDING SUBTOTAL**				**(337,024.96)**	**(124,792.00)**	*(2,218,083.00)*	***(2,218,083.00)***	**(10,000.00)**	**0.00**	**0.00**	**0.00**	Grants, reserves, borrowing
20	51010	Salaries	OPR640-100	Central Recycling - General	295,753.63	272,680.96	286,228.55	***279,831.27***	288,226.21	296,872.99	305,779.18	314,952.56	RWE Based on Salary worksheet (1%), includes salary & training/onboarding related costs; KOK removed
21	51010	Salaries	OPR623-100	CEN - Lead Hand	15,129.39	15,129.39	15,628.66	***15,628.66***	15,941.23	16,260.06	16,585.26	16,916.96	Lead Hand - 30% of S187 service; Based on Salary Worksheet (new CA rate)
22	**51010**	**Salaries**			**310,883.02**	**287,810.35**	*301,857.21*	***295,459.93***	**304,167.44**	**313,133.05**	**322,364.44**	**331,869.52**	
23	51020	Overtime	OPR640-100	Central Recycling - General	4,000.00	1,000.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Limited budget for emerg coverage; reduced
24	**51020**	**Overtime**			**4,000.00**	**1,000.00**	1,000.00	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
25	51030	Benefits	OPR640-100	Central Recycling - General	69,174.00	61,250.56	71,557.14	***69,957.82***	72,056.55	74,218.25	76,444.80	78,738.14	RWEs; Based on Salary Worksheet
26	51030	Benefits	OPR623-100	CEN - Lead Hand	4,538.82	4,538.82	4,688.60	***4,688.60***	4,782.37	4,878.02	4,975.58	5,075.09	Lead Hand - 30% of S187; Based on Salary Worksheet
27	**51030**	**Benefits**			**73,712.82**	**65,789.38**	*76,245.74*	***74,646.42***	**76,838.92**	**79,096.27**	**81,420.38**	**83,813.23**	
28	51050	Employee Health & Safety	OPR640-100	Central Recycling - General	4,000.00	1,000.00	4,100.00	***4,100.00***	4,202.50	4,307.56	4,415.25	4,525.63	RWE footwear, jackets, training, safety check-in monitoring, based estimate provided by H&S coord
29	**51050**	**Employee Health & Safety**			**4,000.00**	**1,000.00**	4,100.00	***4,100.00***	**4,202.50**	**4,307.56**	**4,415.25**	**4,525.63**	
30	51500	Directors - Allowance & Stipend	OPR640-100	Central Recycling - General	7,355.41	7,355.41	7,502.52	***7,502.52***	7,652.57	7,805.62	7,961.73	8,120.97	20% Based on up to 14 RR meetings for 6 Directors, budget meetings and Chair stipend
31	**51500**	**Directors - Allowance & Stipend**			**7,355.41**	**7,355.41**	7,502.52	***7,502.52***	**7,652.57**	**7,805.62**	**7,961.73**	**8,120.97**	
32	51560	Directors - Travel	OVR153-100	Central RR Subregion Administration	1,000.00	1,000.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Increased travel with more in-person meetings
33	**51560**	**Directors - Travel**			**1,000.00**	**1,000.00**	1,000.00	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
34	52010	Travel	OPR640-100	Central Recycling - General	2,000.00	872.50	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	RWE - mileage for field staff training/development/out of area shift coverage; reduced
35	52010	Travel	OPR623-100	CEN - Lead Hand	4,352.88	1,000.00	1,050.00	***1,050.00***	1,102.50	1,157.63	1,215.51	1,276.28	30% Lead Hand S187 - gen site travel (5% increases)
36	**52010**	**Travel**			**6,352.88**	**1,872.50**	2,050.00	***2,050.00***	**2,102.50**	**2,157.63**	**2,215.51**	**2,276.28**	
37	52020	Education & Training	OPR640-100	Central Recycling - General	1,000.00	100.00	1,000.00	***3,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	RWE training; staff incentives
38	**52020**	**Education & Training**			**1,000.00**	**100.00**	*1,000.00*	***3,000.00***	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	

A117 - Central Recycling - 5 year Financial Plan (2025-2029)

	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
39	53020	Admin, Office Supplies & Postage	OPR640-100	Central Recycling - General	500.00	200.00	200.00	***200.00***	200.00	200.00	200.00	200.00	General supplies; reduced from $500 to $200 as many of these costs are applied to bulk purchases in A102
40	**53020**	**Admin, Office Supplies & Postage**			**500.00**	**200.00**	200.00	***200.00***	**200.00**	**200.00**	**200.00**	**200.00**	
41	53030	Communication	OPR640-100	Central Recycling - General	3,198.00	3,312.50	3,401.94	***3,401.94***	3,125.59	3,572.03	3,281.87	3,750.64	RWE cell allowance
42	**53030**	**Communication**			**3,198.00**	**3,312.50**	3,401.94	***3,401.94***	**3,125.59**	**3,572.03**	**3,281.87**	**3,750.64**	
43	53040	Advertising	OPR640-100	Central Recycling - General	1,000.00	0.00	500.00	***500.00***	500.00	500.00	500.00	500.00	Recycling communciations/ads (reduced from $1000 to $500)
44	**53040**	**Advertising**			**1,000.00**	**0.00**	500.00	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
45	53050	Insurance	OPR640-100	Central Recycling - General	546.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, not included in statement of assets due to deductible
46	**53050**	**Insurance**			**546.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
47	54020	Professional Fees	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
48	**54020**	**Professional Fees**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
49	54030	Contracted Services	OPR640-100	Central Recycling - General	206,994.10	176,486.25	194,815.54	***194,815.54***	204,556.31	214,784.13	225,523.33	236,799.50	Placeholder - fluctuates with volumes collected; based on projected with 3.3% with KOK removed; Satellite hauling; IC contract; City of Nelson curbside hauling from GRO
50	54030	Contracted Services	OPR640-100	Central Recycling - General	0.00	0.00	6,025.00	***6,025.00***	0.00	0.00	0.00	0.00	Move of KOK equipment to BAL/CEN, if shack goes to CRE A116 to pay for portion of transport
51	54030	Contracted Services	OPR616-100	RBC depot O&M (Biffy & garbage	5,000.00	0.00	2,017.45	***2,017.45***	2,057.80	2,098.95	2,140.93	2,183.75	Garbage, portable toilets
52	54030	Contracted Services	OPR616-100	RBC depot snow	20,000.00	0.00	26,589.42	***26,589.42***	27,918.89	29,314.84	30,780.58	32,319.61	Snow removal services
53	**54030**	**Contracted Services**			**231,994.10**	**176,486.25**	229,447.41	***229,447.41***	**234,533.00**	**246,197.92**	**258,444.85**	**271,302.86**	
54	55010	Repairs & Maintenance	OPR640-100	Central Recycling - General	3,000.00	1,000.00	5,500.00	***5,500.00***	3,000.00	3,000.00	3,000.00	3,000.00	General repairs; 2025 BAL power conduit $2.5k
55	**55010**	**Repairs & Maintenance**			**3,000.00**	**1,000.00**	5,500.00	***5,500.00***	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	
56	55020	Operating Supplies	OPR640-100	Central Recycling - General	2,500.00	2,195.00	2,650.00	***2,650.00***	2,500.00	2,650.00	2,500.00	2,650.00	General supplies; signage
57	**55020**	**Operating Supplies**			**2,500.00**	**2,195.00**	2,650.00	***2,650.00***	**2,500.00**	**2,650.00**	**2,500.00**	**2,650.00**	
58	55030	Equipment	OPR640-100	Central Recycling - General	2,000.00	500.00	1,700.00	***1,700.00***	500.00	500.00	500.00	500.00	General equip; 2025 A/C BAL, KAS, GRO
59	**55030**	**Equipment**			**2,000.00**	**500.00**	1,700.00	***1,700.00***	**500.00**	**500.00**	**500.00**	**500.00**	
60	55040	Utilities	OPR640-100	Central Recycling - General	9,962.71	1,886.25	6,056.98	***6,056.98***	6,178.11	6,301.68	6,427.71	6,556.26	Power, propane; install new power SAL, LAK, KAS ($5k)
61	**55040**	**Utilities**			**9,962.71**	**1,886.25**	6,056.98	***6,056.98***	**6,178.11**	**6,301.68**	**6,427.71**	**6,556.26**	
62	55060	Rentals	OPR640-100	Central Recycling - General	82,847.00	82,847.00	63,047.00	***63,047.00***	8,000.00	8,000.00	8,000.00	8,000.00	2025 removed KOK $19.8k; Depot lease (Updated lease value LAK $56k; SAL 7073); reduced in 26 assuming closing LAK and
63	**55060**	**Rentals**			**82,847.00**	**82,847.00**	63,047.00	***63,047.00***	**8,000.00**	**8,000.00**	**8,000.00**	**8,000.00**	
64	56110	Short-Term Financing Interest	OPR640-100	Central Recycling - General	448.64	0.00	5,093.53	***5,093.53***	4,001.85	2,910.16	1,818.48	1,818.48	ST - GRO depot design/tendering (remainder funded by GCF)
65	56110	Short-Term Financing Interest	OPR640-100	Central Recycling - General	6,531.46	7,168.00	2,610.44	***2,610.44***	0.00	0.00	0.00	0.00	Short term borrowimg repayment for RBC
66	**56110**	**Short-Term Financing Interest**			**6,980.10**	**7,168.00**	7,703.97	***7,703.97***	**4,001.85**	**2,910.16**	**1,818.48**	**1,818.48**	
67	56010	Debenture Interest	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	92,000.00	92,000.00	92,000.00	92,000.00	LT - New Recycling Depot - 25yr 4.6%
68	**56010**	**Debenture Interest**			**0.00**	**0.00**	0.00	***0.00***	**92,000.00**	**92,000.00**	**92,000.00**	**92,000.00**	
69	56120	Short-Term Financing Principal	OPR640-100	Central Recycling - General	0.00	0.00	19,425.00	***19,425.00***	19,425.00	19,425.00	19,425.00	19,425.00	ST - GRO depot design/tendering (remainder funded by GCF)
70	56120	Short-Term Financing Principal	OPR640-100	Central Recycling - General	86,941.00	86,941.00	86,941.00	***86,941.00***	0.00	0.00	0.00	0.00	Short term borrowimg repayment for RBC
71	**56120**	**Short-Term Financing Principal**			**86,941.00**	**86,941.00**	106,366.00	***106,366.00***	**19,425.00**	**19,425.00**	**19,425.00**	**19,425.00**	
72	56020	Debenture Principal	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	49,997.00	49,997.00	49,997.00	49,997.00	LT - New Recycling Depot - 25yr 4.51%
73	**56020**	**Debenture Principal**			**0.00**	**0.00**	0.00	***0.00***	**49,997.00**	**49,997.00**	**49,997.00**	**49,997.00**	
74	59000	Contribution to Reserve	OPR640-100	Central Recycling - General	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Growing Communities Fund (GCF) Allocation to GCF Reserve
75	59000	Contribution to Reserve	OPR640-100	Central Recycling - General	5,000.00	5,000.00	5,000.00	***5,000.00***	5,000.00	5,000.00	5,000.00	5,000.00	Regular reserve - for asset replacement
76	**59000**	**Contribution to Reserve**			**5,000.00**	**5,000.00**	5,000.00	***5,000.00***	**5,000.00**	**5,000.00**	**5,000.00**	**5,000.00**	

A117 - Central Recycling - 5 year Financial Plan (2025-2029)

	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
77	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administration	98,031.00	98,031.00	101,266.02	***108,682.00***	111,942.46	115,300.73	118,759.76	122,322.55	A102 Resource Recovery; Placeholder; 20% of S187 transfer to A102
78	**59500**	**Transfer to Other Service**			**98,031.00**	**98,031.00**	101,266.02	**108,682.00**	**111,942.46**	**115,300.73**	**118,759.76**	**122,322.55**	
79	59510	Transfer to Other Service - General Admin. Fee	OPR640-100	Central Recycling - General	45,110.00	45,110.00	46,598.63	***44,207.00***	45,533.21	46,899.21	48,306.18	49,755.37	General Admin; Placeholder
80	**59510**	**Transfer to Other Service - General Admin. Fee**			**45,110.00**	**45,110.00**	*46,598.63*	***44,207.00***	**45,533.21**	**46,899.21**	**48,306.18**	**49,755.37**	
81	59520	Transfer to Other Service - IT Fee	OPR640-100	Central Recycling - General	0.00	0.00	5,417.00	***5,028.00***	5,178.84	5,334.21	5,494.23	5,659.06	IT Placeholder - based on new license based costing
82	**59520**	**Transfer to Other Service - IT Fee**			**0.00**	**0.00**	*5,417.00*	***5,028.00***	**5,178.84**	**5,334.21**	**5,494.23**	**5,659.06**	
83	59550	Transfer to Other Service - Environmental Services Fee	OPR640-100	Central Recycling - General	9,803.00	9,803.00	10,126.50	***9,858.00***	10,153.74	10,458.35	10,772.10	11,095.27	A100 Enviro Services; Placeholder 10% of S186 transfer to A100; updated Feb 14
84	**59550**	**Transfer to Other Service - Environmental Services Fee**			**9,803.00**	**9,803.00**	*10,126.50*	***9,858.00***	**10,153.74**	**10,458.35**	**10,772.10**	**11,095.27**	
85	60000	Capital Expenditures	CAP1557-100	Nelson Recycling Depot	237,024.96	24,792.00	1,975,208.00	***1,975,208.00***	0.00	0.00	0.00	0.00	Design in 2024; final design to update costs Q1 2025; Construction into 2025, combine with CEN fleet building expansion
86	60000	Capital Expenditures	CAP1528-100	Balfour recycling area paving	0.00	0.00	0.00	***0.00***	10,000.00	0.00	0.00	0.00	Paving in recycling area
87	**60000**	**Capital Expenditures**			**237,024.96**	**24,792.00**	1,975,208.00	***1,975,208.00***	**10,000.00**	**0.00**	**0.00**	**0.00**	
88	**TOTAL EXPENSES**				**1,234,742.00**	**911,199.64**	*2,964,944.90*	***2,963,315.15***	**1,011,732.74**	**1,029,746.42**	**1,057,804.48**	**1,089,138.12**	
89	**TOTAL OPERATING EXPENSES**				**997,717.04**	**886,407.64**	*989,736.90*	***988,107.15***	**1,001,732.74**	**1,029,746.42**	**1,057,804.48**	**1,089,138.12**	**Increased debenture in 25, decreased ST in 26**
90	**TOTAL CAP REVENUE**				**(237,024.96)**	**(24,792.00)**	*(1,975,208.00)*	***(1,975,208.00)***	**(10,000.00)**	**0.00**	**0.00**	**0.00**	
91	**TOTAL REVENUE**				**(1,234,742.00)**	**(1,024,916.30)**	*(3,001,952.88)*	***(2,963,315.15)***	**(1,011,732.74)**	**(1,029,746.42)**	**(1,057,804.48)**	**(1,089,138.12)**	
92	**SURPLUS/DEFICIT**				**0.00**	**(113,716.66)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
93				Opening Regular Reserve Balance	(10,978.05)	(10,975.05)	*(16,258.64)*	***(16,258.64)***	(139,341.64)	(134,341.64)	(139,341.64)	(144,341.64)	
94				Transfer From Regular Reserves	0.00	0.00	*(118,083.00)*	***(118,083.00)***	10,000.00	0.00	0.00	0.00	
95				Contribution to Regular Reserves	(5,000.00)	(5,000.00)	*(5,000.00)*	***(5,000.00)***	(5,000.00)	(5,000.00)	(5,000.00)	(5,000.00)	
96				Net Change for Year	(5,000.00)	(5,000.00)	*(123,083.00)*	***(123,083.00)***	5,000.00	(5,000.00)	(5,000.00)	(5,000.00)	
97				Year End Regular Reserve	(15,978.05)	(16,258.64)	*(139,341.64)*	***(139,341.64)***	(134,341.64)	(139,341.64)	(144,341.64)	(149,341.64)	
98													
99				GCF	(149,688.87)								

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	**41010**	**Requisitions**			**(752,685.00)**	**(752,685.00)**	(805,083.44)	***(805,083.44)***	***(869,490.12)***	***(939,049.32)***	***(1,014,173.27)***	***(1,095,307.13)***	**8% increase annually**
2	41020	Grants in lieu of Taxes	OVR154-100	West RR Subregion Administration	(306.45)	(360.00)	(5,269.90)	***(5,269.90)***	(5,269.90)	(5,269.90)	(5,269.90)	(5,269.90)	Placeholder
3	**41020**	**Grants in lieu of Taxes**			**(306.45)**	**(360.00)**	(5,269.90)	***(5,269.90)***	**(5,269.90)**	**(5,269.90)**	**(5,269.90)**	**(5,269.90)**	
4	42020	Sale of Services	OPR302-100	NAK-Facility O&M	(303,150.14)	(382,089.00)	(436,087.88)	***(420,297.90)***	(441,312.80)	(463,378.43)	(486,547.36)	(510,874.72)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025.
5	42020	Sale of Services	OPR304-100	OOT Facility O&M	(2,556,882.13)	(3,000,828.00)	(2,363,711.95)	***(2,469,638.08)***	(2,593,119.99)	(2,722,775.99)	(2,858,914.79)	(3,001,860.53)	2024 - est $600K for RDKB soils; Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025
6	42020	Sale of Services	OPR620-100	OOT - Compost	(109,494.00)	(70,870.00)	(94,946.86)	***(77,957.00)***	(81,854.85)	(85,947.59)	(90,244.97)	(94,757.22)	Organics accepted at OOT from Cgar curbside and self haul
7	42020	Sale of Services	OPR306-100	ROS Facility O&M	(116,696.42)	(86,784.00)	(97,018.05)	***(95,462.40)***	(100,235.52)	(105,247.30)	(110,509.66)	(116,035.14)	Placeholder (less than budget due to TS upgrades closure); based on 2024 projected with 10% increase to ALL tipping
8	42020	Sale of Services	OPR422-100	BUR Facility O&M	(19,319.35)	(17,566.00)	(18,126.39)	***(19,322.60)***	(20,288.73)	(21,303.17)	(22,368.32)	(23,486.74)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025.
9	42020	Sale of Services	OPR420-100	EDG Facility O&M	(29,200.53)	(26,580.00)	(27,734.76)	***(29,238.00)***	(30,699.90)	(32,234.90)	(33,846.64)	(35,538.97)	Placeholder, based on 2024 projected with 10% increase to ALL tipping fees in 2025.
10	42020	Sale of Services	OPR307-100	SLO Facility O&M	(130,526.63)	(105,562.00)	(120,617.75)	***(116,118.20)***	(121,924.11)	(128,020.32)	(134,421.33)	(141,142.40)	Placeholder (less than budget due to TS upgrades closure); based on 2024 projected with 10% increase to ALL tipping
11	**42020**	**Sale of Services**			**(3,265,269.19)**	**(3,690,279.00)**	*(3,158,243.64)*	***(3,228,034.18)***	**(3,389,435.89)**	**(3,558,907.69)**	**(3,736,853.07)**	**(3,923,695.72)**	
12	42030	User Fees	OVR154-100	West RR Subregion Administration	(25,724.35)	(42,693.00)	(40,723.71)	***(40,723.71)***	(40,723.71)	(40,723.71)	(40,723.71)	(40,723.71)	Estimate scrap metal rebates, WSDA fees
13	**42030**	**User Fees**			**(25,724.35)**	**(42,693.00)**	(40,723.71)	***(40,723.71)***	**(40,723.71)**	**(40,723.71)**	**(40,723.71)**	**(40,723.71)**	
14	42035	User Fees - Specified	OPR591-100	ENV-West MARR Program reimbursement	(10,000.00)	(14,579.46)	(15,000.00)	***(15,000.00)***	(15,000.00)	(15,000.00)	(15,000.00)	(15,000.00)	Estimate MARR reimbursement
15	**42035**	**User Fees - Specified**			**(10,000.00)**	**(14,579.46)**	(15,000.00)	***(15,000.00)***	**(15,000.00)**	**(15,000.00)**	**(15,000.00)**	**(15,000.00)**	
16	43025	Grants - Specified	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	GCF, remove
17	43025	Grants - Specified	CAP1243-100	WEST - Compost curbside program	(635,241.00)	(615,428.00)	(19,660.00)	***(19,660.00)***	0.00	0.00	0.00	0.00	2025 OICP funds to be transferred to Castlegar; Rural curbside not to proceed
18	**43025**	**Grants - Specified**			**(635,241.00)**	**(615,428.00)**	(19,660.00)	***(19,660.00)***	**0.00**	**0.00**	**0.00**	**0.00**	
19	43100	Proceeds from Borrowing	CAP1116-100	NAK LF-transfer station construction	(1,090,158.08)	(1,090,158.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	LT borrowing
20	43100	Proceeds from Borrowing	CAP1238-100	NAK compost facility	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	moved to reserve funded
21	43100	Proceeds from Borrowing	CAP1237-100	NAK Landfill Closure	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	LT borrowing (moved to Regular Reserve)
22	43100	Proceeds from Borrowing	CAP13119	OOT Landfill Development	0.00	0.00	0.00	***0.00***	0.00	(4,400,000.00)	(4,600,000.00)	0.00	LT borrowing; consider using mix of reserves to offset borrowing cost
23	43100	Proceeds from Borrowing	CAP1243-100	WEST - Compost curbside program	(116,010.25)	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Rural curbside
24	43100	Proceeds from Borrowing	CAP1527-100	RR - West - Legacy Landfill Closures	0.00	0.00	0.00	***0.00***	0.00	0.00	(4,000,000.00)	0.00	LT borrowing
25	43100	Proceeds from Borrowing	CAP1240-100	OOT Tipping Area and scale	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	moved to reserve funded
26	43100	Proceeds from Borrowing	CAP1425-100	SLO TS-2023 Station Upgrades	(673,240.00)	(673,240.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	LT borrowing
27	**43100**	**Proceeds from Borrowing**			**(1,879,408.33)**	**(1,763,398.00)**	0.00	***0.00***	**0.00**	**(4,400,000.00)**	**(8,600,000.00)**	**0.00**	
28	43505	External Contributions & Contracts - Specified	OVR154-100	West RR Subregion Administration	(1,500.00)	(1,157.00)	(1,500.00)	***(1,500.00)***	(1,500.00)	(1,499.00)	(1,498.00)	(1,497.00)	BCUOMA contributions for SIL HHW event.
29	**43505**	**External Contributions & Contracts - Specified**			**(1,500.00)**	**(1,157.00)**	(1,500.00)	***(1,500.00)***	**(1,500.00)**	**(1,499.00)**	**(1,498.00)**	**(1,497.00)**	

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
30	45000	Transfer from Reserves	OVR154-100	West RR Subregion Administration	(1,034,090.00)	(520,430.53)	(868,500.00)	***(884,500.00)***	(3,261,000.00)	(90,000.00)	(36,000.00)	(20,000.00)	Based on CAP projects funded by regular reserve
31	45000	Transfer from Reserves	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Landfill Closure Reserve
32	45000	Transfer from Reserves	OVR154-100	West RR Subregion Administration	(336,781.92)	(336,781.92)	0.00	***0.00***	0.00	0.00	0.00	0.00	Growing Communities Fund (GCF) Allocation - NAK/ROS TS Upgrades.
33	45000	Transfer from Reserves	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	(780,000.00)	0.00	Placeholder; from stabilization reserve
34	**45000**	**Transfer from Reserves**			**(1,370,871.92)**	**(857,212.45)**	*(868,500.00)*	***(884,500.00)***	**(3,261,000.00)**	**(90,000.00)**	**(816,000.00)**	**(20,000.00)**	
35	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(202,632.00)	(202,632.00)	(182,368.80)	***(270,825.55)***	(243,742.99)	(219,368.69)	(197,431.82)	(177,688.64)	Placeholder; Estimated contribution from Central Subregion (reduction due to organics diversion).
36	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(132,990.00)	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Rural curbside not proceeding
37	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(103,000.00)	(103,000.00)	(107,000.00)	***(250,000.00)***	(250,000.00)	(250,000.00)	(250,000.00)	(250,000.00)	Placeholder, transfer from septage service; looking for future septage management options to move away from pits at landfills
38	**45500**	**Transfer from Other Service**			**(438,622.00)**	**(305,632.00)**	*(289,368.80)*	***(520,825.55)***	**(493,742.99)**	**(469,368.69)**	**(447,431.82)**	**(427,688.64)**	
39	45900	Transfer from Provisions	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Landfill Closure - liability reduction
40	**45500**	**Transfer from Provisions**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
41	48200	Gain on Debt	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
42	**48200**	**Gain on Debt**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
43	49100	Prior Year Surplus	OVR154-100	West RR Subregion Administration	(190,501.54)	(525,193.00)	(274,722.07)	***(450,602.71)***	0.00	0.00	0.00	0.00	Placeholder, previous year projected total surplus/deficit.
44	49100	Prior Year Surplus	OVR154-100	West RR Subregion Administration	0.00	(2,691,333.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	ARO - Landfill closure
45	49100	Prior Year Surplus	OVR154-100	West RR Subregion Administration	(240,000.00)	(66,275.00)	(554,000.00)	***(590,000.00)***	0.00	0.00	0.00	0.00	Portion of surplus carried into next year to fund work carried over (2025 is for OOT DOCP and remaining West TS upgrades such including compactors)
46	**49100**	**Prior Year Surplus**			**(430,501.54)**	**(3,282,801.00)**	*(828,722.07)*	***(1,040,602.71)***	**0.00**	**0.00**	**0.00**	**0.00**	
47	**TOTAL REVENUE**				**(8,810,129.78)**	**(11,326,224.91)**	*(6,032,071.56)*	***(6,561,199.49)***	**(8,076,162.61)**	**(9,519,818.31)**	**(14,676,949.77)**	**(5,529,182.10)**	
48	**TAXATION**				**(752,685.00)**	**(752,685.00)**	*(805,083.44)*	***(805,083.44)***	**(869,490.12)**	**(939,049.32)**	**(1,014,173.27)**	**(1,095,307.13)**	
49	**TIPPING FEES**				**(3,265,269.19)**	**(3,690,279.00)**	*(3,158,243.64)*	***(3,228,034.18)***	**(3,389,435.89)**	**(3,558,907.69)**	**(3,736,853.07)**	**(3,923,695.72)**	
50	**CAP FUNDING SUBTOTAL**				**(4,018,511.25)**	**(3,236,038.45)**	*(1,332,160.00)*	***(1,384,160.00)***	**(3,261,000.00)**	**(4,490,000.00)**	**(9,416,000.00)**	**(20,000.00)**	
51	**TOTAL REVENUE (w/o Prior Year Surplus)**				**(8,379,628.24)**	**(8,043,423.91)**	*(5,203,349.49)*	***(5,520,596.78)***	**(8,076,162.61)**	**(9,519,818.31)**	**(14,676,949.77)**	**(5,529,182.10)**	
52	**TOTAL OPERATING REVENUE**				**(4,492,606.99)**	**(4,806,228.46)**	*(4,313,689.49)*	***(4,614,936.78)***	**(4,813,662.61)**	**(5,028,319.31)**	**(5,259,451.77)**	**(5,507,685.10)**	
53	51010	Salaries	OPR652	Waste spotters	90,652.00	65,793.88	0.00	***0.00***	0.00	0.00	0.00	0.00	Moving to LFA shifts
54	51010	Salaries	OPR624-100	West - Lead Hand	35,301.90	28,819.89	36,466.86	***36,466.86***	37,560.87	38,687.69	39,848.33	41,043.78	Lead Hand - 30% to allocation service; Based on Salary Worksheet (3.3%); 2024 includes CA payment
55	51010	Salaries	OVR154-100	West RR Subregion Administration	175,617.43	178,406.03	271,109.18	***278,133.88***	279,453.20	287,836.79	296,471.90	305,366.05	Attendants - based on Salaries worksheet (3.3%); 2% thereafter; increase in 2025 due to waste spotter role moving to LFA; 2024 CA payment deferred to 2025
56	**51010**	**Salaries**			**301,571.33**	**273,019.81**	*307,576.04*	***314,600.74***	**317,014.06**	**326,524.49**	**336,320.22**	**346,409.83**	
57	51020	Overtime	OPR624-100	West - Lead Hand	2,613.16	0.00	300.00	***300.00***	300.00	300.00	300.00	300.00	Lead Hand
58	51020	Overtime	OPR652	Waste spotters	333.89	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Limited budget for emerg coverage; moved to LFA.
59	51020	Overtime	OVR154-100	West RR Subregion Administration	4,522.18	11,550.66	8,000.00	***8,000.00***	5,000.00	5,000.00	5,000.00	5,000.00	Limited budget for emerg coverage + $3k for OOT winter OT.
60	**51020**	**Overtime**			**7,469.23**	**11,550.66**	8,300.00	***8,300.00***	**5,300.00**	**5,300.00**	**5,300.00**	**5,300.00**	
61	51030	Benefits	OPR421-300	Waste spotters	26,901.71	10,772.63	0.00	***0.00***	0.00	0.00	0.00	0.00	Moving to LFA shifts
62	51030	Benefits	OPR624-100	West - Lead Hand	10,237.55	9,312.05	10,575.39	***10,575.39***	10,839.77	11,110.77	11,388.54	11,673.25	Lead Hand - based on salary worksheet

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
63	51030	Benefits	OVR154-100	West RR Subregion Administration	43,904.36	31,503.39	67,027.52	***67,027.52***	69,038.35	71,109.50	73,242.78	75,440.06	Attendants - based on projected benefits; increase in 2025 due to waste spotter role moving to LFA
64	**51030**	**Benefits**			**81,043.62**	**51,588.07**	77,602.91	***77,602.91***	**79,878.12**	**82,220.26**	**84,631.32**	**87,113.32**	
65	51050	Employee Health & Safety	OVR154-100	West RR Subregion Administration	7,868.00	5,370.00	8,064.70	***8,064.70***	8,266.32	8,472.98	8,684.80	8,901.92	Staff PPE, training, hazard tree, safety check-in monitoring - based on costing developed with H&S coord.
66	**51050**	**Employee Health & Safety**			**7,868.00**	**5,370.00**	8,064.70	***8,064.70***	**8,266.32**	**8,472.98**	**8,684.80**	**8,901.92**	
67	51500	Directors - Allowance & Stipend	OVR154-100	West RR Subregion Administration	34,070.02	34,070.02	34,751.42	***34,751.42***	35,446.45	36,155.38	36,878.49	37,616.06	70% (other 20% to recycling and 10% to compost allocation); Based on up to 14 RR meetings (9 directors) + WRRC Chair at 4 other RRC meetings + Chair Stipend
68	**51500**	**Directors - Allowance & Stipend**			**34,070.02**	**34,070.02**	34,751.42	***34,751.42***	**35,446.45**	**36,155.38**	**36,878.49**	**37,616.06**	
69	51560	Directors - Travel	OVR154-100	West RR Subregion Administration	1,000.00	1,000.00	2,000.00	***2,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Placeholder, virtual meetings lower travel; West site tour in 2025 spring
70	**51560**	**Directors - Travel**			**1,000.00**	**1,000.00**	2,000.00	***2,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
71	52010	Travel	OPR624-100	WEST - Lead Hand	16,069.65	7,722.50	16,873.13	***16,873.13***	17,716.79	18,602.63	19,532.76	20,509.40	Lead Hand 70% - cash handling and gen site travel - 30% to recycling service; (2024 lower $ b/c LH on leave for 1/4 of
72	52010	Travel	OVR154-100	West RR Subregion Administration	3,231.84	695.00	4,731.84	***4,731.84***	3,393.43	3,563.10	3,741.26	3,928.32	Landfill attendant - mileage for staff training/development/out of area shift coverage. 2025
73	**52010**	**Travel**			**19,301.49**	**8,417.50**	21,604.97	***21,604.97***	**21,110.22**	**22,165.73**	**23,274.02**	**24,437.72**	
74	52020	Education & Training	OVR154-100	West RR Subregion Administration	2,000.00	0.00	2,000.00	***4,000.00***	4,000.00	4,000.00	4,000.00	4,000.00	Attendant training; staff incentives
75	**52020**	**Education & Training**			**2,000.00**	**0.00**	*2,000.00*	***4,000.00***	**4,000.00**	**4,000.00**	**4,000.00**	**4,000.00**	
76	53020	Admin, Office Supplies & Postage	OPR302-100	NAK-Facility O&M	100.00	0.00	150.00	***150.00***	150.00	150.00	150.00	150.00	Gen supplies
77	53020	Admin, Office Supplies & Postage	OPR304-100	OOT Facility Operations & Maintenance	200.00	0.00	130.00	***130.00***	130.00	130.00	130.00	130.00	Gen supplies
78	53020	Admin, Office Supplies & Postage	OPR420	EDG	100.00	0.00	130.00	***130.00***	130.00	130.00	130.00	130.00	Gen supplies
79	53020	Admin, Office Supplies & Postage	OPR306-100	ROS Facility O&M	100.00	0.00	150.00	***150.00***	150.00	150.00	150.00	150.00	Gen supplies
80	53020	Admin, Office Supplies & Postage	OPR307-100	SLO Facility O&M	100.00	0.00	200.00	***200.00***	200.00	200.00	200.00	200.00	Gen supplies
81	53020	Admin, Office Supplies & Postage	OVR154-100	West RR Subregion Administration	2,000.00	856.25	2,000.00	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	Gen supplies
82	53020	Admin, Office Supplies & Postage	OVR154-303	West Subregion HHW Events	400.00	0.00	400.00	***400.00***	400.00	400.00	400.00	400.00	Hand-outs, event lunch for volunteers
83	**53020**	**Admin, Office Supplies & Postage**			**3,000.00**	**856.25**	3,160.00	***3,160.00***	**3,160.00**	**3,160.00**	**3,160.00**	**3,160.00**	
84	53030	Communication	OPR302-100	NAK-Facility O&M	3,240.91	4,372.81	3,338.14	***3,338.14***	3,438.28	3,541.43	3,647.68	3,757.11	Based on projected + 3%
85	53030	Communication	OPR304-100	OOT Facility Operations & Maintenance	3,048.02	2,377.55	3,139.46	***3,139.46***	3,233.64	3,330.65	3,430.57	3,533.49	Based on projected + 3%
86	53030	Communication	OPR306-100	ROS Facility O&M	1,271.07	1,217.95	1,309.21	***1,309.21***	1,348.48	1,388.94	1,430.61	1,473.52	Based on projected + 3%
87	53030	Communication	OPR307-100	SLO Facility O&M	2,683.29	1,522.95	2,763.79	***2,763.79***	2,846.70	2,932.10	3,020.07	3,110.67	Based on projected + 3%
88	53030	Communication	OVR154-100	West RR Subregion Administration	1,248.00	1,031.25	1,285.44	***1,285.44***	1,324.00	1,363.72	1,404.63	1,446.77	Staff cell allowance; projected +3%
89	**53030**	**Communication**			**11,491.30**	**10,522.51**	11,836.04	***11,836.04***	**12,191.12**	**12,556.85**	**12,933.56**	**13,321.56**	
90	53040	Advertising	OVR154-100	West RR Subregion Administration	2,000.00	1,360.00	1,500.00	***1,500.00***	2,000.00	2,000.00	2,000.00	1,500.00	As per RRP improved education/communication; Ads, brochures; increased 26-28 for adverts for NAK closure and
91	53040	Advertising	OVR154-303	West Subregion HHW Events	2,000.00	1,000.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	As per RRP improved education/communication.
92	**53040**	**Advertising**			**4,000.00**	**2,360.00**	2,500.00	***2,500.00***	**3,000.00**	**3,000.00**	**3,000.00**	**2,500.00**	
93	53050	Insurance	OPR302-100	NAK-Facility O&M	104.33	104.33	107.77	***107.77***	111.00	114.33	117.76	121.29	projected + 3%

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
94	53050	Insurance	OPR304-100	OOT Facility Operations & Maintenance	250.37	250.37	258.63	***258.63***	266.39	274.38	282.61	291.09	projected + 3%
95	53050	Insurance	OPR306-100	ROS Facility O&M	63.75	63.75	65.86	***65.86***	67.83	69.87	71.96	74.12	projected + 3%
96	53050	Insurance	OPR307-100	SLO Facility O&M	115.91	115.91	119.73	***119.73***	123.32	127.02	130.84	134.76	projected + 3%
97	53050	Insurance	OVR154-100	West RR Subregion Administration	4,365.10	4,365.10	4,509.15	***4,509.15***	4,644.42	4,783.76	4,927.27	5,075.09	projected + 3%
98	**53050**	**Insurance**			**4,899.45**	**4,899.45**	5,061.13	***5,061.13***	**5,212.97**	**5,369.36**	**5,530.44**	**5,696.35**	
99	53080	Licence & Permits	OPR304-100	OOT Facility Operations & Maintenance	500.00	0.00	1,000.00	***1,000.00***	0.00	0.00	0.00	0.00	OOT lands application fees
100	53080	Licence & Permits	OVR154-100	West RR Subregion Administration	5,657.12	3,477.55	5,657.12	***5,657.12***	5,657.12	5,657.12	5,657.12	5,657.12	drone software
101	53080	Licence & Permits	OVR154-100	West RR Subregion Administration	7,920.00	8,474.40	7,920.00	***7,920.00***	7,920.00	7,920.00	7,920.00	7,920.00	Scale software license - site specific
102	**53080**	**Licence & Permits**			**14,077.12**	**11,951.95**	14,577.12	***14,577.12***	**13,577.12**	**13,577.12**	**13,577.12**	**13,577.12**	
103	54040	Consulting Fees	OPR302-100	NAK-Facility O&M	25,000.00	10,000.00	21,000.00	***21,000.00***	15,000.00	15,000.00	20,000.00	15,000.00	2025 $6k for AOA and 5 year report: Annual site visits and general engineering support $15k, 2028 landfill gas assessment $5k.
104	54040	Consulting Fees	OPR302-100	NAK-Facility O&M	65,000.00	26,596.00	0.00	***0.00***	0.00	0.00	0.00	65,000.00	Hydrogeo (next in 2029)
105	54040	Consulting Fees	OPR304-100	OOT Facility Operations & Maintenance	10,000.00	5,000.00	20,000.00	***20,000.00***	20,000.00	10,000.00	18,000.00	18,000.00	Annual site visits $10k; next landfill gas assessment ($8k) in 2028, however expect more LFG assessment due to Fed/Provincial guidelines so increased cost in 25/26.
106	54040	Consulting Fees	OPR304-100	OOT Facility Operations & Maintenance	75,000.00	39,679.00	0.00	***0.00***	0.00	0.00	0.00	75,000.00	Hydrogeo
107	54040	Consulting Fees	OPR304-100	OOT Facility Operations & Maintenance	100,000.00	0.00	110,000.00	***110,000.00***	0.00	0.00	0.00	0.00	Design, Operations & Closure Plan; includes $10k for PFR (Arch); Lands acquisition
108	54040	Consulting Fees	OVR154-100	West RR Subregion Administration	2,000.00	(381.00)	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, 23/24 FOI requests for legacy landfills
109	**54040**	**Consulting Fees**			**277,000.00**	**80,894.00**	151,000.00	***151,000.00***	**35,000.00**	**25,000.00**	**38,000.00**	**173,000.00**	
110	54030	Contracted Services	OPR302-100	NAK-Facility O&M	233,216.73	224,000.00	231,392.00	***231,392.00***	60,000.00	63,000.00	66,150.00	69,457.50	Landfill contract (closure late 25); surveillance, fire.
111	54030	Contracted Services	OPR302-100	NAK Bin Haul	0.00	0.00	63,000.00	***63,000.00***	110,250.00	115,762.50	121,550.63	127,628.16	Deferred start to late 2025 Waste hauling to OOT post closure.
112	54030	Contracted Services	OPR302-101	NAK-Environmental Monitoring	10,833.59	10,833.59	12,000.00	***12,000.00***	12,861.46	13,118.69	13,381.06	13,382.06	Based on EMP sampling, reporting, lab contracts; elevated for a period post closure.
113	54030	Contracted Services	OPR302-300	NAK Material Processing	44,073.32	44,073.32	46,276.98	***46,276.98***	48,590.83	51,020.37	53,571.39	56,249.96	Tires, metal, tanks, wood, batteries
114	54030	Contracted Services	OPR304-100	OOT Facility O&M	449,204.56	449,204.56	483,664.79	***515,106.04***	618,127.25	649,033.61	681,485.29	715,559.56	Landfill contract (new in 2026 & increase in 2026 for NAK); fire 200, surviellance 2000; $12k for on-site organics bin
115	54030	Contracted Services	OPR304-101	OOT Environmental Monitoring	13,079.71	9,407.50	15,500.00	***15,500.00***	15,810.00	16,126.20	16,448.72	16,777.70	Based on EMP sampling, reporting, lab contracts.
116	54030	Contracted Services	OPR304-300	OOT Material Processing	111,360.74	111,360.74	116,928.78	***116,928.78***	122,775.22	128,913.98	135,359.68	142,127.66	Tires, metal, tanks, wood, batteries
117	54030	Contracted Services	OPR306-100	ROS Facility O&M	5,000.00	8,776.25	5,100.00	***5,100.00***	5,202.00	5,306.04	5,412.16	5,520.40	water for jobjon, fire
118	54030	Contracted Services	OPR306-300	ROS Snow Removal	14,427.00	9,782.00	15,148.35	***15,148.35***	15,905.77	16,701.06	17,536.11	18,412.91	Snow
119	54030	Contracted Services	OPR306-303	ROS Bin Haul	55,664.49	52,462.50	58,447.71	***64,014.16***	67,214.87	70,575.62	74,104.40	77,809.62	Jan 20 increased additional 10% to account for new WW handling; Bin hauling
120	54030	Contracted Services	OPR306-304	ROS TS - Material Processing	20,000.00	10,000.00	715.41	***715.41***	751.18	788.74	828.18	869.59	Tires, metal, tanks, batteries
121	54030	Contracted Services	OPR307-100	SLO Facility O&M	15,104.25	12,480.00	15,859.46	***15,859.46***	16,652.44	17,485.06	18,359.31	19,277.28	Septic installed 24, no biffy, gen maintenance

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
122	54030	Contracted Services	OPR307-101	SLO Environmental Monitoring	6,829.52	6,829.52	4,800.00	***4,800.00***	4,896.00	4,993.92	5,093.80	5,195.67	Based on EMP sampling, reporting, lab contracts
123	54030	Contracted Services	OPR307-300	SLO Material Processing	2,166.51	1,698.00	10,000.00	***10,000.00***	2,388.57	10,000.00	2,633.40	2,634.40	tires, tanks, metal, wood grinding alternating years.
124	54030	Contracted Services	OPR307-301	SLO Snow Removal	13,780.41	21,330.00	22,396.50	***22,396.50***	23,516.33	24,692.14	25,926.75	27,223.09	Snow
125	54030	Contracted Services	OPR307-304	SLO Bin Haul	49,777.35	32,487.50	52,266.22	***57,243.95***	60,106.15	63,111.46	66,267.03	69,580.38	Jan 20 increased additional 10% to account for new WW handling; Bin hauling
126	54030	Contracted Services	OPR420-302	EDG Facility O&M	68,411.11	68,411.11	71,831.67	***71,831.67***	75,423.25	79,194.41	83,154.13	87,311.84	Tires, biffy, tanks, batteries, CKGB ops contract, wood as needed
127	54030	Contracted Services	OPR422-302	BUR Facility O&M	55,464.59	55,464.59	58,237.82	***58,237.82***	61,149.71	64,207.20	67,417.56	70,788.43	Tires, biffy, tanks, batteries, CKGB ops contract, wood as needed
128	54030	Contracted Services	OVR154-100	West RR Subregion Administration	16,800.00	16,800.00	21,840.00	***21,840.00***	21,840.00	21,840.00	21,840.00	21,840.00	CKISS 30% increase from 24 costs assuming mechanical/manual treatments; opposed to herbicides;
129	54030	Contracted Services	OVR154-303	West - Eco Depot - Castlegar & Nakusp	78,000.00	0.00	98,722.35	***98,722.35***	162,240.00	168,729.60	175,478.78	182,497.94	Castlegar and Nak - earliest start late 2025 (est based on Leafs costs)
130	54030	Contracted Services	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove
131	54030	Contracted Services	OVR154-303	West Subregion HHW Events	15,000.00	57,277.65	57,277.65	***57,277.65***	15,000.00	15,750.00	16,537.50	17,364.38	Allocated funds for ecodepots in Castlegar & NAK; Silverton only by 2026
132	**54030**	**Contracted Services**			**1,278,193.87**	**1,202,678.82**	*1,461,405.69*	***1,503,391.13***	**1,520,701.02**	**1,600,350.59**	**1,668,535.88**	**1,747,508.52**	
133	55010	Repairs & Maintenance	OPR302-100	NAK-Facility O&M	4,000.00	19,000.00	4,000.00	***4,000.00***	4,000.00	4,000.00	4,000.00	4,000.00	General repairs & main, access road dust control; 2024 miscode heatpump, scale, fire extinguisher
134	55010	Repairs & Maintenance	OPR304-100	OOT Facility O&M	29,500.00	15,000.00	19,000.00	***19,000.00***	9,000.00	9,000.00	9,000.00	9,000.00	General repairs & main, Grizzly plate repairs (defered to 25); scale maintenance. Fire extinguishers
135	55010	Repairs & Maintenance	OPR306-100	ROS Facility O&M	4,000.00	1,000.00	4,000.00	***4,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	General repairs & main. Dust control, fire extinguishers
136	55010	Repairs & Maintenance	OPR306-301	ROS Civil/Structural Repairs	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder; Infrastructure repairs
137	55010	Repairs & Maintenance	OPR307-100	SLO Facility O&M	8,000.00	1,000.00	8,000.00	***8,000.00***	7,000.00	8,000.00	7,000.00	8,000.00	General repairs & main. Dust control, fire extinguishers
138	55010	Repairs & Maintenance	OPR307-302	SLO Civil/Structural Repairs	1,000.00	0.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Infrastructure repairs
139	55010	Repairs & Maintenance	OPR420-302	EDG Facility O&M	1,000.00	0.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	General repairs & main
140	55010	Repairs & Maintenance	OPR422-302	BUR Facility O&M	1,000.00	0.00	1,000.00	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	General repairs & main
141	55010	Repairs & Maintenance	OVR154-100	West RR Subregion Administration	15,000.00	10,000.00	10,000.00	***10,000.00***	5,000.00	5,000.00	5,000.00	5,000.00	Fire extinguisher maintenance/replacement; Road and gate repairs; 2025 FireSmart Recommendations $5k.
142	55010	Repairs & Maintenance	OPR517-100	West Sub Region Bin Maintenance	23,000.00	27,782.00	5,000.00	***5,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	2024 moved new bins to CAP; General repairs on bins
143	**55010**	**Repairs & Maintenance**			**86,500.00**	**73,782.00**	53,000.00	***53,000.00***	**34,000.00**	**35,000.00**	**34,000.00**	**35,000.00**	
144	55020	Operating Supplies	OPR302-100	NAK-Facility O&M	1,500.00	1,301.25	1,500.00	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	General site supplies
145	55020	Operating Supplies	OPR304-100	OOT Facility Operations & Maintenance	3,000.00	2,011.25	4,000.00	***4,000.00***	4,000.00	4,000.00	4,000.00	4,000.00	General site supplies, seeding
146	55020	Operating Supplies	OPR306-100	ROS Facility O&M	1,200.00	0.00	500.00	***500.00***	1,200.00	1,200.00	1,200.00	1,200.00	General site supplies
147	55020	Operating Supplies	OPR307-100	SLO Facility O&M	1,000.00	0.00	500.00	***500.00***	1,000.00	1,000.00	1,000.00	1,000.00	General site supplies
148	55020	Operating Supplies	OPR420-302	EDG Facility O&M	500.00	0.00	100.00	***100.00***	500.00	500.00	500.00	500.00	General site supplies
149	55020	Operating Supplies	OPR422-302	BUR Facility O&M	500.00	0.00	100.00	***100.00***	500.00	500.00	500.00	500.00	General site supplies
150	55020	Operating Supplies	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
151	55020	Operating Supplies	OVR154-100	West RR Subregion Administration	13,500.00	4,582.50	1,500.00	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	General supplies
152	55020	Operating Supplies	OVR154-303	West Subregion HHW Events	300.00	0.00	100.00	***100.00***	300.00	300.00	300.00	300.00	General site supplies
153	**55020**	**Operating Supplies**			**21,500.00**	**7,895.00**	8,300.00	***8,300.00***	**10,500.00**	**10,500.00**	**10,500.00**	**10,500.00**	
154	55030	Equipment	OVR154-100	West RR Subregion Administration	12,000.00	1,500.00	10,500.00	***10,500.00***	0.00	0.00	0.00	0.00	Scale software equipment - plate readers, portable devices
155	55030	Equipment	OVR154-100	West RR Subregion Administration	11,100.00	7,700.00	3,400.00	***3,400.00***	0.00	0.00	0.00	0.00	Scale weight display NAK ($1.5k), desk ROS ($900); WS A/C at OOT and NAK; 2024 7.5k for heat pump at NAK scale
156	**55030**	**Equipment**			**23,100.00**	**9,200.00**	13,900.00	***13,900.00***	**0.00**	**0.00**	**0.00**	**0.00**	
157	55040	Utilities	OPR302-100	NAK-Facility O&M	2,262.68	1,946.25	2,337.34	***2,337.34***	2,407.46	2,479.69	2,554.08	2,630.70	Based on projected + 3.3%
158	55040	Utilities	OPR304-100	OOT Facility Operations & Maintenance	2,504.25	2,216.25	2,586.90	***2,586.90***	2,664.50	2,744.44	2,826.77	2,911.57	Based on projected + 3.3%
159	55040	Utilities	OPR306-100	ROS Facility O&M	683.89	471.25	706.46	***706.46***	727.65	749.48	771.97	795.13	Based on projected + 3.3%
160	55040	Utilities	OPR307-100	SLO Facility O&M	1,595.36	1,927.50	1,648.01	***1,648.01***	1,697.45	1,748.37	1,800.82	1,854.85	Based on projected + 3.3%
161	55040	Utilities	OVR154-100	West RR Subregion Administration	906.63	442.50	936.55	***936.55***	964.65	993.59	1,023.40	1,054.10	Based on projected + 3.3%
162	**55040**	**Utilities**			**7,952.81**	**7,003.75**	8,215.26	***8,215.26***	**8,461.72**	**8,715.57**	**8,977.03**	**9,246.35**	
163	55060	Rentals	OPR421-300	West Subregion Recycling	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove
164	**55060**	**Rentals**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
165	55900	Provisions	OVR154-100	West RR Subregion Administration	399,352.33	399,352.33	0.00	***0.00***	0.00	0.00	0.00	0.00	Moved to Landfill Closure reserve transfer
166	**55900**	**Provisions**			**399,352.33**	**399,352.33**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
167	56110	Short-Term Financing Interest	CAP1243-100	WEST - Compost curbside program	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, rural curbside not to proceed
168	56010	Debenture Interest	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove - LT loan repayment completed in 2023
169	56010	Debenture Interest	CAP1116-100	NAK LF-transfer station construction	49,059.00	0.00	49,059.00	***49,059.00***	49,059.00	49,059.00	49,059.00	49,059.00	Based on 4.6% 25 yr
170	56010	Debenture Interest	CAP1237	NAK Landfill Closure	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; moved to reserve funded (25yr LT loan for $1M = $49.5k annual repayment)
171	56010	Debenture Interest	CAP1240	OOT Tipping Area and scale	0.00	0.00	0.00	***0.00***	0.00	67,500.00	67,500.00	67,500.00	Based on 4.6% 25 yr
172	56010	Debenture Interest	CAP1319-100	OOT Landfill Development	0.00	0.00	0.00	***0.00***	0.00	72,000.00	72,000.00	72,000.00	Cell dev/Liner; based on 4.6% 25 yr
173	56010	Debenture Interest	CAP1319-200	OOT Landfill Development	0.00	0.00	0.00	***0.00***	0.00	0.00	202,400.00	202,400.00	Leachate; based on 4.6% 25 yr
174	56010	Debenture Interest	CAP1425-100	SLO TS-2023 Station Upgrades	30,299.00	600.00	30,299.00	***30,299.00***	30,299.00	30,299.00	30,299.00	30,299.00	Based on 4.6% 25 yr
175	**56010**	**Debenture Interest**			**79,358.00**	**600.00**	79,358.00	***79,358.00***	**79,358.00**	**218,858.00**	**421,258.00**	**421,258.00**	
176	56120	Short-Term Financing Principal	CAP1243-100	WEST - Compost curbside program	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove, rural curbside not to proceed
177	56020	Debenture Principal	OVR154-100	West RR Subregion Administration	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove - LT loan repayment completed in 2023
178	56020	Debenture Principal	CAP1116-100	NAK LF-transfer station construction	27,253.00	0.00	27,253.00	***27,253.00***	27,253.00	27,253.00	27,253.00	27,253.00	25 yr LT loan
179	56020	Debenture Principal	CAP1237	NAK Landfill Closure	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; moved to reserve funded (25yr LT loan for $1M = $27.5k annual repayment)
180	56020	Debenture Principal	CAP1240	OOT Tipping Area and scale	0.00	0.00	0.00	***0.00***	0.00	37,498.00	37,498.00	37,498.00	25 yr LT loan

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
181	56020	Debenture Principal	CAP1319-100	OOT Landfill Development	0.00	0.00	0.00	***0.00***	0.00	39,997.00	39,997.00	39,998.00	25 yr LT loan; Cell dev/Liner
182	56020	Debenture Principal	CAP1319-200	OOT Landfill Development	0.00	0.00	0.00	***0.00***	0.00	0.00	112,966.00	112,966.00	25 yr LT loan; Leachate
183	56020	Debenture Principal	CAP1425-100	SLO TS-2023 Station Upgrades	16,831.00	0.00	16,831.00	***16,831.00***	16,831.00	16,831.00	16,831.00	16,831.00	25 yr LT loan
184	**56020**	**Debenture Principal**			**44,084.00**	**0.00**	44,084.00	***44,084.00***	**44,084.00**	**121,579.00**	**234,545.00**	**234,546.00**	
185	59000	Contribution to Reserve	OVR154-100	West RR Subregion Administration	472,834.78	472,834.78	363,415.34	***658,467.37***	509,246.90	377,426.53	288,926.75	259,353.78	Cont to regular reserves
186	59000	Contribution to Reserve	OVR154-100	West RR Subregion Administration	0.00	2,691,333.00	450,000.00	***450,000.00***	450,000.00	450,000.00	450,000.00	450,000.00	ARO - Landfill Closure transfer; moved Provisions here
187	59000	Contribution to Reserve	OVR154-100	West RR Subregion Administration	95,250.77	262,596.50	137,361.03	***225,301.36***	0.00	0.00	0.00	0.00	Cont to stabilization reserves, 1/2 of prior year surplus
188	**59000**	**Contribution to Reserve**			**568,085.55**	**3,426,764.28**	*950,776.37*	***1,333,768.72***	**959,246.90**	**827,426.53**	**738,926.75**	**709,353.78**	
189	57010	Grants	OVR154-100	West RR Subregion Administration	14,540.00	14,540.00	7,800.00	***9,550.00***	7,800.00	7,800.00	7,800.00	7,800.00	HCSNSV - NewDenver/Silverton Compost program curing area $14.5K; on-going support $7.8k annually; 2025 two joracans
190	57010	Grants	OVR154-100	West RR Subregion Administration	660,690.21	694,428.00	0.00	***0.00***	0.00	0.00	0.00	0.00	2024 Transfer of OICP grant ($583k) and RDCK 1/3 ($79k) to City of Castlegar for organics curbside bins and ambassasdors.
191	**57010**	**Grants**			**675,230.21**	**708,968.00**	*7,800.00*	***9,550.00***	**7,800.00**	**7,800.00**	**7,800.00**	**7,800.00**	
192	59500	Transfer to Other Service	OVR154-100	West RR Subregion Administration	30,000.00	30,000.00	10,000.00	***10,000.00***	50,000.00	50,000.00	50,000.00	50,000.00	A112, PM fees - ALL see notes
193	59500	Transfer to Other Service	OVR153-100	Central RR Subregion Administration	9,700.50	9,700.50	9,700.50	***9,700.50***	0.00	0.00	0.00	0.00	transfer to S187 for HHW Reso # 845/21, pending Cgar ecodepot in 25/26
194	59500	Transfer to Other Service	OVR154-100	West RR Subregion Administration	340,658.00	340,658.00	351,899.71	***470,536.00***	484,652.08	499,191.64	514,167.39	529,592.41	Placeholder; 70% A102 (20% in A118 recycling allocation service and 10% in A120 C-W Compost allocation service).
195	59500	Transfer to Other Service	OPR643-100	Central-West Organics - General	100,000.00	*100,000.00*	281,077.64	***281,077.64***	238,112.15	240,667.57	152,158.29	155,210.19	Placeholder; Transfer of tipping fees to A120 Compost Allocation Service for CEN compost facility.
196	59500	Transfer to Other Service	OPR643-100	Central-West Organics - General	311,567.15	311,567.15	73,392.13	***59,346.83***	61,765.60	61,952.83	16,566.73	16,918.11	Placeholder Transfer to A120 - tax subidization; Current tax split 50/50 with S187
197	59500	Transfer to Other Service	OPR619-100	OOT - Compost Hauling to CEN	28,659.95	49,030	80,000.00	***80,000.00***	84,000.00	88,200.00	92,610.00	97,240.50	Placeholder, Transfer to S187 for hauling OOT to CEN; in house estimate.
198	59500	Transfer to Other Service	OPR421-300	West Subregion Recycling	457,730.68	457,730.68	411,613.81	***348,929.37***	457,107.27	472,920.40	489,316.11	506,316.77	Placeholder, Transfer to West Recycling Allocation Service
199	**59500**	**Transfer to Other Service**			**1,278,316.28**	**1,298,686.27**	*1,217,683.79*	***1,259,590.34***	**1,375,637.10**	**1,412,932.44**	**1,314,818.52**	**1,355,277.99**	
200	59510	Transfer to Other Service - General Admin. Fee	OVR154-100	West RR Subregion Administration	134,444.00	134,444.00	138,880.65	***119,835.00***	123,430.05	127,132.95	130,946.94	134,875.35	General Admin Placeholder
201	**59510**	**Transfer to Other Service - General Admin. Fee**			**134,444.00**	**134,444.00**	*138,880.65*	***119,835.00***	**123,430.05**	**127,132.95**	**130,946.94**	**134,875.35**	
202	59520	Transfer to Other Service - IT Fee	OVR154-100	West RR Subregion Administration	24,350.00	24,350.00	5,702.00	***7,097.00***	7,309.91	7,529.21	7,755.08	7,987.74	IT - based on license based costing
203	**59520**	**Transfer to Other Service - IT Fee**			**24,350.00**	**24,350.00**	*5,702.00*	***7,097.00***	**7,309.91**	**7,529.21**	**7,755.08**	**7,987.74**	
204	59550	Transfer to Other Service - Environmental Services Fee	OVR154-100	West RR Subregion Administration	77,862.00	77,862.00	80,431.45	***97,551.00***	100,477.53	103,491.86	106,596.61	109,794.51	Placeholder 80% A100 (10% to recycling allocation service and 10% to C-W Compost allocation service).
205	**59550**	**Transfer to Other Service - Environmental Services Fee**			**77,862.00**	**77,862.00**	*80,431.45*	***97,551.00***	**100,477.53**	**103,491.86**	**106,596.61**	**109,794.51**	
206	60000	Capital Expenditures	CAP1116-100	NAK LF-transfer station construction	1,426,940.00	1,360,933.00	220,000.00	***232,000.00***	0.00	0.00	0.00	0.00	Compactors ($207,283) expect Jan 2025 delivery and install; $5k consulting (asbuilt); $5K cleanout; Jan 20 moved $12k
207	60000	Capital Expenditures	CAP1237-100	NAK Landfill Closure	100,000.00	10,224.00	70,000.00	***70,000.00***	1,400,000.00	0.00	0.00	0.00	Landfill closure plan started in 24, rolling over $70k to 25 for add planning (test pits, arch, etc.), completion of closure plan, $10K add for detailed design and tech specs, 2026: landfill closure.
208	60000	Capital Expenditures	CAP1238-100	NAK compost facility	7,500.00	0.00	2,500.00	***2,500.00***	0.00	70,000.00	780,000.00	0.00	2025: completion of RD and feasibility assessment. Placeholders for Design (27) and Construction (28).

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
209	60000	Capital Expenditures	CAP1413-100	NAK waste spotter shelter	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove
210	60000	Capital Expenditures	CAP1240-100	OOT Tipping Area and scale	0.00	0.00	100,000.00	***100,000.00***	1,500,000.00	0.00	0.00	0.00	OOT Tipping Area relocation and second scale design 2025, construction in 2026.
211	60000	Capital Expenditures	CAP1243-100	WEST - Compost curbside program	239,425.00	3,020.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove - will not proceed
212	60000	Capital Expenditures	CAP1118-100	OOT LF-2021 Upgrades to Compost	10,000.00	0.00	10,000.00	***10,000.00***	0.00	0.00	0.00	0.00	Construction completed in 2023; 2024 modifications to gate opening; can remove
213	60000	Capital Expenditures	CAP1404-100	OOT Organics bins	20,000.00	0.00	10,000.00	***10,000.00***	0.00	0.00	0.00	0.00	Remaining 5th bin
214	60000	Capital Expenditures	CAP1319-100	OOT Landfill Development	200,000.00	14,056.00	150,000.00	***150,000.00***	200,000.00	4,400,000.00	4,600,000.00	0.00	2025 roll over $150K start of Detailed design for optimized footprint and ramp to new cell, 26 fence relocation, road move; 27 optimized footprint cell development & liner, 28 leachate
215	60000	Capital Expenditures	CAP1425-100	SLO TS-Upgrades 2023/24	673,240.00	515,705.00	107,000.00	***119,000.00***	0.00	0.00	0.00	0.00	Compactor ($104,474) expect Jan 2025 delivery and install; $5k consulting (asbuilt); $5K cleanout; Jan 20 moved $12k for CCTV install
216	60000	Capital Expenditures	CAP1335-100	ROS bear proofing	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove
217	60000	Capital Expenditures	CAP1336-100	ROS Surveillance	0.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove
218	60000	Capital Expenditures	CAP1120-100	ROS TS-2023 Transfer Station Ugrade	488,050.00	458,649.00	117,000.00	***129,000.00***	0.00	0.00	0.00	0.00	Compactor ($106,596) expect Jan 2025 delivery and install; $5k consulting (asbuilt); $5K cleanout; Jan 20 moved $12k for CCTV install
219	60000	Capital Expenditures	CAP1556-100	OOT litter fence	0.00	0.00	15,000.00	***15,000.00***	0.00	0.00	0.00	0.00	Litter fence for OOT landfill ops
220	60000	Capital Expenditures	CAP1236-100	West - Legacy Landfills	80,000.00	0.00	158,000.00	***158,000.00***	50,000.00	0.00	0.00	0.00	assessments all sites and Phase 2 on 2 sites if possible, new $2k for each site for desktop APA if needed: 26 remaining Phase 2
221	60000	Capital Expenditures	CAP1527-100	RR - West - Legacy Landfill Closures	0.00	0.00	0.00	***0.00***	0.00	0.00	4,000,000.00	0.00	Estimated Closure Works
222	60000	Capital Expenditures	CAP1332-100	WEST - 2024 - Roll Off Bins	45,000.00	34,481.53	80,000.00	***80,000.00***	0.00	0.00	0.00	0.00	2024 purchased 2, 2025 purchase est of up to 4 additional for NAK
223	60000	Capital Expenditures		OOT Iron Grizzly Plates	0.00	0.00	0.00	***16,000.00***	16,000.00	0.00	16,000.00	0.00	Replacement Iron Gizzly Plates used for alternate daily cover on landfill active face (used instead of soil - saves airspace and cost): 2 plates in 2025/26/28 rolling stock replacement
224	60000	Capital Expenditures	CAP971-100	ENV - RR - 2019 West Subregion Bin Purchase	0.00	0.00	20,000.00	***20,000.00***	20,000.00	20,000.00	20,000.00	20,000.00	Rolling stock replacement
225	60000	Capital Expenditures	CAP1534-100	OOT monitoring well network expansion	0.00	0.00	200,000.00	***200,000.00***	0.00	0.00	0.00	0.00	Recommendation from 2024 Hydrogeo
226	60000	Capital Expenditures	CAP1521-100	OOT tipping wall bins	18,170.00	20,467.00	18,000.00	***18,000.00***	40,000.00	0.00	0.00	0.00	2024 moved from 55010; 2025 2 new bins; 2026 new bins for new tipping wall
227	60000	Capital Expenditures	CAP1316-100	Castlegar EcoDepot	35,000.00	0.00	35,000.00	***35,000.00***	0.00	0.00	0.00	0.00	
228	60000	Capital Expenditures	CAP1318-100	Nakusp EcoDepot	35,000.00	0.00	0.00	***0.00***	35,000.00	0.00	0.00	0.00	
229	60000	Capital Expenditures	CAP973-100	SLO TS - 2019 Washroom	44,000.00	0.00	0.00	***0.00***	0.00	0.00	0.00	0.00	Combined with TS upgrade CAP1425-100
230	**60000**	**Capital Expenditures**			**3,422,325.00**	**2,417,535.53**	*1,312,500.00*	***1,364,500.00***	**3,261,000.00**	**4,490,000.00**	**9,416,000.00**	**20,000.00**	

S188 - West Resource Recovery - 5 year Financial Plan (2025-2029)

No.	Acc #	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
231	TOTAL EXPENSES				***8,889,445.61***	**10,285,622.20**	*6,032,071.55*	***6,561,199.49***	***8,076,162.61***	***9,519,818.31***	***14,676,949.77***	***5,529,182.10***	
232	TOTAL CAP REVENUE				**(4,018,511.25)**	**(3,236,038.45)**	*(1,332,160.00)*	***(1,384,160.00)***	**(3,261,000.00)**	**(4,490,000.00)**	**(9,416,000.00)**	**(20,000.00)**	
233	TOTAL CAP EXPENDITURES				**4,083,015.21**	**3,111,963.53**	*1,312,500.00*	***1,364,500.00***	**3,261,000.00**	**4,490,000.00**	**9,416,000.00**	**20,000.00**	
234	OPERATING EXPENSES (no CAP)				**4,775,593.06**	**4,440,722.39**	*3,645,353.18*	***3,739,488.76***	**3,732,473.71**	**3,861,954.78**	**3,866,220.02**	**4,144,024.32**	
235	BORROWING				**123,442.00**	**600.00**	*123,442.00*	***123,442.00***	**123,442.00**	**340,437.00**	**655,803.00**	**655,804.00**	
236	CONT TO RESERVES				**568,085.55**	**3,426,764.28**	*950,776.37*	***1,333,768.72***	**959,246.90**	**827,426.53**	**738,926.75**	**709,353.78**	
237	TIPPING FEES				**(3,265,269.19)**	**(3,690,279.00)**	*(3,158,243.64)*	***(3,228,034.18)***	**(3,389,435.89)**	**(3,558,907.69)**	**(3,736,853.07)**	**(3,923,695.72)**	
238	TAXATION				**(752,685.00)**	**(752,685.00)**	*(805,083.44)*	***(805,083.44)***	**(869,490.12)**	**(939,049.32)**	**(1,014,173.27)**	**(1,095,307.13)**	
239	TOTAL REVENUE				**(8,810,129.78)**	**(11,326,224.91)**	*(6,032,071.56)*	***(6,561,199.49)***	**(8,076,162.61)**	**(9,519,818.31)**	**(14,676,949.77)**	**(5,529,182.10)**	
240	SURPLUS/DEFICIT				**79,315.83**	**(1,040,602.71)**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
241													
242				Opening Regular Reserve Balance	(3,683,996.07)		*(3,750,723.47)*	***(3,750,723.47)***	(3,524,690.84)	(772,937.74)	(1,060,364.27)	(1,313,291.01)	
243				Transfer From Regular Reserves	1,034,090.00	520,430.53	*868,500.00*	***884,500.00***	3,261,000.00	90,000.00	36,000.00	20,000.00	
244				Contribution to Regular Reserves	(472,834.78)		*(363,415.34)*	***(658,467.37)***	(509,246.90)	(377,426.53)	(288,926.75)	(259,353.78)	
245				Net Change for Year	561,255.22		*505,084.66*	***226,032.63***	2,751,753.10	(287,426.53)	(252,926.75)	(239,353.78)	
246				Year End Regular Reserve	(3,122,740.85)	(3,750,723.47)	*(3,245,638.81)*	***(3,524,690.84)***	(772,937.74)	(1,060,364.27)	(1,313,291.01)	(1,552,644.80)	
247													
248				Opening Landfill Closure Reserve Balance	0.00	0.00	*(3,090,685.33)*	***(3,090,685.33)***	(3,540,685.33)	(3,990,685.33)	(4,440,685.33)	(4,890,685.33)	
249				Transfer From LC Reserves	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	
250				Contribution to LC Reserves	0.00	(3,090,685.33)	*(450,000.00)*	***(450,000.00)***	(450,000.00)	(450,000.00)	(450,000.00)	(450,000.00)	
251				Net Change for Year	0.00	(3,090,685.33)	*(450,000.00)*	***(450,000.00)***	(450,000.00)	(450,000.00)	(450,000.00)	(450,000.00)	
252				Year End LC Reserve	0.00	(3,090,685.33)	*(3,540,685.33)*	***(3,540,685.33)***	(3,990,685.33)	(4,440,685.33)	(4,890,685.33)	(5,340,685.33)	
253													
254				Opening Stabillizatio Reserve Balance	(2,068,009.25)	(2,135,034.15)	*(2,397,630.65)*	***(2,397,630.65)***	(2,622,932.01)	(2,622,932.01)	(2,622,932.01)	(1,842,932.01)	
255				Transfer From Stabilization Reserves	0.00	0.00	*0.00*	***0.00***	0.00	0.00	780,000.00	0.00	
256				Contribution to Stabilization Reserves	(95,250.77)	(262,596.50)	*(137,361.03)*	***(225,301.36)***	0.00	0.00	0.00	0.00	
257				Net Change for Year	(95,250.77)	(262,596.50)	*(137,361.03)*	***(225,301.36)***	0.00	0.00	780,000.00	0.00	
258				Year End Stabilization Reserve	(2,163,260.02)	(2,397,630.65)	*(2,534,991.68)*	***(2,622,932.01)***	(2,622,932.01)	(2,622,932.01)	(1,842,932.01)	(1,842,932.01)	
259				Total Reserves	(5,286,000.87)	(6,148,354.12)	*(5,780,630.49)*	***(6,147,622.84)***	(3,395,869.74)	(3,683,296.27)	(3,156,223.02)	(3,395,576.80)	
260				*CGF*	(352,843.55)								

A118 - West Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	42035	User Fees - Specified	OPR641-100	West Recycling - General	(70,449.15)	(75,282.95)	*(112,937.63)*	***(164,116.83)***	(167,399.17)	(170,747.15)	(174,162.09)	(177,645.34)	RBC Financial Incentive, 2025 new incentive rates 118% increase; reduced to reflect equalization payment to E&C (2024 $54K total)
2	**42035**	**User Fees - Specified**			**(70,449.15)**	**(75,282.95)**	*(112,937.63)*	***(164,116.83)***	**(167,399.17)**	**(170,747.15)**	**(174,162.09)**	**(177,645.34)**	
3	43025	Grants - Specified	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
4	**43025**	**Grants - Specified**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
5	43100	Proceeds from Borrowing	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
6	**43100**	**Proceeds from Borrowing**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
7	45000	Transfer from Reserves	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
8	**45000**	**Transfer from Reserves**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
9	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(457,730.68)	(457,730.68)	*(411,613.81)*	***(348,929.37)***	(457,107.27)	(472,920.40)	(489,316.11)	(506,316.77)	Taxation revenue from S188
10	**45500**	**Transfer from Other**			**(457,730.68)**	**(457,730.68)**	*(411,613.81)*	***(348,929.37)***	**(457,107.27)**	**(472,920.40)**	**(489,316.11)**	**(506,316.77)**	
11	49100	Prior Year Surplus	OPR641-100	West Recycling - General	(83,282.73)	(91,344.00)	*(92,925.85)*	***(92,925.85)***	0.00	0.00	0.00	0.00	Prior year surplus or deficit
12	**49100**	**Prior Year Surplus**			**(83,282.73)**	**(91,344.00)**	*(92,925.85)*	***(92,925.85)***	**0.00**	**0.00**	**0.00**	**0.00**	
13	**TOTAL REVENUE**				**(611,462.55)**	**(624,357.63)**	*(617,477.29)*	***(605,972.05)***	**(624,506.44)**	**(643,667.55)**	**(663,478.20)**	**(683,962.11)**	
14	**CAP FUNDING SUBTOTAL**				**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	Grants, reserves, borrowing
15	51010	Salaries	OPR641-100	West Recycling - General	208,233.93	192,122.88	*242,620.61*	***221,633.27***	228,282.27	235,130.74	242,184.66	249,450.20	Updated Jan 20 removed WIN and adjust to 1% (down from 3.3%in earlier est); Based on Salary worksheet (1%); includes training/onboarding costs; Approx $25K increase due to change
16	51010	Salaries	OPR624-100	West - Lead Hand	15,129.39	15,129.39	*15,628.66*	***15,628.66***	16,097.52	16,580.45	17,077.86	17,590.19	Lead Hand - 30% of S188 service; Based on Salary Worksheet
17	**51010**	**Salaries**			**223,363.32**	**207,252.27**	*258,249.27*	***237,261.93***	**244,379.79**	**251,711.18**	**259,262.52**	**267,040.39**	
18	51020	Overtime	OPR641-100	West Recycling - General	1,000.00	1,568.75	*1,000.00*	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	Limited budget for emerg coverage
19	**51020**	**Overtime**			**1,000.00**	**1,568.75**	*1,000.00*	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
20	51030	Benefits	OPR641-100	West Recycling - General	49,521.00	46,254.08	*47,780.46*	***55,327.54***	56,434.09	57,562.77	58,714.03	59,888.31	Updated Jan 20; RWEs; Based on Salary Worksheet
21	51030	Benefits	OPR624-100	West - Lead Hand	4,538.82	4,538.82	*4,688.60*	***4,688.60***	4,805.81	4,925.96	5,049.11	5,175.33	Lead Hand - 30% of S188
22	**51030**	**Benefits**			**54,059.82**	**50,792.90**	*52,469.06*	***60,016.14***	**61,239.90**	**62,488.73**	**63,763.14**	**65,063.64**	
23	51050	Employee Health & Safety	OPR641-100	West Recycling - General	2,000.00	760.00	*2,000.00*	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	RWE footwear, jackets, training, safety check-in monitoring; reduced due to lower than expected actuals
24	**51050**	**Employee Health & Safety**			**2,000.00**	**760.00**	*2,000.00*	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
25	51500	Directors - Allowance & Stipend	OPR641-100	West Recycling - General	9,349.32	9,349.32	*9,536.31*	***9,536.31***	9,727.03	9,921.57	10,120.00	10,322.40	20% Based on up to 14 RR meetings (9 directors) @ $280/meeting
26	**51500**	**Directors - Allowance & Stipend**			**9,349.32**	**9,349.32**	*9,536.31*	***9,536.31***	**9,727.03**	**9,921.57**	**10,120.00**	**10,322.40**	
27	51560	Directors - Travel	OPR641-100	West Recycling - General	250.00	250.00	*250.00*	***250.00***	250.00	250.00	250.00	250.00	Coded to travel or mileage accounts

A118 - West Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
28	**51560**	**Directors - Travel**			**250.00**	**250.00**	*250.00*	***250.00***	**250.00**	**250.00**	**250.00**	**250.00**	
29	52010	Travel	OPR641-100	West Recycling - General	2,000.00	2,547.50	*1,500.00*	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	RWE - mileage for field staff training/development/out of area shift coverage
30	52010	Travel	OPR624-100	WEST - Lead Hand	4,674.72	3,506.04	*4,908.45*	***4,908.45***	5,153.87	5,411.57	5,682.15	5,966.25	30% Lead Hand travel - assessing fleet unit
31	**52010**	**Travel**			**6,674.72**	**6,053.54**	*6,408.45*	***6,408.45***	**6,653.87**	**6,911.57**	**7,182.15**	**7,466.25**	
32	52020	Education & Training	OPR641-100	West Recycling - General	1,000.00	100.00	*1,000.00*	***3,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	RWE training/development; staff incentives $2k
33	**52020**	**Education & Training**			**1,000.00**	**100.00**	*1,000.00*	***3,000.00***	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	
34	53020	Admin, Office Supplies & Postage	OPR641-100	West Recycling - General	200.00	100.00	*200.00*	***200.00***	200.00	200.00	200.00	200.00	General supplies; reduced from $500 to $200 as many of these costs are applied to bulk purchases in A102
35	**53020**	**Admin, Office Supplies &**			**200.00**	**100.00**	*200.00*	***200.00***	**200.00**	**200.00**	**200.00**	**200.00**	
36	53030	Communication	OPR641-100	West Recycling - General	3,328.00	1,937.50	*1,976.25*	***1,976.25***	2,015.78	2,056.09	2,097.21	2,139.16	RWE cell allowance
37	**53030**	**Communication**			**3,328.00**	**1,976.25**	*1,976.25*	***1,976.25***	**2,015.78**	**2,056.09**	**2,097.21**	**2,139.16**	
38	53040	Advertising	OPR641-100	West Recycling - General	1,000.00	0.00	*500.00*	***500.00***	500.00	500.00	500.00	500.00	Recycling communciations/ads (reduced from $1000 to $500)
39	**53040**	**Advertising**			**1,000.00**	**0.00**	*500.00*	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
40	53050	Insurance	OPR641-100	West Recycling - General	414.73	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Remove, not included in statement of assets due to deductible
41	**53050**	**Insurance**			**414.73**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
42	54020	Professional Fees	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
43	**54020**	**Professional Fees**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
44	54030	Contracted Services	OPR641-100	West Recycling - General	109,444.65	86,698.75	*91,033.69*	***81,819.98***	85,910.98	90,206.53	94,716.85	99,452.69	Updated Jan 20 removed WIN; 5% subsequent yrs; Satellite hauling; IC contract; 2024 $4762 miscode for seacan move
45	54030	Contracted Services	OPR617-100	WEST - RBC Depot Maintenance	5,000.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Remove if coding OPR641-100; Garbage, portable toilets
46	54030	Contracted Services	OPR617-100	RBC depot snow	20,000.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Remove if coding to OPR641-100; Snow removal services
47	**54030**	**Contracted Services**			**134,444.65**	**86,698.75**	*91,033.69*	***81,819.98***	**85,910.98**	**90,206.53**	**94,716.85**	**99,452.69**	
48	55010	Repairs & Maintenance	OPR641-100	West Recycling - General	8,500.00	4,652.00	*3,000.00*	***3,000.00***	3,000.00	3,000.00	3,000.00	3,000.00	General repairs; 24 move Seacan from ND to BUR and move ND shack to improve sight lines
49	**55010**	**Repairs & Maintenance**			**8,500.00**	**4,652.00**	*3,000.00*	***3,000.00***	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	
50	55020	Operating Supplies	OPR641-100	West Recycling - General	2,000.00	2,000.00	*2,000.00*	***2,000.00***	2,000.00	2,000.00	2,000.00	2,000.00	General site supplies & signage
51	**55020**	**Operating Supplies**			**2,000.00**	**2,000.00**	*2,000.00*	***2,000.00***	**2,000.00**	**2,000.00**	**2,000.00**	**2,000.00**	
52	55030	Equipment	OPR641-100	West Recycling - General	3,700.00	1,000.00	*1,000.00*	***1,000.00***	1,000.00	1,000.00	1,000.00	1,000.00	General equipment; Some A/C and mini fridges budgeted here were charged to 55020
53	**55030**	**Equipment**			**3,700.00**	**1,000.00**	*1,000.00*	***1,000.00***	**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	
54	55040	Utilities	OPR641-100	West Recycling - General	5,300.00	4,000.00	*2,000.00*	***2,000.00***	2,040.00	2,080.80	2,122.42	2,164.86	Propane; 2024 new power installs CV, ND
55	**55040**	**Utilities**			**5,300.00**	**4,000.00**	*2,000.00*	***2,000.00***	**2,040.00**	**2,080.80**	**2,122.42**	**2,164.86**	

A118 - West Recycling - 5 year Financial Plan (2025-2029)

No.	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
56	55060	Rentals	OPR641-100	West Recycling - General	12,000.00	12,000.00	*12,000.00*	***8,400.00***	8,568.00	8,739.36	8,914.15	9,092.43	Updated Jan 20 removed WIN: Based on depot lease at CV
57	**55060**	**Rentals**			**12,000.00**	**12,000.00**	*12,000.00*	***8,400.00***	**8,568.00**	**8,739.36**	**8,914.15**	**9,092.43**	
58	56010	Debenture Interest	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
59	**56010**	**Debenture Interest**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
60	56020	Debenture Principal	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder
61	**56020**	**Debenture Principal**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
62	59000	Contribution to Reserve	OPR641-100	West Recycling - General	5,000.00	5,000.00	*5,000.00*	***5,000.00***	5,000.00	5,000.00	5,000.00	5,000.00	Cont to West Recycling reserves - Asset Management
63	**59000**	**Contribution to Reserve**			**5,000.00**	**5,000.00**	*5,000.00*	***5,000.00***	**5,000.00**	**5,000.00**	**5,000.00**	**5,000.00**	
64	59500	Transfer to Other Service	OPR641-100	West Recycling - General	97,331.00	97,331.00	*99,277.62*	***134,439.00***	138,472.17	142,626.34	146,905.13	151,312.28	A102 Resource Recovery Placeholder; 20% of S188 transfer to A102
65	**59500**	**Transfer to Other Service**			**97,331.00**	**97,331.00**	*99,277.62*	***134,439.00***	**138,472.17**	**142,626.34**	**146,905.13**	**151,312.28**	
66	59510	Transfer to Other Service - General Admin. Fee	OPR641-100	West Recycling - General	30,814.00	30,814.00	*31,430.28*	***29,851.00***	30,746.53	31,668.93	32,618.99	33,597.56	General Admin Placeholder
67	**59510**	**Transfer to Other Service -**			**30,814.00**	**30,814.00**	*31,430.28*	***29,851.00***	**30,746.53**	**31,668.93**	**32,618.99**	**33,597.56**	
68	59520	Transfer to Other Service - IT Fee	OPR641-100	West Recycling - General	0.00	0.00	*3,742.00*	***4,119.00***	4,242.57	4,369.85	4,500.94	4,635.97	IT Placeholder - based on new license based costing
69	**59520**	**Transfer to Other Service -**			**0.00**	**0.00**	*3,742.00*	***4,119.00***	**4,242.57**	**4,369.85**	**4,500.94**	**4,635.97**	
70	59550	Transfer to Other Service - Environmental Services	OPR641-100	West Recycling - General	9,733.00	9,733.00	*9,927.66*	***12,194.00***	12,559.82	12,936.61	13,324.71	13,724.45	A100 Enviro Services Placeholder 10% of S188 transfer to A100
71	**59550**	**Transfer to Other Service -**			**9,733.00**	**9,733.00**	*9,927.66*	***12,194.00***	**12,559.82**	**12,936.61**	**13,324.71**	**13,724.45**	
72	60000	Capital Expenditures	OPR641-100	West Recycling - General	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	Placeholder, new bins, site works
73	**60000**	**Capital Expenditures**			**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
74	**TOTAL EXPENSES**				**611,462.55**	**531,431.77**	*594,000.59*	***605,972.05***	**624,506.44**	**643,667.55**	**663,478.20**	**683,962.11**	
75	**TOTAL CAP REVENUE**				**0.00**	**0.00**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
76	**TOTAL REVENUE**				**(611,462.55)**	**(624,357.63)**	*(617,477.29)*	***(605,972.05)***	**(624,506.44)**	**(643,667.55)**	**(663,478.20)**	**(683,962.11)**	
77	**SURPLUS/DEFICIT**				**0.00**	**(92,925.85)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
78				Opening Regular Reserve Balance	(7,240.52)	(7,397.41)	*(12,397.41)*	***(12,397.41)***	(17,397.41)	(22,397.41)	(27,397.41)	(32,397.41)	
79				Transfer From Regular Reserves	0.00	0.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	
80				Contribution to Regular Reserves	(5,000.00)	(5,000.00)	*(5,000.00)*	***(5,000.00)***	(5,000.00)	(5,000.00)	(5,000.00)	(5,000.00)	
81				Net Change for Year	(5,000.00)	(5,000.00)	*(5,000.00)*	***(5,000.00)***	(5,000.00)	(5,000.00)	(5,000.00)	(5,000.00)	
82				Year End Regular Reserve	(12,240.52)	(12,397.41)	*(17,397.41)*	***(17,397.41)***	(22,397.41)	(27,397.41)	(32,397.41)	(37,397.41)	

A120 - Central/West Compost - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
1	42020	Sale of Services	OPR643-100	Central-West Organics - General	(132,000.00)	(62,998.57)	(71,216.60)	***(81,898.14)***	(82,717.12)	(83,544.29)	(84,379.74)	(85,223.53)	Placeholder Central Compost Facility TF revenue; tipping fees from RDKB
2	**42020**	**Sale of Services**			**(132,000.00)**	**(62,998.57)**	*(71,216.60)*	***(81,898.14)***	**(82,717.12)**	**(83,544.29)**	**(84,379.74)**	**(85,223.53)**	
3	42030	User Fees	OPR643-100	Central-West Organics - General	(5,000.00)	*0.00*	(40,000.00)	***(40,000.00)***	(42,000.00)	(44,100.00)	(46,305.00)	(48,620.25)	Placeholder, Sales of finished compost delayed to 2025
4	**42030**	**User Fees**			**(5,000.00)**	**0.00**	(40,000.00)	***(40,000.00)***	**(42,000.00)**	**(44,100.00)**	**(46,305.00)**	**(48,620.25)**	
5	43505	External Contributions & Contracts - Specified	OPR643-100	Central-West Organics - General	0	*(2,340.00)*	0.00	***0***	0	0	0	0	MIABC - risk management grant railings & stairs
6	43025	Grants - Specified	CAP1113-100	ENV-Central RR-2020-Compost Facility	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Growing Communities Fund (GCF) Allocation - Composting Facility Completion
7	43025	Grants - Specified	CAP1113-100	ENV-Central RR-2020-Compost Facility	(175,482.00)	*(175,482.00)*	0.00	***0.00***	0.00	0.00	0.00	0.00	Incoming funds from OIP grant, which covers 2/3rds of costs. Claims are made in April each year for the previous April 1 to March 31 period. 2024 last payment.
8	**43025**	**Grants - Specified**			**(175,482.00)**	**(177,822.00)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
9	43100	Proceeds from Borrowing	CAP1113-100	ENV-Central RR-2020-Compost Facility	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder; Short term borrowing if funding required for CAP works
10	**43100**	**Proceeds from Borrowing**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
11	43300	Proceeds from Asset Disposal	OPR643-100	Central-West Organics - General	(6,000.00)	*(6,550.00)*	0.00	***0.00***	0.00	0.00	0.00	0.00	Expected in 24, but may be deferred to 25 - sale of loader tires
12	**43200**	**Proceeds from Equipment Financing**			**(6,000.00)**	**(6,550.00)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
13	45000	Transfer from Reserves	OPR643-100	Central-West Organics - General	(8,000.00)	*(8,000.00)*	0.00	***0.00***	0.00	0.00	0.00	0.00	CAP works not funded from borrowing
14	**45000**	**Transfer from Reserves**			**(8,000.00)**	**(8,000.00)**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
15	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(58,738.62)	*(58,738.62)*	(174,855.48)	***(183,318.10)***	***(174,901.77)***	***(176,550.47)***	***(87,062.30)***	***(89,055.16)***	Transfer from S187 - in lieu of tipping fees based on CAP & fixed operating costs
16	45500	Transfer from Other Service	OVR153-100	Central RR Subregion Administration	(311,567.15)	*(569,060.40)*	(73,392.13)	***(59,346.83)***	***(61,765.60)***	***(61,952.83)***	***(16,566.73)***	***(16,918.11)***	Placeholder Transfer from S187 - tax subidization - missed $258k transfer in 23 added to $312k in 24; Current tax split 50/50 with S188
17	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(131,224.27)	*(131,224.27)*	(249,853.37)	***(257,606.89)***	***(248,248.33)***	***(251,549.96)***	***(163,818.19)***	***(167,680.00)***	Transfer from S188 - in lieu of tipping fees based on CAP and fixed & variable operating costs
18	45500	Transfer from Other Service	OVR154-100	West RR Subregion Administration	(311,567.15)	*(311,567.15)*	(73,392.13)	***(59,346.83)***	***(61,765.60)***	***(61,952.83)***	***(16,566.73)***	***(16,918.11)***	Placeholder Transfer from S188 - tax subidization; Current tax split 50/50 with S187
19	**45500**	**Transfer from Other Service**			**(813,097.19)**	**(1,070,590.44)**	*(571,493.11)*	***(559,618.67)***	**(546,681.31)**	**(552,006.10)**	**(284,013.94)**	**(290,571.39)**	
20	49100	Prior Year Surplus	OPR643-100	Central-West Organics - General	(72,121.92)	*168,861.00*	(389,852.51)	***(415,015.08)***	0.00	0.00	0.00	0.00	Deficit carried into 2024 due to missed S187 tax subsidy transfer in 23 ($258K)
21	**49100**	**Prior Year Surplus**			**(72,121.92)**	**168,861.00**	*(389,852.51)*	***(415,015.08)***	**0.00**	**0.00**	**0.00**	**0.00**	
22	**TOTAL REVENUE**				**(1,211,701.11)**	**(1,157,100.01)**	*(1,072,562.22)*	***(1,096,531.89)***	**(671,398.43)**	**(679,650.39)**	**(414,698.68)**	**(424,415.17)**	
23	**TIPPING FEES**				**(326,962.89)**	**(252,961.46)**	(535,925.45)	**(562,823.14)**	**(547,867.22)**	**(555,744.72)**	**(381,565.23)**	**(390,578.95)**	
24	**CAP FUNDING SUBTOTAL**				**(189,482.00)**	**(192,372.00)**	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
25	51010	Salaries	OPR643-100	Central-West Organics - General	59,749.50	*59,749.00*	49,376.57	***48,277.19***	49,242.74	50,227.59	51,232.14	52,256.79	Based on one FT operator shared 20% with S187 starting 2025 (1% increase); salary for back up operator (approx 1 month)
26	**51010**	**Salaries**			**59,749.50**	**59,749.00**	*49,376.57*	***48,277.19***	**49,242.74**	**50,227.59**	**51,232.14**	**52,256.79**	
27	51020	Overtime	OPR643-100	Central-West Organics - General	500.00	*0.00*	300.00	***300.00***	300.00	300.00	300.00	300.00	limited OT, est more in first few years while establishing system, reduced
28	**51020**	**Overtime**			**500.00**	**0.00**	300.00	***300.00***	**300.00**	**300.00**	**300.00**	**300.00**	
29	51030	Benefits	OPR643-100	Central-West Organics - General	19,316.66	*19,316.66*	14,319.21	***14,000.39***	14,280.39	14,566.00	14,857.32	15,154.47	based on salary worksheet
30	**51030**	**Benefits**			**19,316.66**	**19,316.66**	*14,319.21*	***14,000.39***	**14,280.39**	**14,566.00**	**14,857.32**	**15,154.47**	
31	51050	Employee Health & Safety	OPR643-100	Central-West Organics - General	1,150.00	*750.00*	3,000.00	***3,000.00***	1,150.00	1,150.00	1,150.00	1,150.00	Ops footwear, jackets, training, safety check-in monitoring. Added 2 pairs per person coveralls/gloves ($350), respirators/fit tests/filters ($300) to increase from 500 to 1150. 2025: assumes biosolids composting starting, and additional safety gear is needed.
32	**51050**	**Employee Health & Safety**			**1,150.00**	**750.00**	3,000.00	***3,000.00***	**1,150.00**	**1,150.00**	**1,150.00**	**1,150.00**	
33	51500	Directors - Allowance & Stipend	OPR643-100	Central-West Organics - General	7,947.26	*7,947.26*	8,106.21	***8,106.21***	8,268.33	8,433.70	8,602.37	8,774.42	Based on up to 14 RR meetings @ $268/meeting for for 6 Dir Central and 9 Dir West - 10% each of total S188/S187 stipend

A120 - Central/West Compost - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
34	**51500**	**Directors - Allowance &**			**7,947.26**	**7,947.26**	8,106.21	***8,106.21***	**8,268.33**	**8,433.70**	**8,602.37**	**8,774.42**	
35	51560	Directors - Travel	OPR643-100	Central-West Organics - General	500.00	*500.00*	525.00	***525.00***	551.25	578.81	607.75	638.14	Assumes remote
36	**51560**	**Directors - Travel**			**500.00**	**500.00**	525.00	***525.00***	**551.25**	**578.81**	**607.75**	**638.14**	
37	52010	Travel	OPR643-100	Central-West Organics - General	1,000.00	*200.00*	500.00	***500.00***	500.00	500.00	500.00	500.00	mileage for ops staff; travel/overnight for staff for compost facility tour
38	**52010**	**Travel**			**1,000.00**	**200.00**	500.00	***500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
39	52020	Education & Training	OPR643-100	Central-West Organics - General	2,500.00	*1,221.00*	1,500.00	***1,500.00***	1,500.00	1,500.00	1,500.00	1,500.00	Compost operations training - 2 staff trained; additional funds for staff associated with trialing, training etc.
40	**52020**	**Education & Training**			**2,500.00**	**1,221.00**	1,500.00	***1,500.00***	**1,500.00**	**1,500.00**	**1,500.00**	**1,500.00**	
41	52030	Memberships, Dues & Subscriptions	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove? Compost Council of Canada membership within A102
42	**52030**	**Memberships, Dues &**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
43	53020	Admin, Office Supplies & Postage	OPR643-100	Central-West Organics - General	300.00	*257.50*	150.00	***150.00***	150.00	150.00	150.00	150.00	Shipping samples, sampling supplies, etc 2025 onward: reduced from $300 to $150 based on actuals.
44	**53020**	**Admin, Office Supplies &**			**300.00**	**257.50**	150.00	***150.00***	**150.00**	**150.00**	**150.00**	**150.00**	
45	53030	Communication	OPR643-100	Central-West Organics - General	1,720.00	*3,187.50*	2,000.00	***2,000.00***	2,040.00	2,080.80	2,122.42	2,164.86	2025: reotemp remote view ($500), monthly cell for operator (assumes $45/mo), internet for facility $80/mo. In 2024 over budget due to $2.3k surveillance/internet upgrade
46	**53030**	**Communication**			**1,720.00**	**3,187.50**	2,000.00	***2,000.00***	**2,040.00**	**2,080.80**	**2,122.42**	**2,164.86**	
47	53040	Advertising	OPR643-100	Central-West Organics - General	3,500.00	*2,500.00*	2,000.00	***2,000.00***	2,000.00	1,300.00	1,300.00	1,300.00	On-going Education/Communication costs.2025: increased to reflect start of ICI programs and likelihood of needing additional funds. Decrease 2027 onward, to reflect stabilization of program.
48	**53040**	**Advertising**			**3,500.00**	**2,500.00**	2,000.00	***2,000.00***	**2,000.00**	**1,300.00**	**1,300.00**	**1,300.00**	
49	53050	Insurance	OPR643-100	Central-West Organics - General	1,473.68	*1,496.00*	1,503.15	***1,503.15***	1,563.28	1,563.28	1,625.81	1,625.81	MIABC compost facility/equipment
50	**53050**	**Insurance**			**1,473.68**	**1,496.00**	1,503.15	***1,503.15***	**1,563.28**	**1,563.28**	**1,625.81**	**1,625.81**	
51	53080	Licence & Permits	OPR643-100	Central-West Organics - General	250.00	*0.00*	250.00	***250.00***	200.00	204.00	208.08	212.24	Well license application $250. 2025: $0 due to 2 year backlog for license applications. 2026:Annual rent is $200 for estimated annual quantity increase by 2% per year
52	**53080**	**Licence & Permits**			**250.00**	**0.00**	250.00	***250.00***	**200.00**	**204.00**	**208.08**	**212.24**	
53	54040	Consulting Fees	OPR643-100	Central-West Organics - General	4,000.00	*3,685.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	2025:Transform Compost Systems ongoing virtual support
54	**54020**	**Professional Fees**			**4,000.00**	**3,685.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
55	54030	Contracted Services	OPR643-100	Central-West Organics - General	5,000.00	*0.00*	5000	***5,000.00***	0.00	0.00	0.00	0.00	2025 $5k for additional analysis fees for staff to run a pilot program with biosolids and compostable plastics, other items.
56	54030	Contracted Services	OPR643-100	Central-West Organics - General	0.00	*0.00*	30,000.00	***30,000.00***	30,000.00	30,000.00	30,000.00	30,000.00	Moved from 55060 for screening of finished compost
57	54030	Contracted Services	OPR643-100	Central-West Organics - General	83,000.00	*80,000.00*	35,000.00	***35,000.00***	20,000.00	20,400.00	20,808.00	21,224.16	Lab costs: Assumes lower volumes received, OMRR required sampling - $10k for lab samples and collection, $5k contingency for quality failure retesting, $5k for water monitoring leachate pond sampling, reporting etc.; $5k industrial coverall service. 2% annual adjustment for increases to lab sampling costs and analysis etc. Draining Leachate Pond: Assumes 2 pond draining events in 2025, then pond expansion is completed.
58	**54030**	**Contracted Services**			**88,000.00**	**80,000.00**	70,000.00	***70,000.00***	**50,000.00**	**50,400.00**	**50,808.00**	**51,224.16**	
59	55010	Repairs & Maintenance	OPR643-100	Central-West Organics - General	5,000.00	*5,000.00*	9,000.00	***9,000.00***	9,000.00	9,000.00	9,000.00	9,000.00	Facility & small equipment, i.e. generator/mixer
60	55010	Repairs & Maintenance	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove - moved to new WO below specific to Loader:

A120 - Central/West Compost - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
61	55010	Repairs & Maintenance	OPR662-100	2020 Loader	11,000.00	*26,218.00*	10,000.00	***10,000.00***	10,000.00	10,000.00	10,000.00	10,000.00	New loader WO to track maintenance costs; 2024 $12k tires
62	**55010**	**Repairs & Maintenance**			**16,000.00**	**31,218.00**	19,000.00	***19,000.00***	**19,000.00**	**19,000.00**	**19,000.00**	**19,000.00**	
63	55020	Operating Supplies	OPR643-100	Central-West Organics - General	2,500.00	*2,419.00*	2,500.00	***2,500.00***	2,500.00	2,500.00	2,500.00	2,500.00	General supplies, winter sand
64	55020	Operating Supplies	OPR662-100	2020 Loader	0.00	*790.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	2024, miscode should be 55010
65	**55020**	**Operating Supplies**			**2,500.00**	**3,209.00**	2,500.00	***2,500.00***	**2,500.00**	**2,500.00**	**2,500.00**	**2,500.00**	
66	55030	Equipment	OPR643-100	Central-West Organics - General	1,000.00	*0.00*	6,500.00	***1,500.00***	500.00	500.00	500.00	500.00	Sampling & testing equipment. 2025: Solvita test kits, pie plates, thermos etc. for field tests; moved Loader bucket for biosolids to CAP (removed $5k), $1k line trimmer
67	**55030**	**Equipment**			**1,000.00**	**0.00**	*6,500.00*	***1,500.00***	**500.00**	**500.00**	**500.00**	**500.00**	
68	55040	Utilities	OPR643-100	Central-West Organics - General	30,000.00	*6,500.00*	13,500.00	***13,500.00***	13,770.00	14,045.40	14,326.31	14,612.83	Power, propane, diesel (generator)
69	**55040**	**Utilities**			**30,000.00**	**6,500.00**	13,500.00	***13,500.00***	**13,770.00**	**14,045.40**	**14,326.31**	**14,612.83**	
70	55050	Vehicles	OPR643-100	Central-West Organics - General	40,000.00	*11,000.00*	16,000.00	***16,000.00***	17,600.00	19,360.00	21,296.00	23,425.60	Fuel - loader
71	**55050**	**Vehicles**			**40,000.00**	**11,000.00**	16,000.00	***16,000.00***	**17,600.00**	**19,360.00**	**21,296.00**	**23,425.60**	
72	55060	Rentals	OPR643-100	Central-West Organics - General	30,000.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Moved to 54030 as will hire service not rent and operate with in house staff
73	**55060**	**Rentals**			**30,000.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
74	56110	Short-Term Financing Interest	OPR643-100	ENV-Central RR-2020-Compost Facility	55,000.00	*50,400.00*	30,521.30	***30,521.30***	*30,521.30*	*30,521.30*	0.00	0.00	ST loan for 1/3 of compost facility, updated
75	56110	Short-Term Financing Interest	CAP1121-100	ENV - RR- 2020 - Loader	12,000.00	*11,100.00*	6,719.65	***6,719.65***	6,719.65	6,719.65	0.00	0.00	Interest - 5yr repayment for CEN Loader $250K
76	**56110**	**Short-Term Financing Interest**			**67,000.00**	**61,500.00**	37,240.95	***37,240.95***	**37,240.95**	**37,240.95**	**0.00**	**0.00**	
77	56120	Short-Term Financing Principal	OPR643-100	ENV-Central RR-2020-Compost Facility	227,096.00	227,096.00	227,096.00	***227,096.00***	227,096.00	227,096.00	0.00	0.00	ST loan for 1/3 of compost facility (ends 2028)
78	56120	Short-Term Financing Principal	CAP1121-100	ENV - RR- 2020 - Loader	50,000.00	50,000.00	50,000.00	***50,000.00***	50,000.00	50,000.00	0.00	0.00	Prinicial - 5yr repayment for CEN Loader $250K
79	**56120**	**Short-Term Financing Principal**			**277,096.00**	**277,096.00**	277,096.00	***277,096.00***	**277,096.00**	**277,096.00**	**0.00**	**0.00**	
80	56610	Equipment Financing Interest	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
81	56610	Equipment Financing Interest	CAP1121-100	ENV - RR- 2020 - Loader	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Moved to 56110
82	**56610**	**Equipment Financing Interest**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
83	56620	Equipment Financing Principal	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder
84	56620	Equipment Financing Principal	CAP1121-100	ENV - RR- 2020 - Loader	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Moved to 56110
85	**56620**	**Equipment Financing Principal**			**0.00**	**0.00**	0.00	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
86	59000	Contribution to Reserve	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Remove; Growing Communities Fund (GCF) Allocation to GCF Reserve
87	59000	Contribution to Reserve	OPR643-100	Central-West Organics - General	5,000.00	*5,000.00*	5,000.00	***5,000.00***	5,000.00	5,000.00	45,000.00	45,000.00	Regular reserve for asset replacement - Increase by $40k in 2028 for asset replacement after ST borrowing
88	**59000**	**Contribution to Reserve**			**5,000.00**	**5,000.00**	5,000.00	***5,000.00***	**5,000.00**	**5,000.00**	**45,000.00**	**45,000.00**	
89	59500	Transfer to Other Service	CAP1113-100	ENV-Central RR-2020-Compost Facility	0.00	*0.00*	5,000.00	***5,000.00***	0.00	0.00	0.00	0.00	A112 PM fees - assistance with facility projects
90	59500	Transfer to Other Service	OPR643-100	Central-West Organics - General	8,000.00	*8,000.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Transfer to S187 for 40ft seacan - using for mechanical and storage - funded by A120 reserves

A120 - Central/West Compost - 5 year Financial Plan (2025-2029)

Line	Account	Account(T)	Work Order	Work Order(T)	2024 Budget	2024 Projected YE	1st DRAFT '25 Budget from Jan '25 Review	*2025 Budget*	2026 Budget	2027 Budget	2028 Budget	2029 Budget	2025 Notes
91	59500	Transfer to Other Service	OPR643-100	Central-West Organics - General	7,500.00	*0.00*	7,500.00	***7,500.00***	0.00	0.00	0.00	0.00	Transfer to S187 for half of Automatic Kiosk (Strong) to allow for deposits of organics outside regular hours - deferred to 2025
92	59500	Transfer to Other Service	OPR643-100	Central-West Organics - General	97,681.00	*97,681.00*	100,904.47	***121,561.00***	125,207.83	128,964.06	132,832.99	136,817.98	A102 Resource Recovery: Placeholder 10% of S187 and 10% of S188 transfer to A102
93	**59500**	**Transfer to Other Service**			**113,181.00**	**105,681.00**	*113,404.47*	***134,061.00***	**125,207.83**	**128,964.06**	**132,832.99**	**136,817.98**	
94	59510	Transfer to Other Service - General Admin. Fee	OPR643-100	Central-West Organics - General	7,611.00	*7,611.00*	7,609.97	***12,550.00***	12,926.50	13,314.30	13,713.72	14,125.14	General Admin; Placeholder
95	**59510**	**Transfer to Other Service - General Admin. Fee**			**7,611.00**	**7,611.00**	*7,609.97*	***12,550.00***	**12,926.50**	**13,314.30**	**13,713.72**	**14,125.14**	
96	59520	Transfer to Other Service - IT Fee	OPR643-100	Central-West Organics - General	4,870.00	*4,870.00*	3,000.00	***5,920.00***	6,097.60	6,280.53	6,468.94	6,663.01	IT; Placeholder, license based costing
97	**59520**	**Transfer to Other Service - IT Fee**			**4,870.00**	**4,870.00**	*3,000.00*	***5,920.00***	**6,097.60**	**6,280.53**	**6,468.94**	**6,663.01**	
98	59550	Transfer to Other Service - Environmental Services Fee	OPR643-100	Central-West Organics - General	19,536.00	*19,536.00*	20,180.69	***22,052.00***	22,713.56	23,394.97	24,096.82	24,819.72	A100 Enviro Services; Placeholder; 10 % of S188 and 10% of S187 transfer to A100
99	**59550**	**Transfer to Other Service - Environmental Services Fee**			**19,536.00**	**19,536.00**	*20,180.69*	***22,052.00***	**22,713.56**	**23,394.97**	**24,096.82**	**24,819.72**	
100	60000	Capital Expenditures	CAP1385-100	ENV-Central RR-2020-Compost Facility	406,000.00	*28,054.00*	73,000.00	***43,000.00***	0.00	0.00	0.00	0.00	2025 Remaining misc CAP works for facility: $6k for moving ditch from middle of flat area in borrow to around perimeter to expand storage room, $5k lightning rod, $10k solar set up for electric fence, $7k lockblock push wall area for compost sales area, $5k expand east fence/gate for equipment movement, reduced contingency from $40k to $10k (reallocted funds to loader bucket and septic for santiary facility); moved large value projects to new CAP codes below
101	60000	Capital Expenditures		Compost Loader Biosolids Bucket	0.00	*0.00*	0.00	***12,000.00***	0.00	0.00	0.00	0.00	Previously in Equip 55030 for $5k, but initial estimates came in at $11.8K
102	60000	Capital Expenditures	CAP1555-100	Central Compost Water Storage	0.00	*0.00*	250,000.00	***250,000.00***	0.00	0.00	0.00	0.00	Moved from 1385-100 to have separate WO; Placeholder for water storage capacity increase (larger pond, tanks) or treatment including construction and design
103	60000	Capital Expenditures	CAP1553-100	Central Compost Irrigation and Pumphouse	0.00	*0.00*	35,000.00	***35,000.00***	0.00	0.00	0.00	0.00	Moved from 1385-100 to have separate WO; Irrigation or more efficient pond/well watering system and small pump building
104	60000	Capital Expenditures	CAP1554-100	Central Compost Sanitary Facility	0.00	*0.00*	40,000.00	***58,000.00***	0.00	0.00	0.00	0.00	Moved from 1385-100 to have separate WO; Sanitary facilities including emerg shower (moved contingency funds for septic field)
105	60000	Capital Expenditures	OPR643-100	Central-West Organics - General	0.00	*0.00*	0.00	***0.00***	0.00	0.00	0.00	0.00	Placeholder; Screener - purchase shared with East A119 ($200k) has been removed and will be rented/contracted initially
106	**60000**	**Capital Expenditures**			**406,000.00**	**28,054.00**	*398,000.00*	***398,000.00***	**0.00**	**0.00**	**0.00**	**0.00**	
107	**TOTAL EXPENSES**				**1,211,701.11**	**742,084.93**	*1,072,562.22*	***1,096,531.89***	**671,398.43**	**679,650.39**	**414,698.68**	**424,415.17**	
108	**Operational Expenses**				**805,701.11**	**714,030.93**	*674,562.22*	***698,531.89***	**671,398.43**	**679,650.39**	**414,698.68**	**424,415.17**	
109	**TOTAL REVENUE**				**(1,211,701.11)**	**(1,157,100.01)**	*(1,072,562.22)*	***(1,096,531.89)***	**(671,398.43)**	**(679,650.39)**	**(414,698.68)**	**(424,415.17)**	
110	**SURPLUS/DEFICIT**				**0.00**	**(415,015.08)**	*0.00*	***0.00***	**0.00**	**0.00**	**0.00**	**0.00**	
111				Opening Regular Reserve Balance	(12,393.62)	(12,393.62)	*(9,721.06)*	***(9,721.06)***	(14,721.06)	(19,721.06)	(24,721.06)	(69,721.06)	
112				Transfer From Regular Reserves	8,000.00	8,000.00	*0.00*	***0.00***	0.00	0.00	0.00	0.00	
113				Contribution to Regular Reserves	(5,000.00)	(5,000.00)	*(5,000.00)*	***(5,000.00)***	(5,000.00)	(5,000.00)	(45,000.00)	(45,000.00)	
114				Net Change for Year	3,000.00	3,000.00	*(5,000.00)*	***(5,000.00)***	(5,000.00)	(5,000.00)	(45,000.00)	(45,000.00)	
115				Year End Regular Reserve	(9,393.62)	(9,721.06)	*(14,721.06)*	***(14,721.06)***	(19,721.06)	(24,721.06)	(69,721.06)	(114,721.06)	
116													