



HDPE liner with previously installed liner visible



Effluent pond after HDPE installation





Cell 1 West Sump ready for drainrock installation





HDPE pipe connected to leachate collection pipe in Cell 1 East

**David Barbour**  
P. Eng.  
Construction Engineering Inspector & Waste Management Engineer

**GHD**  
Proudly employee-owned | [ghd.com](http://ghd.com)  
138 East 7<sup>th</sup> Avenue Suite 100 Vancouver British Columbia V5T 1M6 Canada  
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## Matthew Senior

---

**From:** David Barbour  
**Sent:** Tuesday, September 26, 2023 4:50 PM  
**To:** Matthew Senior; Rose Marie Rocca; Roxy Hasior  
**Cc:** Deacon Liddy  
**Subject:** Upland Landfill Site Inspection Sept 22

**CompleteRepository:** 088877  
**Description:** Upland Landfill  
**JobNo:** 8877  
**OperatingCentre:** 08  
**RepoEmail:** 088877@ghd.com  
**RepoType:** Project

Hello all,

Here are my notes and photos with descriptions regarding Friday's site inspection.

### Work completed

- The sump area was filled with drain rock and the geotextile installed before waste was placed.
- One lift of waste has been placed over entire floor of landfill.
- A second lift has been started on the north west area
- Concrete slab poured for pump station enclosure
- A berm has been built along the top west and south edge of landfill to divert surface water from flowing onto the lined area

### Next steps

- Construct pump station enclosure
- Install pump, wiring, ect.

Let me know if you have any questions. I am available tomorrow but away from Sept 28 – Oct 10<sup>th</sup>. You can reach me by call or text during that time.





Cell 1 West viewed from northwest corner





Leachate and leak detection risers / concrete poured for pump station





Leachate and leak detection risers / concrete poured for pump station





Pipe directing leachate to Cell 1 East





Cell 1 West from north east corner





West perimeter road. Berm to prevent surface water run-on visible on right side of photo





Z  
South end of Cell 2

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Please consider the environment before printing this email





## Field Notes

<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/8/2022 8:00	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Mixed sun and cloud, -2 C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Crew cleared snow from geotextiled area west of sump yesterday. No geosynthetics installed yesterday due to snow -Crew placing GCL and HDPE panels # 34 and 35 on small area where primary liner was placed west of sump. Slope above this area has both layers of HDPE installed. Area being lined to prevent run-off from lined slope flowing into leak detection layer in sump. Area approximately 7m x 10m. -Slow progress due to snow and frozen conditions  <b>Next Steps</b> - resume geosynthetic installation when weather permits			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b> -Snow and frozen conditions making geosynthetic installation inpracticle			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
NOTE: All site photos to be filed in the Project Folder on the Project Portal.			





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## Field Notes

<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/10/2022 12:30	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Liner crew		
<b>WEATHER CONDITIONS:</b>	Cloudy 1C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Geotextile, GCL and HDPE liner on north-west area of landfill yesterday - Geocomposite being placed on north end of west slope  <b>Next Steps</b> - continue placing geosynthetics on north west area of landfill			
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<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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<b>DATE/TIME:</b>	11/11/2022 12:30	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Snowing 1C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Liner Crew cleaning up north west area of landfill floor -Installing second 50 mm leachate detection port on north slope -Shut down operation due to snow  <b>Next Steps</b> - resume geosynthetic installation when weather permits			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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## Field Notes

<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/12/2022 8:00	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Overcast 1C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Liner crew installing geotextile, GCL and HDPE on south west area of landfill -tying liner into anchor trench on slope between top of west berm and south transition berm  <b>Next Steps</b> - complete installation of geosynthetics on south west area of landfill			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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## Field Notes

<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/14/2022 9:30	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Foggy 0C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Crew installed 3 HDPE pannels 43-45 in south west area of landfill on Saturday Nov 12. -Crew installed HDPE panels 29-32 on norrrth west corner of landfill on Saturday Nov 12 -Geotextile and GCL installed in south west area up edge of fill around ramp - Installing first HDPE layer on south west area -Cut DT-7 on panels 45/46 (Smooth / Texture) and sent to lab			
<b>Next Steps</b> - complete installation of geosynthetics on south west area of landfill			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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<b>DATE/TIME:</b>	11/14/2022 9:30	<b>SITE:</b>	Upland landfill
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<b>WEATHER CONDITIONS:</b>	Foggy 0C		
<b>HASP for this project can be found on project portal</b>			
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<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/15/2022 7:30	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Sunny 0C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Grew installing GCL and HDPE on South west area up to edge of ramp  <b>Next Steps</b> - place fill in ramp area to blend grades and allow for anchor trench tie in - complete installation of geosynthetics on south west area of landfill			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
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## Field Notes

<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/16/2022 9:00	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Sunny 0C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Ramp area filled and remainder of anchor trench dug on top of west slope -Grew installing GCL and HDPE on South west area were ramp was filled over -Inspected proposed drainrock material in Upland pit wil Terry			
<b>Next Steps</b>  - complete installation of geosynthetics on south west area of landfill			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
<b>ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):</b>			
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<b>DATE/TIME:</b>	11/16/2022 9:00	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Sunny 0C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Ramp area filled and remainder of anchor trench dug on top of west slope -Grew installing GCL and HDPE on South west area were ramp was filled over -Inspected proposed drainrock material in Upland pit wil Terry			
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<b>NAME:</b>	David Barbour	<b>PROJECT NUMBER:</b>	88877
<b>DATE/TIME:</b>	11/17/2022 13:30	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Liner crew, Brian Fagan		
<b>WEATHER CONDITIONS:</b>	Sunny 3C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Installing first layer of Geotextile, GCL and HDPE on former ramp area on west slope  <b>Next Steps</b> -Install remaining geosynthetic layers in middle on former ramp area			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
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<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Brian Fagan, Liner crew		
<b>WEATHER CONDITIONS:</b>	Clear Sky -2C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Crew installing first layer of GCL and HDPE in middle of west slope and panels number 53, 54 and 55 completing first layer of HDPE --Grabbed destructive tests 8 - panels 49/50 of upper HDPE layer and 9 Panel 53/54 of lower HDPE layer  <b>Next Steps</b> - Install GCL, Geocomposite, and HDPE in middle area of west slope			
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<b>DATE/TIME:</b>	11/19/2022 8:00	<b>SITE:</b>	Upland landfill
<b>PERSONNEL ON SITE:</b>	Joe Cassidy, Liner crew		
<b>WEATHER CONDITIONS:</b>	Sunny -3C		
<b>HASP for this project can be found on project portal</b>			
<b>SITE VISIT OBJECTIVE:</b> - Observe construction activities			
<b>SITE NOTES / PROGRESS:</b> -Crew placing final GCL on middle of west slope -Installed second 50 mm HDPE port on west slope -Installed final 3.5 HDPE panels numbers 53-56 on middle of west slope -Cut destructive test 10 from panels 55/56			
<b>Next Steps</b>  - Prep west side of base of landfill for geotextile installation - Install geocomposite on west slope - Install remainder of 200 mm perforated leachate collection pipe			
<b>OUTSTANDING INFORMATION / NEW ISSUES:</b>			
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# **Appendix C**

**Cell 1 East, Cell 1 West and Ponds  
Commissioning Report**



# Cell 1 East, Cell 1 West & Ponds Commissioning Report

Northwin Landfill

Northwin Environmental

22 March 2024



09/08/2022 11:06  
N 50° 0' 8", W 125° 21' 31"  
247° SW  
Campbell River BC

<b>Project name</b>		088877 Upland Landfill					
<b>Document title</b>		Cell 1 East, Cell 1 West & Ponds Commissioning Report   Northwin Landfill					
<b>Project number</b>		11222680					
<b>File name</b>		11222680-RPT-3-Cell 1 East, Cell 1 West & Ponds Commissioning Report.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	Toby Wong	Deacon Liddy		Deacon Liddy		January 20, 2023
S3	01	Deacon Liddy	Deacon Liddy		Rose Marie Rocca		February 22, 2024
S3	02	Deacon Liddy	Deacon Liddy		Rose Marie Rocca		March 22, 2024

**GHD**

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# Contents

<b>1. Introduction</b>	<b>1</b>
1.1 Purpose of this Report	1
<b>2. Leachate Treatment Concept</b>	<b>1</b>
<b>3. Summary of Construction</b>	<b>2</b>
3.1 Observed Deficiencies and Corrective Actions	2
<b>4. Commissioning Activities</b>	<b>2</b>
<b>5. Analytical Results</b>	<b>3</b>
<b>6. Maintenance and Performance Monitoring Plan</b>	<b>4</b>
<b>7. Certification</b>	<b>5</b>

## Table index

Table 5.1	Summary of Influent Leachate Samples During Commissioning Period	3
Table 5.2	Summary of Treated Leachate Samples During Commissioning Period	4

## Figure index

Figure 3.1	Leachate Treatment Process	2
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## Appendices

Appendix A	Leachate Treatment Works Layout
Appendix B	Photograph Log
Appendix C	Laboratory Analytical Reports



# 1. Introduction

## 1.1 Purpose of this Report

The Northwin Landfill (landfill) is owned by Upland Excavating Ltd. (Upland) and operated by Northwin Environmental (Northwin). The landfill is located on the Upland property at civic address 7295 and 7311 Gold River Highway, Campbell River, British Columbia (Site), approximately 7 kilometers (km) southwest of Campbell River city centre. The Site operates as a sand, gravel and rock quarry, and a waste management facility.

This Commissioning Report (Report) documents the initial leachate characterization and confirmation of treatment process capabilities during the commissioning period of Cell 1 East and Cell 1 West, carried out by Upland Contracting Ltd. (Contractor), Northwin, and other contractors hired by Upland. The Leachate Treatment Facility (LTF) Commissioning Plan is provided in Appendix F of the 2021 Design, Operation, and Closure Plan (DOCP).

The Report has been prepared by GHD for Upland for submission to the Ministry of Environment and Climate Change Strategy (ENV) fulfilling the requirements of Section 2.6(b) of the Landfill's Operational Certificate 107689 (OC).

Upland, as the OC holder retained GHD to act as the Qualified Professional (QP) for this project scope. In this capacity, GHD reviewed and summarized the sampling results taken during the commissioning period to determine the performance of LTF.

## 2. Leachate Treatment Concept

The leachate treatment system is designed to treat the landfill leachate to meet the BC Contaminated Sites Regulation (CSR) Schedule 3.2 Drinking Water Criteria (discharge criteria) prior to discharge to the infiltration pond.

A series of perforated pipes installed at the base of the landfill cell convey leachate to the existing Cell 1 East sump and the Cell 1 West sump. Pumps in perforated pipes within the Cell 1 East sump and Cell 1 West sump, pump leachate to the LTF. The pumps are controlled by level transducers.

The LTS is a batch treatment system, generating a batch of effluent for infiltration. To target operation of a weekly batch at the peak daily leachate generation rate, an average batch size is considered to be 625 m<sup>3</sup>, with the maximum batch size to be 1,400 m<sup>3</sup>. A batch size may vary, requiring operational adjustments to the treatment system.

The process begins with aerated equalization, where the aerated equalization pond is filled, and undergoes aeration during filling. The leachate is pumped through a shipping container where chemicals for oxidization, pH adjustment and/or coagulation/flocculation can be added inline through injection ports. After chemical addition, leachate can be recirculated to the equalization pond or a clarifier for settling/precipitation of solids. The water is then pumped through a series of sand filters before entering the effluent holding pond and/or pumped through Granular Activated Carbon (GAC) filters. The effluent batch will be held in the effluent holding pond and sampled and sent for laboratory analysis. Following receipt of sample results, the batch will then be pumped to the infiltration pond or recirculated through the treatment steps as required to meet discharge criteria. During operations the batches will be tested periodically to confirm discharge criteria are being met.

The leachate treatment system will reduce the concentration of leachate constituents by the processes described below:

- Aeration oxidizes dissolved metals such as iron and manganese to less soluble forms and produces flocs that will be filtered. Concentrations of other metals present in the leachate that are not readily oxidized in an aeration lagoon will also be reduced when the suspended (not dissolved) components of these metals are filtered in the sand filters. Oxidization can also be enhanced by adding oxidization chemicals.

- Hydrocarbons and volatile organic compounds will be readily volatilized in an aeration lagoon thereby reducing the concentration. If concentrations of organic compounds are required to be further reduced, the effluent will be filtered through a GAC filter.
- The dissolved metals will be removed, if required by chemical precipitation, by adding a volume of chemicals (i.e., mild acids or bases) that will cause an increase or decrease of pH of the leachate to facilitate the formation of an insoluble salt.

Should leachate quality change over time and additional leachate constituents require treatment, the process can include a polishing step to continue to meet the CSR Schedule 3.2 Drinking Water Criteria.

### 3. Summary of Construction

Construction of the LTF was completed with the liner installation on the effluent holding pond on October 19, 2021. The effluent pond was expanded in November with construction completed on November 12, 2021. All components of the LTF were tested by Northwin. GHD observed the functioning of pumps through each stage of the treatment process on December 2, 2021. A drawing of the leachate treatment works layout is provided in Appendix A.

The leachate treatment process is depicted in Figure 3.1 below.

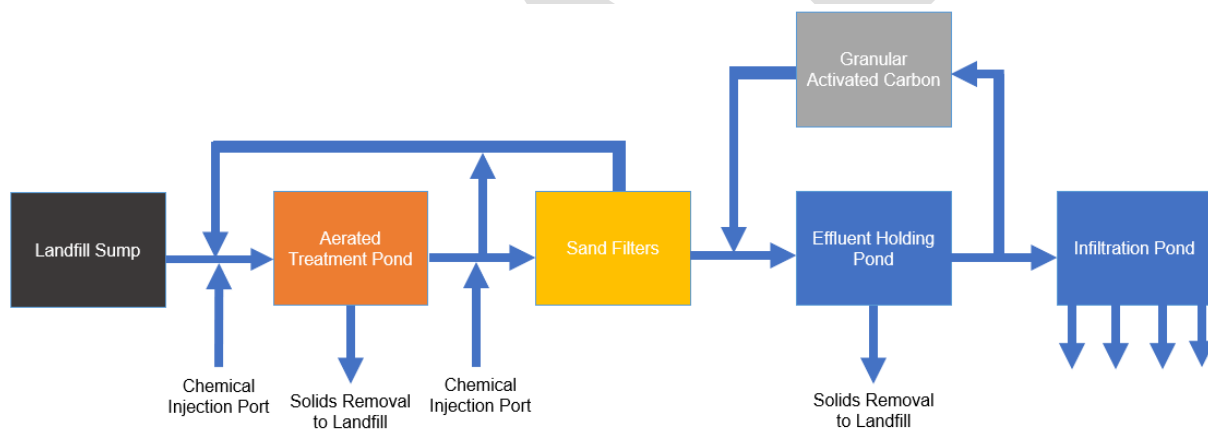


Figure 3.1 Leachate Treatment Process

### 3.1 Observed Deficiencies and Corrective Actions

The effluent holding pond constructed in October 2021 was undersized. A larger effluent holding pond of appropriate size was constructed in November 2021.

## 4. Commissioning Activities

The commissioning activities support initial leachate quality characterization and confirm treatment process capabilities. the commissioning activities summarized below.

### **Clean Water Testing and Equipment Commissioning**

Clean water testing was the initial step in the LTF commissioning in the fall of 2021. The hydraulic integrity of all major process ponds, tanks, pumps, piping, and appurtenance was verified via clean water testing prior to the commencement of start-up and commissioning activities. Process equipment (blowers, pumps, and aeration system) was also commissioned by manufacturer representatives prior to start-up activities. All necessary process chemicals were delivered to Site prior to commissioning and all control systems were tested to verify automatic control functions prior to initiation of start-up activities.

### **Sampling Activities**

During the commissioning period, untreated leachate samples were collected from the effluent holding pond prior to discharge to the infiltration pond. This will aid in leachate characterization and establish a baseline for determining the effectiveness of the leachate treatment process.

Samples were analyzed for the comprehensive set of parameters presented in the attached Tables 1 through 4 to confirm the parameters of concern within the leachate.

## **5. Analytical Results**

Influent and treated leachate samples were collected and submitted to ALS Environmental (ALS) in Burnaby, BC. Samples were analysed for one or more of the treatment parameters listed in the LTF Commissioning Plan (refer to Appendix F of the DOCP) which include dissolved metals, hardness, chemical oxygen demand (COD), alkalinity, sulphate, sulphide, sodium, pH, total dissolved solids (TDS), total suspended solids (TSS), and polycyclic aromatic hydrocarbons (PAH). Parameter concentrations were compared to the CSR Schedule 3.2 Drinking Water Criteria. If treated leachate concentrations met the discharge criteria, then the treated leachate was discharged to the infiltration pond. If the discharge criteria were not met, leachate continued treatment.

During the commissioning period between December 2021 to December 2023, 24 sampling events were completed. Influent samples were collected by GHD and are summarized in Table 5.1. Treated leachate samples were collected by Northwin and are summarized in Table 5.2. Laboratory reports are provided in Appendix C.

**Table 5.1 Summary of Influent Leachate Samples During Commissioning Period**

<b>Sample Date</b>	<b>Lab Report No.</b>
June 03, 2021	C138327
November 16, 2021	C188804
April 01, 2022	C221453
June 22, 2022	C244592
September 8, 2022	C268908
November 17, 2022	C268889

Table 5.2 Summary of Treated Leachate Samples During Commissioning Period

Sample Date	Lab Report No.	Discharge Criteria Results	Treatment Continued or Discharged
December 8, 2021	VA21C7462	- 001: Quinoline	Treatment continued
December 15, 2021	VA21C7962	- 001: Quinoline	Treatment continued
January 7, 2022	VA22A0431	- 001: No exceedances	Treatment continued
January 12, 2022	VA22A0612	- 001: No exceedances	Discharged
February 23, 2022	VA22A3490	- 001: Sulphate, lithium, manganese, benzo(b)pyridine (Quinoline) - 002: Sulphate	Treatment continued
March 29, 2022	VA22A6872	- 001: Sulfate, manganese, quinoline	Treatment continued
April 11, 2022	VA22A7623	- 001: Sulfate, manganese, quinoline	Treatment continued
June 07, 2022	VA22B2754	- 001: Sulfate	Treatment continued
July 01, 2022	VA22B5020	- 001: Quinoline, cobalt	Treatment continued
July 29, 2022	VA22B7883	- 001: No exceedances	Discharged
July 29, 2022	VA22B7886	- 001: Boron, cobalt, sodium	Treatment continued
November 2, 2022	VA22C6839	- 001: Sulfate, boron, sodium	Treatment continued
February 2, 2023	VA23A2628	- 001: No exceedances	Discharged
February 13, 2023	VA23A3351	- 001: Boron, quinoline	Treatment continued
March 6, 2023	VA23A4848	- 001: Arsenic, boron, quinoline	Treatment continued
March 30, 2023	VA23A6860	- 001: No exceedances - 002: No exceedances	Discharged
April 14, 2023	VA23A8082	- 001: Boron, sodium	Treatment continued
October 23, 2023	VA23C5387	- 001: Sulfate, boron, benzo(a)pyrene, quinoline	Treatment continued
November 21, 2023	VA23C7975	- 001: No exceedances - 002: No exceedances	Discharged
December 11, 2023	VA23C0976	- 001: No exceedances	Discharged
December 18, 2023	VA23D0378	- 001: Benzo(a)pyrene, quinoline - 002: No exceedances	Treatment continued Discharged

## 6. Maintenance and Performance Monitoring Plan

To assist in the operation and maintenance of the LTF, a Maintenance and Performance Monitoring Plan has been developed to monitor the performance of the LTF and to identify modifications where necessary.

### **Influent and Chemical Jar Testing**

To optimize chemical dosing to suit the influent leachate characteristics, on-site jar testing will be conducted at the same time as clean water testing. Influent samples will be collected to create an initial leachate profile. LTF operators will conduct jar tests with various chemicals and dosages to evaluate the effectiveness and appropriate dose conditions for removal of target parameters. The jar tests will be used to set initial batch volume chemical dosage rates.



### **Future Sampling Activities**

To meet discharge quality objectives, treated leachate will be sampled regularly to develop a relationship between the parameters of concern within the leachate and the batch treatment sampling program, as well as to monitor the performance of the LTF and chemical dosage.

Each batch of effluent will be sampled from the effluent holding pond and analyzed for a comprehensive set of parameters to determine if a batch can be discharged to the infiltration pond. The effluent will only be discharged to the infiltration pond if the effluent meets the CSR Schedule 3.2 DW criteria. Dependent on the analytical sampling results, leachate will either be recirculated back through the treatment process for additional treatment or, if the effluent meets CSR Schedule 3.2 Drinking Water Criteria, discharged into the infiltration pond.

The effluent sampling results will be used to establish the parameter list for compliance sampling throughout the operation of LTF. Based on leachate quality forecasting discussed in the DOCP, the key leachate parameters will be chemical constituents commonly found in construction and demolition waste, and contaminated soil leachate which may include:

- Chloride
- Sulphate
- Boron
- Iron
- Manganese
- Sulphide
- Arsenic
- Sodium
- PAHs

In addition to sampling to meet discharge quality objectives, leachate will also be sampled to monitor the performance of the treatment process and to observe changes to leachate quality over time as additional waste is added to the landfill. The following parameters may be used to develop an understanding of the system performance and to assist in the operation and maintenance of the LTF:

- Chemical Oxygen Demand (COD)
- Alkalinity
- CSR Metals including hardness
- pH
- TDS
- TSS

Northwin and GHD will continue to monitor parameters and observe changes to the leachate quality, if any.

## **7. Certification**

This commissioning report demonstrates that Cell 1 East, Cell 1 West and Ponds have been commissioned in accordance with the OC and the 2021 DOCP. QPs completed inspections before and during commissioning of Cell 1 East, Cell 1 West and the Ponds.

This commissioning report includes the information described in Section 2.6(b) of the OC, and LTF Commissioning Plan presented in the 2021 DOCP, specifically:

- Summary of commission activities including sampling activities
- Summary of analytical results of influent leachate and effluent sampling
- Copy of all calibration reports and laboratory analytical reports
- Comments on any observed deficiencies in the LTF design or performance, and a plan for addressing any such deficiencies
- Maintenance and performance monitoring plan

All of Which is Respectfully Certified and Submitted by:

GHD

Deacon Liddy

Rose Marie Rocca

DRAFT

# Appendices

# **Appendix A**

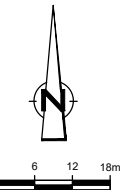
## **Leachate Treatment Works Layout**





GHD Ltd.  
 138 EAST 7<sup>TH</sup> AVENUE, SUITE 100  
 VANCOUVER, BRITISH COLUMBIA V5T 1M6 CANADA  
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Client  
**UPLAND EXCAVATING LTD.**  
**CAMPBELL RIVER, B.C.**

Project  
**LEACHATE TREATMENT WORKS**

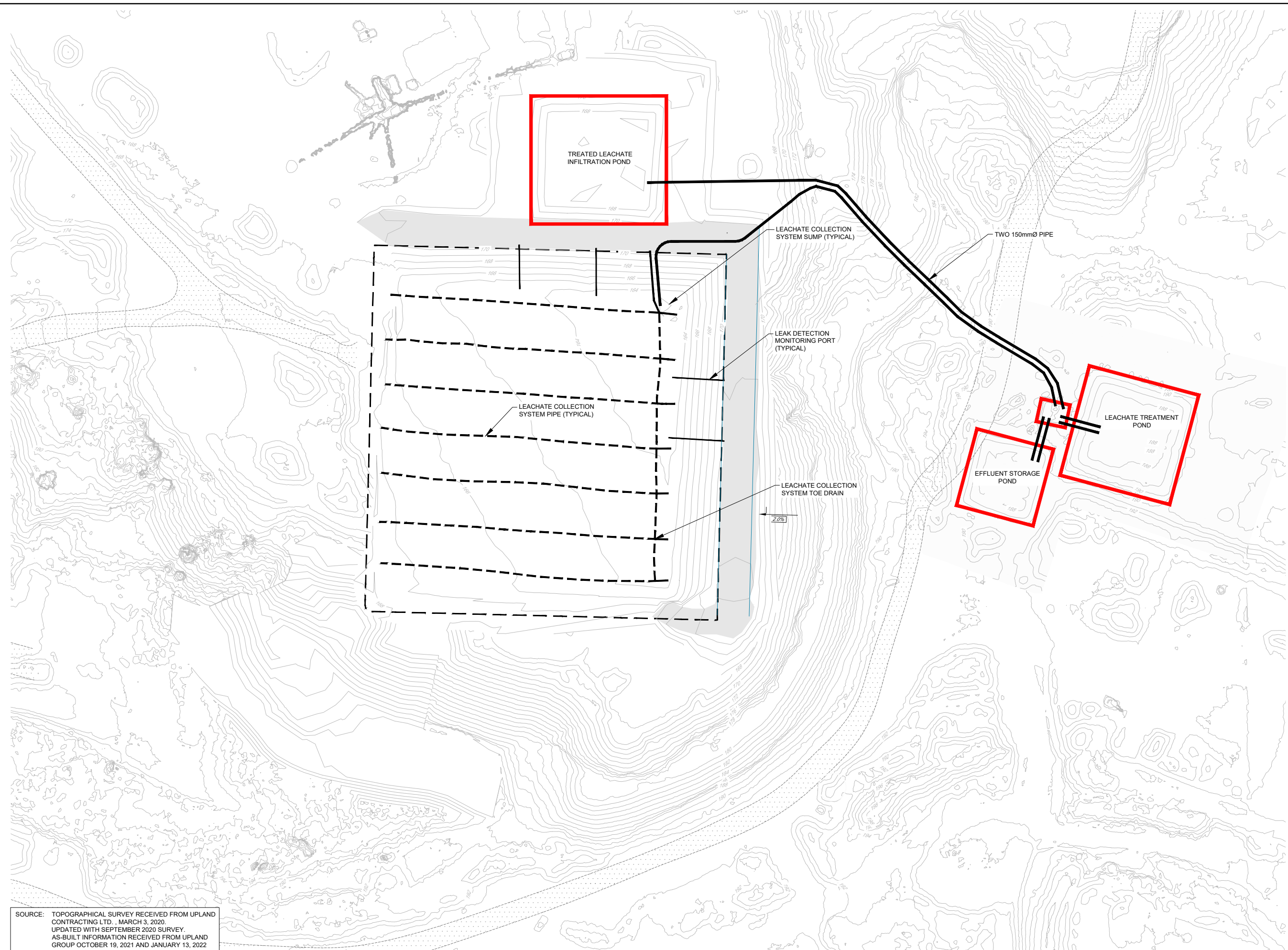

No.	Issue	Drawn	Approved	Date

Drawn	T.WAGSTAFF	Designer
Drafting Check		Design Check
Project Manager		Date
		January 19, 2022
This document shall not be used for construction unless signed and sealed for construction.		Scale
Original Size		1:600
ANSI D		Bar is 20mm on original size drawing
		0 20mm

Project No. **11222680**

Title  
**LEACHATE TREATMENT WORKS LAYOUT**

Sheet No.  
**CI-001**



SOURCE: TOPOGRAPHICAL SURVEY RECEIVED FROM UPLAND CONTRACTING LTD., MARCH 3, 2020.  
 UPDATED WITH SEPTEMBER 2020 SURVEY.  
 AS-BUILT INFORMATION RECEIVED FROM UPLAND GROUP OCTOBER 19, 2021 AND JANUARY 13, 2022

# **Appendix B**

## **Photo Log**



# Site Photographs



*Photo 1 Aerated Treatment Pond*



*Photo 2 Infiltration Pond*



*Photo 3 Submersible landfill leachate pump*

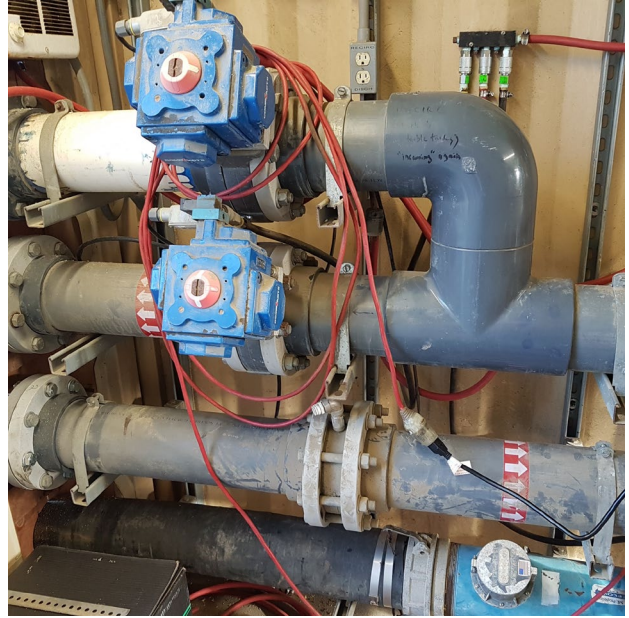


*Photo 4 Effluent pond after reconstruction*





**Photo 5** Leachate inlet / effluent out lines



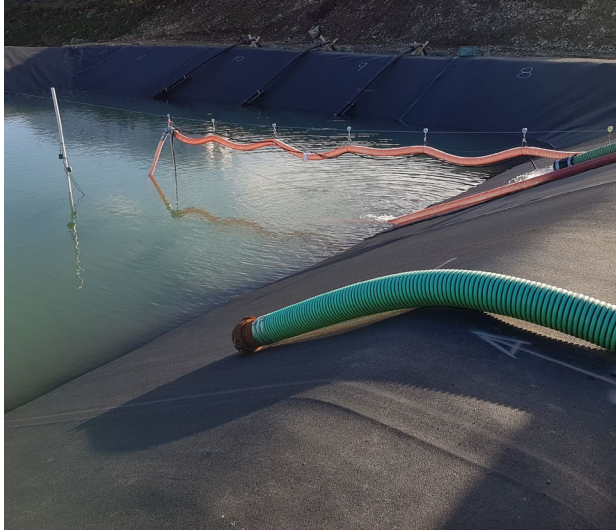
**Photo 6** Recirculation control valves



**Photo 7** Leachate and effluent lines inside treatment container



**Photo 8** Typical chemical injection port



**Photo 9**     *Aeration Pond inlet / suction lines*



**Photo 10**     *Effluent Pond inlet lines*



# **Appendix C**

## **Laboratory Analytical Reports**

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA21C7462**  
**Client** : **Northwin Environmental Ltd.**  
**Contact** : Mr Brian Fagan  
**Address** : 315 - 1434 Ironwood Street  
                   Campbell River BC Canada V9W 5T5  
**Telephone** : ----  
**Project** : ----  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : ----  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 7  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Sneha Sansare  
**Address** : 8081 Lougheed Highway  
                   Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 09-Dec-2021 13:15  
**Date Analysis Commenced** : 09-Dec-2021  
**Issue Date** : 11-Dec-2021 17:01

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Water					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
(Matrix: Water)					Client sampling date / time	08-Dec-2021 04:30	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA21C7462-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	22.8	---	---	---	---	
<b>Anions and Nutrients</b>										
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.84	---	---	---	---	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0244	---	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	---	---	---	---	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00537	---	---	---	---	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	---	---	---	---	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	---	---	---	---	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.93	---	---	---	---	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	---	---	---	---	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00010	---	---	---	---	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00409	---	---	---	---	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.017	---	---	---	---	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000061	---	---	---	---	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.34	---	---	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0414	---	---	---	---	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000220	---	---	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	---	---	---	---	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.060	---	---	---	---	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.287	---	---	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000095	---	---	---	---	





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					08-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7462-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.11	----	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	5.47	----	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0186	----	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.89	----	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	----	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	----	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00018	----	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00096	----	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000013	----	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00055	----	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0018	----	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	----	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	----	----	----	----	
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	----	----	----	----	
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	----	----	----	----	
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					08-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7462-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	----	----	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	----	----	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
styrene	100-42-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
toluene	108-88-3	E611C	0.40	µg/L	<0.40	----	----	----	----	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	----	----	----	----	
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	----	----	----	----	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	84.2	----	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	101	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					08-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7462-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----	
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	90.7	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	0.399	----	----	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	0.012	----	----	----	----	
acridine	260-94-6	E641A	0.010	µg/L	<0.021 <sup>DLO</sup>	----	----	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.022 <sup>DLO</sup>	----	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.011 <sup>DLO</sup>	----	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	0.010	----	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	0.112	----	----	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	0.176	----	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.064 <sup>DLO</sup>	----	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.032	----	----	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	0.098	----	----	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	0.104	----	----	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	0.055	----	----	----	----	
quinoline	91-22-5	E641A	0.050	µg/L	0.554	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	101	----	----	----	----	



## Analytical Results

Sub-Matrix: <b>Water</b>					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
(Matrix: <b>Water</b> )					Client sampling date / time	08-Dec-2021 04:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C7462-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
naphthalene-d8	1146-65-2	E641A	0.1	%	97.1	----	----	----	----	
phenanthrene-d10	1517-22-2	E641A	0.1	%	111	----	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.





CERTIFICATE OF ANALYSIS

Work Order : **VA21C7962**  
Client : **Northwin Environmental Ltd.**  
Contact : Mr Brian Fagan  
Address : 315 - 1434 Ironwood Street  
Campbell River BC Canada V9W 5T5  
Telephone : ----  
Project : ----  
PO : ----  
C-O-C number : ----  
Sampler : ----  
Site : ----  
Quote number : ----  
No. of samples received : 1  
No. of samples analysed : 1

Page : 1 of 7  
Laboratory : Vancouver - Environmental  
Account Manager : Sneha Sansare  
Address : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
Telephone : +1 604 253 4188  
Date Samples Received : 15-Dec-2021 20:35  
Date Analysis Commenced : 16-Dec-2021  
Issue Date : 19-Dec-2021 23:07

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Water					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
(Matrix: Water)					Client sampling date / time	15-Dec-2021 04:30	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA21C7962-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	29.6	---	---	---	---	
<b>Anions and Nutrients</b>										
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	11.7	---	---	---	---	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0291	---	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00035	---	---	---	---	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00458	---	---	---	---	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	---	---	---	---	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.021	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000134	---	---	---	---	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	9.04	---	---	---	---	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	---	---	---	---	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00016	---	---	---	---	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00779	---	---	---	---	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.018	---	---	---	---	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000112	---	---	---	---	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.71	---	---	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0664	---	---	---	---	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000549	---	---	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	---	---	---	---	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.106	---	---	---	---	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.383	---	---	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00025	---	---	---	---	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000097	---	---	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					15-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7962-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.06	----	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	8.69	----	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0311	----	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.78	----	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	----	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	----	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00106	----	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000016	----	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00056	----	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0043	----	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	----	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	----	----	----	----	
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	----	----	----	----	
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	----	----	----	----	
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					15-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7962-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	----	----	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	----	----	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
styrene	100-42-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
toluene	108-88-3	E611C	0.40	µg/L	<0.40	----	----	----	----	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	----	----	----	----	
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	----	----	----	----	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	----	----	----	----	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	102	----	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	99.8	----	----	----	----	





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
Client sampling date / time					15-Dec-2021 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7962-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----	
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	89.2	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	0.210	----	----	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----	
acridine	260-94-6	E641A	0.010	µg/L	0.021	----	----	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.020 <sup>DLCL</sup>	----	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	<0.015	----	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	0.074	----	----	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	0.086	----	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.050 <sup>DLCL</sup>	----	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.014	----	----	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	0.033	----	----	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	0.039	----	----	----	----	
quinoline	91-22-5	E641A	0.050	µg/L	0.512	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	98.2	----	----	----	----	



## Analytical Results

Sub-Matrix: <b>Water</b>					Client sample ID	New Landfill Holding Pond 08/12/21	----	----	----	----
(Matrix: <b>Water</b> )					Client sampling date / time	15-Dec-2021 04:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C7962-001	-----	-----	-----	-----	
Polycyclic Aromatic Hydrocarbons Surrogates					Result	----	----	----	----	
naphthalene-d8	1146-65-2	E641A	0.1	%	85.6	----	----	----	----	
phenanthrene-d10	1517-22-2	E641A	0.1	%	105	----	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



CERTIFICATE OF ANALYSIS

Work Order : VA22A0431  
Amendment : (Partial Results)  
Client : Northwin Environmental Ltd.  
Contact : Mr Brian Fagan  
Address : 315 - 1434 Ironwood Street  
Campbell River BC Canada V9W 5T5  
Telephone : ----  
Project : ----  
PO : ----  
C-O-C number : ----  
Sampler : B F  
Site : ----  
Quote number : ----  
No. of samples received : 1  
No. of samples analysed : 1

Page : 1 of 5  
Laboratory : Vancouver - Environmental  
Account Manager : Sneha Sansare  
Address : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
Telephone : +1 604 253 4188  
Date Samples Received : 12-Jan-2022 07:30  
Date Analysis Commenced : 12-Jan-2022  
Issue Date : 12-Jan-2022 16:32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Christopher Li	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

## (Partial Results)

Page : 2 of 5  
Work Order : VA22A0431  
Client : Northwin Environmental Ltd.  
Project : ----



### General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

### Sample Comments

<i>Sample</i>	<i>Client Id</i>	<i>Comment</i>
VA22A0431-001	Holding Pond	Sample(s) XXX: Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

### Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

(Partial Results)

Page : 3 of 5  
 Work Order : VA22A0431  
 Client : Northwin Environmental Ltd.  
 Project : ----



**Analytical Results**

Sub-Matrix: Water					Client sample ID	Holding Pond	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Jan-2022	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A0431-001	-----	-----	-----	-----	-----
						Result	---	---	---	---
<b>Physical Tests</b>										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	165	----	----	----	----	----
<b>Anions and Nutrients</b>										
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	166	----	----	----	----	----
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0112	----	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00202	----	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00186	----	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0228	----	----	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	----	----	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	----	----	----	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.857	----	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000151	----	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L	55.1	----	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000010	----	----	----	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00192	----	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00188	----	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0553	----	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.020	----	----	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000431	----	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0025	----	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.68	----	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.344	----	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00186	----	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00364	----	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.074	----	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L	6.65	----	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00348	----	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000286	----	----	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.72	----	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	----	----	----	----	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L	35.3	----	----	----	----	----



(Partial Results)

Page : 4 of 5  
 Work Order : VA22A0431  
 Client : Northwin Environmental Ltd.  
 Project : ----



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Holding Pond	----	----	----	----
Client sampling date / time					07-Jan-2022	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A0431-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Dissolved Metals</b>										
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.240	----	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	54.3	----	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000014	----	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	----	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00020	----	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00060 <sup>DLM</sup>	----	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000272	----	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00065	----	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0207	----	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
ethylbenzene	100-41-4	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
styrene	100-42-5	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
toluene	108-88-3	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	Not Authorised	----	----	----	----	
xylene, o-	95-47-6	E611A	0.30	µg/L	Not Authorised	----	----	----	----	
xylenes, total	1330-20-7	E611A	0.50	µg/L	Not Authorised	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	Not Authorised	----	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	Not Authorised	----	----	----	----	

(Partial Results)

Page : 5 of 5  
 Work Order : VA22A0431  
 Client : Northwin Environmental Ltd.  
 Project : ----



**Analytical Results**

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Holding Pond	----	----	----	----
Client sampling date / time					07-Jan-2022	----	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A0431-001	-----	-----	-----	-----	-----
					Result	---	---	---	---	---
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	Not Authorised	---	---	---	---	---
EPH (C19-C32)	----	E601A	250	µg/L	Not Authorised	---	---	---	---	---
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	Not Authorised	---	---	---	---	---
VPHw	----	EC580A	100	µg/L	Not Authorised	---	---	---	---	---
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	Not Authorised	---	---	---	---	---
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	Not Authorised	---	---	---	---	---

Please refer to the General Comments section for an explanation of any qualifiers detected.

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA22A0612**  
**Client** : **Northwin Environmental Ltd.**  
**Contact** : Mr Brian Fagan  
**Address** : 315 - 1434 Ironwood Street  
                   Campbell River BC Canada V9W 5T5  
**Telephone** : ----  
**Project** : ----  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : ----  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 6  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Sneha Sansare  
**Address** : 8081 Lougheed Highway  
                   Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 13-Jan-2022 17:50  
**Date Analysis Commenced** : 13-Jan-2022  
**Issue Date** : 14-Jan-2022 20:23

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
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<i>Unit</i>	<i>Description</i>
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µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Water					Client sample ID	New Landfill	----	----	----	----
(Matrix: Water)						Recirc 13/01/22				
					Client sampling date / time	12-Jan-2022 04:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A0612-001	-----	-----	-----	-----	-----
					Result	----	----	----	----	----
<b>Physical Tests</b>										
hardness (as CaCO3), dissolved	----	EC100	0.50	mg/L	85.1	----	----	----	----	----
<b>Anions and Nutrients</b>										
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	87.3	----	----	----	----	----
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0079	----	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00096	----	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00090	----	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00764	----	----	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	----	----	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	----	----	----	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.317	----	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000541	----	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.5	----	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000032	----	----	----	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00079	----	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00069	----	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0218	----	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.024	----	----	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000785	----	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0013	----	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	4.00	----	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.140	----	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000956	----	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00167	----	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.113	----	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L	3.76	----	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00263	----	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000140	----	----	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.10	----	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	----	----	----	----	----





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Recirc 13/01/22	----	----	----	----
Client sampling date / time					12-Jan-2022 04:30	---	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A0612-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
sodium, dissolved	7440-23-5	E421	0.050	mg/L	20.6	---	---	---	---	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.127	---	---	---	---	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	30.8	---	---	---	---	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	---	---	---	---	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	---	---	---	---	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00014	---	---	---	---	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	---	---	---	---	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000092	---	---	---	---	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0157	---	---	---	---	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	---	---	---	---	
dissolved metals filtration location	----	EP421	-	-	Field	---	---	---	---	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	---	---	---	---	
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	---	---	---	---	
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	---	---	---	---	
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	---	---	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Recirc 13/01/22	----	----	----	----
Client sampling date / time					12-Jan-2022 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A0612-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	----	----	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	----	----	----	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	----	----	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
styrene	100-42-5	E611C	0.50	µg/L	<0.50	----	----	----	----	
toluene	108-88-3	E611C	0.40	µg/L	0.69	----	----	----	----	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	----	----	----	----	
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	----	----	----	----	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	----	----	----	----	
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	----	----	----	----	
chloroform	67-66-3	E611C	0.50	µg/L	3.28	----	----	----	----	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	----	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----	
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	64.2	----	----	----	----	



**Analytical Results**

Sub-Matrix: Water (Matrix: Water)					Client sample ID	New Landfill Recirc 13/01/22	----	----	----	----
Client sampling date / time					12-Jan-2022 04:30	----	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A0612-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.035 <sup>DLO</sup>	----	----	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----	
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	----	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	<0.015	----	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.108	----	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.277	----	----	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	0.233	----	----	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----	
quinoline	91-22-5	E641A	0.050	µg/L	<0.050	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	108	----	----	----	----	
naphthalene-d8	1146-65-2	E641A	0.1	%	98.9	----	----	----	----	
phenanthrene-d10	1517-22-2	E641A	0.1	%	106	----	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



# **Appendix D**

**2023 Annual Status Form**

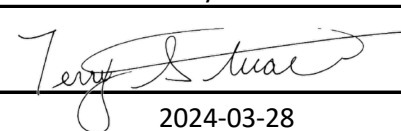




# Annual Compliance Status Form

AUTHORIZATION NUMBER: 107689  
 AUTHORIZATION TYPE: Operational Certificate  
 LEGAL AUTHORIZATION HOLDER NAME: Upland Excavating Ltd.  
 PERIOD OF COMPLIANCE STATUS ASSESSMENT: 2023-01-01 to 2023-12-31

AUTHORIZED PERSON NAME: Terry Stuart

AUTHORIZED PERSON SIGNATURE:   
 SIGNATURE DATE: 2024-03-28

I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true.  
 I have been given the authority by the authorization holder to sign this form.

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
1.1.1	The maximum rate of waste discharge to the Original Lined Cell is 45,000 tonnes per calendar year.	Yes	N/A - waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.1.2	The characteristics of the waste discharge to the Original Lined Cell must be: (a) demolition waste, (b) construction waste, (c) land clearing waste, (d) soil in which the concentrations of all substances are less than the lowest applicable industrial land use standard specified for those substances in (i) the generic numerical soil standards, (ii) the matrix numerical soil standards, or (iii) a director's interim standard for soil, referred to in section 41(1)(a) of the Contaminated Sites Regulation, B.C. Reg. 375/96, (e) sludge from the Original Leachate Management Works, or, (f) other waste as authorized in writing by the director, but does not include: (g) hazardous waste except as authorized pursuant to the Hazardous Waste Regulation, controlled waste, Attractants, and,	Yes	N/A - waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.1.3	The waste discharge is authorized to the Original Lined Cell approximately located as shown on Site Plan A. Waste discharge to the Original Un-lined Cell is not authorized.	Yes	N/A - waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.1.4	Authorization to discharge waste to the Original Lined Cell ceases on the earlier of: (i) the date the Original Lined Cell is filled to capacity with grades not steeper than 3H:1V (33%), (ii) the date of commencement of waste discharge to the New Landfill.	Yes	N/A - waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.1.5	The authorized works are: (i) a lined landfill footprint with a maximum area of 0.72 ha (85 m x 85 m) including from bottom to top a base with perimeter berm, 0.3 m sand cushion layer, 0.5 mm thick coated woven polyethylene liner, 0.3 m granular leak detection layer, leak detection riser pipe, 0.5 mm thick coated woven polyethylene liner, 0.3 m sand protection layer, leachate extraction chamber, final cover, and, (ii) an un-lined landfill footprint with an approximate area of 0.7 ha, final cover,	Yes	N/A - Presently, the New Landfill includes two cells: Cell 1 East and Cell 1 West. Cell 1 West was constructed in 2022. Both cells include a double liner system, leak detection layer, and leachate management works.	Refer to Section 2.1 of the annual report.
1.1.6	The operational certificate holder must ensure the Original Landfill, excluding final cover, is complete and fully operational on or before the date of issuance of this operational certificate, and at all times thereafter, until the Original Landfill is decommissioned in compliance with the plan referred to in section 2.9(a) (plan to remove all waste from the Original Landfill) of this operational certificate.	Yes	N/A - Waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.2.1	The operational certificate holder must convey the leachate from the Original Lined Cell, that is to be discharged on the Facility site, to the Original Leachate Management Works.	Yes	N/A - Northwin collected, treated, and discharged leachate including batches of leachate from the Original Landfill to the New Landfill. Treated leachate effluent was sampled by Northwin throughout the year.	Refer to Section 2.8 of the annual report.
1.2.2	The maximum rate of treated leachate effluent discharge to the treated leachate infiltration pond is 7,139 m <sup>3</sup> per calendar year.	Yes	N/A - Refer to Section 2.8 of the annual report.	Refer to Section 2.8 of the annual report.
1.2.3	The concentration of any substance in the treated leachate effluent discharge to the treated leachate infiltration pond must not be greater than the Contaminated Sites Regulation Generic Numerical Water Standards for Drinking Water (DW), for that substance.	Yes	N/A - Details regarding treated leachate effluent quality is provided in the Cell 1 East & Ponds Commissioning Report and associated lab reports are provided in Section 2.8 of the annual report.	Refer to Section 2.8 of the annual report.
1.2.4	The treated leachate effluent is authorized to be discharged to the treated leachate infiltration pond and infiltrated into the ground. This authorization ceases on the date the Original Leachate Management Works are decommissioned in compliance with the plan referred to in section 2.9(a) (plan to remove all waste from the Original Landfill) of this operational certificate.	Yes	N/A	Refer to Section 2.2 of the annual report.
1.2.6	Minimum Freeboard must be maintained at all times as follows: treated leachate infiltration pond: 0.6 m	Yes	N/A	Refer to Section 2.2 of the annual report.
1.2.7	The operational certificate holder must ensure the Original Leachate Management Works are complete and fully operational on or before the date of commencement of discharge to the treated leachate infiltration pond, and at all times thereafter, until the Original Leachate Management Works are decommissioned in compliance with the plan referred to in section 2.9(a) (plan to remove all waste from the Original Landfill) of this operational certificate.	Yes	N/A - waste was not discharged to the Original Landfill in 2023. Operations ceased at the Original Landfill in September 2022 and waste was removed and placed into the New Landfill from April to June 2023. Decommissioning activities were completed in June 2023.	Refer to Section 1.2 of the annual report.
1.3.1	The maximum rate of waste discharge to the New Landfill is 45,000 tonnes per calendar year.	Yes	N/A - New Landfill accepted approximately 38,327 tonnes in 2023. Note Operational Certificate 107689 Section 1.3.1 states "The maximum rate of waste discharge to the New Landfill is: (45,000 minus the waste discharge to the Original Lined Cell) tonnes per calendar year". Since waste was not discharged to the Original Landfill in 2023 and operations ceased at the Original Landfill in September 2022, The maximum waste discharge rate of 45,000 tonnes per calendar year is maintained.	Refer to Section 2.6 of the annual report.
1.3.2	The characteristics of the waste discharge to the New Landfill must be: (a) demolition waste, (b) construction waste, (c) land clearing waste, (d) soil in which the concentrations of all substances are less than the lowest applicable industrial land use standard specified for those substances in (i) the generic numerical soil standards, (ii) the matrix numerical soil standards, or (iii) a director's interim standard for soil, referred to in section 41(1)(a) of the Contaminated Sites Regulation, B.C. Reg. 375/96, (e) sludge from the New Leachate Management Works or the New Stormwater Management Works, or, (f) other waste as authorized in writing by the director, but does not include: (g) hazardous waste except as authorized pursuant to the Hazardous Waste Regulation, controlled waste, Attractants, and,	Yes	N/A	Refer to Section 2.6 of the annual report.
1.3.3	The waste discharge is authorized to the New Landfill approximately located as shown on Site Plan A.	Yes	N/A	Refer to Section 2.6 of the annual report.
1.3.6	The operational certificate holder must ensure the New Landfill, excluding final cover, is complete and fully operational on or before the date of commencement of waste discharge to the New Landfill, and at all times thereafter.	Yes	N/A	Refer to Section 2.1 of the annual report.
1.4.1	The operational certificate holder must convey the leachate from the New Landfill, that is to be discharged on the Facility site, to the New Leachate Management Works.	Yes	N/A - Leachate is collected within Cell 1 East (and stormwater from Cell 1 West) in a series of perforated pipes installed at the base of the cell and discharges to a sump. Leachate is stored temporarily in the landfill and pumped from the sump to the leachate treatment pond for batch treatment.	Refer to Section 2.2 of the annual report.
1.4.2	The maximum rate of treated leachate effluent discharge to the treated leachate infiltration pond is 24,633 m <sup>3</sup> per calendar year.	Yes	N/A - Details regarding treated leachate effluent quality is provided in the Cell 1 East & Ponds Commissioning Report.	Refer to Section 2.8 of the annual report.
1.4.3	The concentration of any substance in the treated leachate effluent discharge to the treated leachate infiltration pond must not be greater than the Contaminated Sites Regulation Generic Numerical Water Standards for Drinking Water (DW), for that substance.	Yes	N/A - Details regarding treated leachate effluent quality is provided in the Cell 1 East & Ponds Commissioning Report.	Refer to Section 2.8 of the annual report.
1.4.4	The treated leachate effluent is authorized to be discharged to the treated leachate infiltration pond and infiltrated into the ground.	Yes	N/A - Details regarding treated leachate effluent quality is provided in the Cell 1 East & Ponds Commissioning Report.	Refer to Section 2.8 of the annual report.
1.4.5	The authorized works are leachate conveyance, treatment and discharge works including pumps, pipes, leachate treatment pond(s), treated leachate infiltration pond, flow monitoring works, and related appurtenances approximately located as shown on Site Plan A.	Yes	N/A - The new leachate management works include leachate collection, extraction, storage, treatment, and infiltration. A process schematic of the new leachate management works is provided in Section 2.2 of the annual report.	Refer to Section 2.2 of the annual report.
1.4.7	Minimum Freeboard must be maintained at all times as follows: leachate treatment pond(s): 0.6 m treated leachate infiltration pond: 0.6 m	Yes	N/A	
1.4.8	The operational certificate holder must ensure the New Leachate Management Works are complete and fully operational on or before the date of commencement of waste discharge to the New Landfill, and at all times thereafter.	Yes	N/A	Refer to Section 2.2 of the annual report.
1.5.1	The operational certificate holder must manage stormwater from the New Landfill such that stormwater is infiltrated into the ground with the authorized works.	Yes	N/A	Refer to Section 2.3 of the annual report.
1.5.2	The stormwater must not include leachate and the concentration of any substance in the stormwater must not be greater than the Contaminated Sites Regulation Generic Numerical Water Standards for Drinking Water (DW), for that substance.	Yes	N/A - The perimeter stormwater ditches will be established and included in the EMP once final cover is placed.	Refer to Section 6.4 of the annual report.
1.5.4	Minimum Freeboard must be maintained at all times as follows: stormwater infiltration area: 0.6 m all other authorized works: 0.3 m	Yes	N/A	
1.5.5	The operational certificate holder must ensure that adequate authorized works to manage stormwater, such that stormwater is infiltrated into the ground with the authorized works, are complete and fully operational on or before the date of commencement of waste discharge to the New Landfill, and at all times thereafter.	Yes	N/A	Refer to Section 3.2 of the annual report.
2.70	Before a specific quantity of soil is accepted at the Facility, the operational certificate holder must cause a Qualified Professional to certify and submit to the operational certificate holder, a document pertaining to the specific quantity of soil that includes: (i) the soil tonnage(s) and soil quality class(es) as described in the most recent version of Technical Guidance 1 on Contaminated Sites Site Characterization and Confirmation Testing, (ii) the soil origin including applicable civic address, site identification number, parcel identifier, parcel identification number, legal description, and, (iii) characterization of the soil in accordance with ministry procedures and applicable Contaminated Sites Regulation Guidance, Protocols and	Yes	N/A	Refer to Section 3.2 of the annual report.
2.11	The operational certificate holder must cause a Qualified Professional to carry out inspections before and during the construction or modification of Significant Works, and, after the completion of construction or modification of Significant Works, to certify and submit construction report(s) to the director for all Significant Works, on or before 60 days after the completion of construction or modification of the Significant Works.	Yes	N/A	Refer to Sections 2.1 of the annual report (i.e., construction reports).
2.12	The operational certificate holder must notify the director of the date of commencement of waste discharge to the New Landfill, on that date.	Yes	N/A	
3.1	The operational certificate holder must provide and install multiple and/or spare works and auxiliary power facilities to ensure the Original Lined Cell, Original Leachate Management Works, New Landfill, New Leachate Management Works, and New Storm water Management Works, are complete and fully operational as specified in this operational certificate, including during maintenance, breakdowns and electrical power outages.	Yes	N/A	
3.2	The operational certificate holder must cause persons that are qualified and trained to operate, regularly inspect, and maintain the Facility, in good working order. If components of the Facility have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.	Yes	N/A	
3.2	The operational certificate holder must prepare documents of the qualification and training of the persons operating, inspecting and maintaining the Facility, and of Facility inspections, operation and maintenance.	Yes	N/A	
3.3	The operational certificate holder must ensure that at least one person responsible for the management of the Facility is certified, and maintains certification, by The Solid Waste Association of North America (SWANA) as a Manager of Landfill Operations, and at least one person responsible for the operation of the Facility has, within the preceding five years, successfully completed the SWANA Landfill Operations Basics course, on or before the earlier of: (i) the date of commencement of waste discharge to the Original Lined Cell, (ii) the date of commencement of waste discharge to the New Landfill,	Yes	N/A	
3.3	The operational certificate holder must prepare documents of the SWANA certification and training of the person(s) responsible for the management and operation of the Facility.	Yes	N/A	
3.5	The operational certificate holder must ensure that the Facility does not cause the concentration of any substance in groundwater flowing from the Facility site boundary to be greater than: (i) the Contaminated Sites Regulation Generic Numerical Water Standards for Drinking Water (DW), for that substance, or (ii) if the local background concentration of any substance is greater than (i), the local background concentration of that substance.	Yes	N/A	Refer to Section 6.3 of the annual report.
3.7	The operational certificate holder must ensure that the Facility does not cause a nuisance including with regard to birds, rodents, insects, odour, noise, dust, litter, vector and wildlife attraction.	Yes	N/A	
3.8	The operational certificate holder must prepare documents of complaints with regard to matters relevant to this operational certificate, including environmental and nuisance complaints. These documents must include the source and nature of the complaint, actions, responses, and corresponding dates and times.	Yes	N/A	
4.1	The operational certificate holder must carry out required sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition (Permittee)" or most recent edition, or by alternative procedures as authorized by the director.	Yes	N/A - Refer to Section 5.5 of the annual report.	
4.2	The operational certificate holder must carry out required analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the director.	Yes	N/A	Refer to Sections 5.4 of the annual report.
4.3	The operational certificate holder must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the operational certificate holder and an evaluation of the data acceptability, based on criteria set by such laboratory.	Yes	N/A - Laboratory reports and respective field sample keys (FSK) for each monitoring event are provided in Appendix F of the annual report.	Refer to Section 5.6 and 6 of the annual report.

Authorized Person Initial: \_\_\_\_\_

Date: \_\_\_\_\_

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
4.3	The operational certificate holder must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.	Yes	N/A - Analytical services were provided by Bureau Veritas Laboratories (BV) of Burnaby, BC.	Refer to Section 4.6 and 6 of the annual report.
4.3	The operational certificate holder must collect, prepare and submit for analysis by the analytical laboratory(ies) quality control (QC) samples for each parameter. As a minimum, the number of QC samples should be 20% of all samples collected (environmental + QC samples) within 48 hours of each other, and include duplicate, field and trip blank samples for each parameter.	Yes	N/A - A qualified GHD chemist completed data verification to assess laboratory and field QA/QC measures.	Refer to Section 4.7 and Appendix G of the annual report.
5.2	The operational certificate holder must immediately notify the director or designate by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director of any non-compliance with the requirements of this authorization by the operational certificate holder and must take remedial action to remedy any effects of such non-compliance.	Yes	N/A - No non-compliances or public complaints.	Refer to Section 2.9 of the annual report.
5.2	The operational certificate holder must provide the director with written confirmation of all non-compliance events, including available test results within 24 hours of the original notification by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director.	Yes	N/A - No non-compliances or public complaints.	Refer to Section 2.9 of the annual report.
5.3	If the operational certificate holder fails to comply with any of the requirements of this authorization, the operational certificate holder must, within 30 days of such non-compliance, submit to the director a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following: (i) all relevant test results obtained by the operational certificate holder related to the non-compliance, ii) an explanation of the most probable cause(s) of the non-compliance, and (iii) a description of remedial action planned and/or taken by the operational certificate holder to prevent similar non-compliance(s) in the future.	Yes	N/A - No non-compliances or public complaints.	Refer to Section 2.9 of the annual report.
5.3	The operational certificate holder must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox at EnvironmentalCompliance@gov.bc.ca or as otherwise instructed by the director.	Yes	N/A - No non-compliances or public complaints.	Refer to Section 2.9 of the annual report.
5.4	The operational certificate holder must cause a Qualified Professional to certify and submit an Annual Operations and Monitoring Report in a format suitable for public release, for the preceding calendar year, to the director on or before March 31 of each year. On or before March 31 of each year, the operational certificate holder must post a copy of the Annual Operations and Monitoring Report online, on a website accessible to the public, and in accordance with any requirements of the director.	Yes	N/A	
5.4	The Annual Operations and Monitoring Report must include a summary of OCP implementation that addresses the information in section 2.3(b), and summary of DOCP implementation that addresses the information in 2.5(b), of this operational certificate.	Yes	N/A	Refer to Section 2.3 of the annual report.
5.4	The Annual Operations and Monitoring Report must include a summary of construction reports.	Yes	N/A	Refer to Section 2.5 of the annual report.
5.4	The Annual Operations and Monitoring Report must include annual and cumulative tonnages and categories of waste including soil tonnage(s) and soil quality class(es) discharged to the Original Lined Cell and to the New Landfill.	Yes	N/A	Refer to Section 2.6 of the annual report.
5.4	The Annual Operations and Monitoring Report must include remaining volume and life of the Original Lined Cell and of the New Landfill.	Yes	N/A - the decommissioning of the Original Landfill began in 2022.	Refer to Section 2.7 of the annual report.
5.4	The Annual Operations and Monitoring Report must include a summary of treated leachate effluent quantity and quality discharged to the treated leachate infiltration pond.	Yes	N/A	Refer to Section 2.7 and 3.8 of the annual report.
5.4	The Annual Operations and Monitoring Report must include a summary of complaints and nuisances and description of remedial action planned and/or taken by the operational certificate holder to prevent similar complaints and nuisances in the future.	Yes	N/A	Refer to section 2.9 the annual report.
5.4	The Annual Operations and Monitoring Report must include a summary of non-compliance notifications and non-compliance reporting and description of remedial action planned and/or taken by the operational certificate holder to prevent similar non-compliance(s) in the future.	Yes	N/A - Refer to sections 2.8 and 3.8 of the annual report.	
5.4	The Annual Operations and Monitoring Report must include an annual status form in accordance with the instructions and template at the ministry website <a href="https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/annual-status-form">https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/annual-status-form</a>	Yes	N/A - Refer to this form.	(Appendix of the annual report).
5.4	The Annual Operations and Monitoring Report must include a summary of OCP and DOCP implementation, and construction of Significant Works, planned for the next calendar year.	Yes	N/A	Refer to Sections 2.3 and 2.4 of the annual report.
5.4	The Environmental Monitoring Plan Report must include site plan(s), sampling locations, storm water flow paths, groundwater elevations, gradients and flow directions.	Yes	N/A	Refer to Figures of the annual report.
5.4	The Environmental Monitoring Plan Report must include data including laboratory analysis and quality assurance and quality control results.	Yes	N/A	Refer to appendix F of the annual report.
5.4	The Environmental Monitoring Plan Report must include data tabulation, trend analysis, graphs, diagrams, and interpretation.	Yes	N/A	Refer to Tables 2 - 6 and appendix F of the annual report.
5.4	The Environmental Monitoring Plan Report must include trigger level assessment plan monitoring, data, results and interpretation.	Yes	N/A - A trigger level assessment plan is not needed for the Original Lined Cell, the New Landfill EMP includes a trigger level response plan.	Refer to Section 2.3 of the annual report.
5.4	The Environmental Monitoring Plan Report must include any determination(s) of the local background concentration of substance(s) in accordance with section 3.5 of this operational certificate.	Yes	N/A - Local determination(s) on local background concentration of substances was not needed.	
5.4	The Environmental Monitoring Plan Report must include comparison of the data with the standards for treated leachate effluent discharge, storm water quality, groundwater quality, and landfill gas management, specified in sections 1.2, 1.4, 1.5, 3.5 and 3.6 of this operational certificate, and identification of any non-compliance and predicted future non-compliance.	Yes	N/A	Refer to Section 2.8, Appendix E, and the Tables 2 - 6 of the annual report.
5.4	The Environmental Monitoring Plan Report must include results, conclusions, recommendations and changes to the environmental monitoring plan.	Yes	N/A - Refer to sections 9 and 10 of the annual report.	Refer to sections 7 and 9 of the annual report.
5.4	The operational certificate holder must upload monitoring data associated with this operational certificate to the Ministry's Environmental Monitoring System (EMS) database, within 45 days of the end of the 3 month period in which the data is collected.	Yes	N/A - Data has been uploaded to the EMS by the laboratory.	

# **Appendix E**

## **Borehole Logs**





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: BH1-16  
 DATE COMPLETED: January 27, 2016  
 DRILLING METHOD: Rotasonic  
 FIELD PERSONNEL: S. Foster

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541551.19 EASTING: 330846.01	GROUND SURFACE 168.41					
2	SW-GRAVELY SAND, well graded, fine to medium sand, fine to coarse gravel, brown, dry, dense		SOIL CUTTINGS BENONITE GRAVEL	RS-1	30.48		
4	SW/GW-SAND AND GRAVEL, well graded, fine to medium sand, fine gravel, brown, dry, very dense - with coarse sand at 3.05m BGS - moist at 5.15m BGS	165.67		SPT-2 RC-2	24.38 30.48	43	
6	SP-SAND with gravel, fine sand with trace coarse sand and fine gravel, moist, sub-rounded, very dense	163.23	152 mm Ø BOREHOLE	SPT-3 RS-3	24.38 30.48	45	
8	SW/GW-SAND AND GRAVEL, well graded, fine to coarse sand and gravel, subangular, grey, moist, very dense	162.31		SPT-4 RS-4	15.24 30.48	85	
10	SP-FINE SAND, trace coarse gravel, grey, moist, dense	158.05		SPT-5 GB-2	30.48	87	
12	SW-SAND with gravel, fine to medium grained sand and gravel, grey, moist, very dense - cobbles at 12.80m BGS	157.13	SOIL CUTTINGS	RS-4	30.48		
14	SW-SAND, with gravel to trace gravel, fine to medium grained sand and gravel, grey, wet, loose - heaving sands at 14.94m BGS	154.39		SPT-6	15.24	41	
16	SP-SAND, fine to medium grained sand, grey, moist	150.43		RS-5	30.48		
18				SPT-7 GB-1	15.24	4	
20				RS-7	30.48		
22				RS-8	30.48		
24	BEDROCK, (highly weathered), silty, slight plasticity, soft, grey, wet	145.25 144.94 144.33	BENTONITE GRAVEL				
26	BEDROCK, Karmutsen, porphyritic basalt, igneous extrusive, black (blueish) with white crystals, phaneritic, moderate iron staining on fractures vertical fracturing, with iron staining on fracture surface, largely non-intact, RQD=0.25						
28	END OF BOREHOLE @ 24.08m BGS  Borehole completed to target depth in bedrock No topsoil evident/surface compact sand and						

**WELL DETAILS**  
 Seal:  
 146.46 to 144.33m AMSL  
 21.95 to 24.08m BGS  
 Material: Bentonite Gravel

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼

OVERBURDEN LOG 088877-WI-GPJ\_CRA\_CORP\_GDT 4/17/17







# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: BH2-16

PROJECT NUMBER: 088877

DATE COMPLETED: January 28, 2016

CLIENT: Uplands

DRILLING METHOD: Rotosonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: J. Stewart

DRILLING CONTRACTOR: Drillwell

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541470.19 EASTING: 330839.07	GROUND SURFACE 167.86					
2	SW-GRAVELY SAND, with cobbles, well graded, fine to coarse sand and gravel, brown, moist, dense			SPT-1 RS-1	6.10 30.48	48	
				SPT-2 RS-2	6.10 30.48	42	
4	SW/GW-SAND AND GRAVEL, fine to medium grain sand, dry, compact	164.51		SPT-3 RS-3	15.24 30.48	44	
				GB-1 SPT-4 RS-4	18.29 30.48	21	
6	SP-SAND, poorly graded, fine sand, brown, dry, very dense	162.68		SPT-5	15.24	>66	
				RS-5	30.48		
8	SW/GW-GRAVELY SAND, well graded, grey, moist, dense	159.63		GB-2			
				SPT-6	15.24	37	
10				RS-6	30.48		
12	ML-SANDY SILT with gravel, slightly cohesive, low plasticity, fine sand and gravel silt till, grey with brown ribbons, moist, compact	156.28		GB-3			
				STP-7 GB-4	15.24	13	
14	BEDROCK, highly weathered (saprolite) surface, silt, crumbly, interbedded grey and brown, moist	153.84 153.53		BENTONITE GRAVEL	RS-7	30.48	
16	BEDROCK, Karmutsen, porphyritic basalt, igneous extrusive, black (blueish) with white crystals, phaneritic, moderate iron staining on fractures	151.40			GB-5		
18	vertical fracturing, with iron staining on fracture surface, largely non-intact, RQD=0						
20	END OF BOREHOLE @ 16.46m BGS						
22	Borehole completed to target depth in bedrock No topsoil evident/surface compact sand and gravel Borehole dry upon completion Borehole backfilled with soil cuttings and sealed with bentonite						
24	RS - Rotosonic Core Sample SPT - Standard Penetration Test (splitspoon sample) GB - Grab Sample						
26							
28							

**WELL DETAILS**  
 Seal:  
 156.28 to 151.40m AMSL  
 11.58 to 16.46m BGS  
 Material: Bentonite Gravel

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877-WI-GPJ\_CRA\_CORP\_GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: BH5-15

PROJECT NUMBER: 088877

DATE COMPLETED: August 6, 2015

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Fitzgerald

DRILLING CONTRACTOR: BMD

DRILLER: A. McRea

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (m)	N' VALUE
2	GW GRAVEL, with sand, well graded gravel, medium to coarse grained sand, 1.52 m of recovery from 0-3.05 m						
		3.05					
4	GW GRAVEL, well graded, up to 7.5 cm	3.66					
	GW GRAVEL, with sand, well graded gravel up to 7.5 cm, medium to coarse grained sand	4.27					
6	SW SAND, with gravel, medium to coarse grained well graded sand, gravel up to 7.5 cm						
8	- 0.3 m thick bed of silty sand from 7.01 to 7.32m BGS						
		9.14					
10	GW GRAVEL, with sand, well graded gravel, coarse grained sand	10.36					
	SW SAND, medium grained	11.28					
12	SW SAND, with gravel, gravel up to 2 cm	12.19					
	GW GRAVEL, with sand, well graded gravel, coarse grained sand	13.11					
14	SW SAND, medium grained	13.41					
	SW SAND, with gravel, gravel up to 2 cm, some cementation but pulverized by coring	15.24					
16	GW GRAVEL, with sand, gravel up to 10 cm, coarse grained sand	17.37					
	SW SAND, with gravel, gravel up to 2 cm, some cementation but pulverized by coring	18.29					
18	GW GRAVEL, with sand, gravel up to 3 cm, medium to coarse grained sand	20.42					
20	SW SAND, with gravel, medium to coarse grained sand, gravel up to 6 cm						
22							
24	END OF BOREHOLE @ 24.38m BGS	24.38					
26	Lost 15.24 m of 0.15 m diameter casing down the borehole. Borehole abandoned.						
28							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW1-14

PROJECT NUMBER: 088877

DATE COMPLETED: December 4, 2014

CLIENT: Uplands

DRILLING METHOD: Air Rotary

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: Red Williams Drilling Ltd

INSTALLED BY: Red Williams Drilling Ltd

DRILLER: T Johnson

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (m)	'N' VALUE	
	NORTHING: 5541791.65 EASTING: 100824.35	GROUND SURFACE 171.80						
2	SP/PG-SAND AND GRAVEL							
4								
6	- wet at 5.49m BGS							
8								
10								
12	END OF BOREHOLE @ 10.97m BGS	160.83	<p><u>WELL DETAILS</u></p> <p>Screened interval: 166.92 to 160.83m AMSL 4.88 to 10.97m BGS Length: 6.1m Diameter: 51mm Material: PVC</p> <p>Seal: 171.80 to 167.23m AMSL 0.00 to 4.57m BGS Material: Bentonite</p> <p>Sand Pack: 167.23 to 160.83m AMSL 4.57 to 10.97m BGS Material: Sand</p>					
14	Log recreated from notes taken by Red Williams Drilling							
16								
18								
20								
22								
24								
26								
28								

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
WATER FOUND ∇ 12/4/14

OVERBURDEN LOG 088877-M1.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW2-14

PROJECT NUMBER: 088877

DATE COMPLETED: December 4, 2014

CLIENT: Uplands

DRILLING METHOD: Air Rotary

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: Red Williams Drilling Ltd

INSTALLED BY: Red Williams Drilling Ltd

DRILLER: T Johnson

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541591.19 EASTING: 100877.04	TOP OF RISER GROUND SURFACE 173.85 173.09					
2	SP/GP-SAND AND GRAVEL		<p style="font-size: small;">0.8m Stickup 5.08cm Ø PVC Well Casing Bentonite 15.24cm Ø Borehole  5.08cm Ø PVC Well Screen Sand Pack</p>				
4							
6							
8	BOULDERS	166.38 165.77					
10	SP/GP-SAND AND GRAVEL						
12							
14			▽				
16							
18	GP-SANDY GRAVEL, wet	156.02					
20							
22	END OF BOREHOLE @ 21.64m BGS	151.45					
24	Log recreated from notes taken by Red Williams Drilling						
26							
28							

**WELL DETAILS**  
 Screened interval:  
 157.54 to 151.45m AMSL  
 15.54 to 21.64m BGS  
 Length: 6.1m  
 Diameter: 51mm  
 Material: PVC  
 Seal:  
 173.09 to 168.52m AMSL  
 0.00 to 4.57m BGS  
 Material: Bentonite  
 Sand Pack:  
 168.52 to 151.45m AMSL  
 4.57 to 21.64m BGS  
 Material: Sand

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▽ 12/4/14

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW2A-16  
 DATE COMPLETED: January 27, 2016  
 DRILLING METHOD: Rotasonic  
 FIELD PERSONNEL: S. Foster

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541591.43 EASTING: 100878	173.86 173.10	STICKUP 0.80 M				
2	SW/GW-SAND AND GRAVEL, medium to coarse sand to coarse gravel, well graded, grey, dry, subrounded to rounded, dense - Compact, brown, dry at 1.22m BGS			SPT-1 RS-1		7.62 30.48	32
		170.36	BENTONITE GRAVEL	SPT-2 GB-1 RS-2		7.62 30.48	15
4	GW-GRAVEL with sand and cobbles, fine to coarse grain gravel, cobbles, coarse sand, well graded, grey, dry, sub-angular-subrounded, compact		51 mm Ø PVC RISER PIPE	SPT-3 RS-3		7.62 30.48	12
6	- Cobble rich (7-9 cm diameter) from 5.18 to 6.71m BGS - Sandy silt layer, increase in fines, very dense, grey, moist at 5.49m BGS	167.61 166.70	152 mm Ø BOREHOLE	SPT-4 RS-4 RS-5 GB-2 SPT-5 RS-6		15.24 0.00 30.48 7.62 30.48	12 69
8	SW/GW-SAND AND GRAVEL, medium sand to coarse gravel, with cobbles, grey moist, well rounded to subrounded, very dense			RS-7		30.48	
10	SW/GW-SAND AND GRAVEL, fine to medium sand fine to coarse gravel, grey, dry, very dense			RS-8		30.48	
12		160.91		SPT-6		15.24	90
14	SP-SAND with gravel, poorly graded, fine to medium sand, fine gravel, grey, moist, subangular to subrounded, very dense - Becoming wet at 13.41m BGS		SOIL CUTTINGS	RS-9 GB-3		30.48 30.48	
16		156.64		SPT-7		6.10	>100
18	SP-SAND, trace gravel, poorly graded, fine to medium sand, grey, wet, very dense			RS-10		30.48	
20	- Cobbles at 19.81m BGS			RS-11		30.48	
22	SW/GW-SAND AND GRAVEL, fine to coarse sand and gravel to cobble, sand heaving, grey, wet	152.68 152.07		RS-12		30.48	
24	SP-SAND, fine grain, grey, sand heaving, wet			GB-4 SPT-9		15.24	7
26	- Silt rich layer (20 cm) at 24.08m BGS		BENTONITE GRAVEL	RS-13		30.48	
28			SOIL	GB-5 RS-14		30.48 30.48	
				RS-15		30.48	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17







# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW2A-16

PROJECT NUMBER: 088877

DATE COMPLETED: January 27, 2016

CLIENT: Uplands

DRILLING METHOD: Rotosonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: S. Foster

DRILLING CONTRACTOR: Drillwell

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (m)	N' VALUE	
62  64  66  68  70  72  74  76  78  80  82  84  86  88			148.72 to 138.05m AMSL 24.38 to 35.05m BGS Material: SOIL CUTTINGS					

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: MW3-14  
 DATE COMPLETED: December 4, 2014  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: Red Williams Drilling Ltd  
 DRILLER: T Johnson

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541429.8 EASTING: 100853.88  TOP OF RISER GROUND SURFACE	168.59 167.59					
2	SP/GP-SAND AND GRAVEL		<p style="font-size: small;">0.8m Stickup 5.08cm Ø PVC Well Casing Bentonite 15.24cm Ø Borehole  5.08cm Ø PVC Well Screen Sand Pack</p> <p><b>WELL DETAILS</b>            Screened interval:            156.31 to 150.22m AMSL            11.28 to 17.37m BGS            Length: 6.1m            Diameter: 51mm            Material: PVC            Seal:            167.59 to 163.02m AMSL            0.00 to 4.57m BGS            Material: Bentonite            Sand Pack:            163.02 to 150.22m AMSL            4.57 to 17.37m BGS            Material: Sand</p>				
4	GP-SANDY GRAVEL	163.32					
6							
8	SP/GP-SAND AND GRAVEL	159.97					
10							
12	GP-SANDY GRAVEL, wet	155.09					
14							
16							
18	GRANITE BECROCK	150.83					
20	END OF BOREHOLE @ 18.59m BGS  Log recreated from notes taken by Red Williams Drilling	149.00					
22							
24							
26							
28							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▼ 12/4/14

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW4A-15

PROJECT NUMBER: 088877

DATE COMPLETED: August 5, 2015

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Fitzgerald

DRILLING CONTRACTOR: BMD

DRILLER: A. McRea

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541583.05 EASTING: 100808.74	TOP OF RISER GROUND SURFACE	169.30 168.54				
2	GW GRAVEL, with sand, subrounded gravel up to 5.1 cm diameter, medium to coarse grained sand		Concrete Bentonite Chips				
4			Soil Cuttings				
6		162.14					
8	SW SAND, well graded, medium to coarse grained, moist						
10	SW SAND, well graded, fine to medium grained, moist, 1.52 m of recovery	159.09					
12		156.35					
14	SW SAND, some gravel, well graded sand, medium to coarse grained gravel	155.74					
14	SP SAND, fine grained	155.43					
14	SW SAND, some gravel, medium to coarse grained well graded sand						
16	GW GRAVEL, clean, up to 5.1 cm diameter	153.30					
16	SW SAND, medium to coarse grained, 1.52 m of recovery	153.00					
18	- wet at 16.15m BGS						
18	- some gravel from 17.98 to 18.29m BGS						
18	BEDROCK	150.25					
20	IGNEOUS ROCK, porphyritic, aphanitic, brown; phenocrysts approximately 1-3 mm, reddish brown; no evidence of fractures, rock core broken by vibration of the sonic rig	149.95	Bentonite Chips				
20		149.34	15.2 cm Ø Borehole Sand Pack				
22	IGNEOUS ROCK, fine grained, coarser than above, green; phenocrysts up to 1 cm	147.20	5.1 cm Ø Well Screen				
22	- horizontal fracture, fine sediment filling at 19.51m BGS						
24	- vertical and oblique fractures at 19.81m BGS						
24	- with secondary mineralization from 20.88 to 21.34m BGS						
26	END OF BOREHOLE @ 21.34m BGS						
28							

**WELL DETAILS**  
 Screened interval:  
 148.73 to 147.20m AMSL  
 19.81 to 21.34m BGS  
 Length: 1.52m  
 Diameter: 51mm  
 Slot Size: 10  
 Material: PVC  
 Seal:  
 150.56 to 149.03m AMSL  
 17.98 to 19.51m BGS  
 Material: Bentonite Chips  
 Sand Pack:  
 149.03 to 147.20m AMSL  
 19.51 to 21.34m BGS  
 Material: Sand

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 8/5/15

OVERBURDEN LOG 088877-MI-GPJ\_CRA\_CORP\_GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW4B-15

PROJECT NUMBER: 088877

DATE COMPLETED: August 5, 2015

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Fitzgerald

DRILLING CONTRACTOR: BMD

DRILLER: A. McRea

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541575.03 EASTING: 100810.75	TOP OF RISER GROUND SURFACE 169.29 168.42					
2	GW GRAVEL, with sand, subrounded gravel up to 5.1 cm diameter, medium to coarse grained sand		<p style="font-size: small;">Concrete Bentonite Chips Soil Cuttings Bentonite Chips 15.2 cm Ø Borehole Sand Pack 5.1 cm Ø Well Screen</p>				
4							
6							
8	SW SAND, well graded, medium to coarse grained, moist	162.02					
10	SW SAND, well graded, fine to medium grained, moist, 1.52 m of recovery	158.97					
12		156.23					
13	SW SAND, some gravel, well graded sand, medium to coarse grained gravel	155.62					
14	SP SAND, fine grained	155.31					
15	SW SAND, some gravel, medium to coarse grained well graded sand						
16	GW GRAVEL, clean, up to 5.1 cm diameter	153.18					
17	SW SAND, medium to coarse grained, 1.52 m of recovery	152.88					
18	- wet at 16.15m BGS - some gravel from 17.98 to 18.29m BGS - bedrock at 18.29m BGS						
19	END OF BOREHOLE @ 18.29m BGS	150.13					
20							
22							
24							
26							
28							

**WELL DETAILS**  
 Screened interval:  
 153.18 to 150.13m AMSL  
 15.24 to 18.29m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: 10  
 Material: PVC  
 Seal:  
 155.01 to 153.48m AMSL  
 13.41 to 14.94m BGS  
 Material: Bentonite Chips  
 Sand Pack:  
 153.48 to 150.13m AMSL  
 14.94 to 18.29m BGS  
 Material: Sand

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 8/5/15

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW5A-15

PROJECT NUMBER: 088877

DATE COMPLETED: August 7, 2015

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Fitzgerald

DRILLING CONTRACTOR: BMD

DRILLER: A. McRea

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	N' VALUE
	TOP OF RISER GROUND SURFACE	191.88 191.25					
2	GW GRAVEL (FILL), with sand, subrounded gravel up to 10 cm, medium to coarse grained sand, 1.52 m of recovery		Concrete				
4	GW GRAVEL, with sand, gravel up to 10 cm, medium to coarse grained sand - wet due to drilling fluids from 3.05 to 5.49 m BGS	188.20	Bentonite Chips				
6	SM SAND, silty, fine grained, light brown, wet	185.15					
	ML SILT, light brown, dry	184.85					
	MH SILT, with clay, brownish gray, moist	184.54					
	SM SAND, silty, fine grained, gray, wet	183.93					
	MH SILT, with clay, light brown	183.33					
8	SM SAND, silty, fine grained, gray, wet	183.02					
10	IGNEOUS ROCK, porphyritic, aphanitic; phenocrysts approximately 1-3 mm; some weathered rock possibly from fracture infilling; rock broken by vibration from sonic rig; reddish brown - 0.15 m long vertical fracture, rock mostly broken by sonic rig, reddish brown, green phenocrysts up to 5 mm from 9.45 to 9.60m BGS	180.58	15.2 cm Ø Borehole Sand Pack 5.1 cm Ø Well Screen				
12			<b>WELL DETAILS</b> Screened interval: 182.11 to 180.58m AMSL 9.14 to 10.67m BGS Length: 1.52m Diameter: 51mm Slot Size: 10 Material: PVC Seal: 190.34 to 182.41m AMSL 0.91 to 8.84m BGS Material: Bentonite Chips Sand Pack: 182.41 to 180.58m AMSL 8.84 to 10.67m BGS Material: Sand				
14	END OF BOREHOLE @ 10.67m BGS						
16							
18							
20							
22							
24							
26							
28							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 8/7/15

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW5B-15

PROJECT NUMBER: 088877

DATE COMPLETED: August 7, 2015

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Fitzgerald

DRILLING CONTRACTOR: BMD

DRILLER: A. McRea

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	N' VALUE
	NORTHING: 5541325.84 EASTING: 100792.89	TOP OF RISER GROUND SURFACE	192.01 191.30				
2	GW GRAVEL (FILL), with sand, subrounded gravel up to 10 cm, medium to coarse grained sand, 1.52 m of recovery from 0-3.05 m		<p><b>WELL DETAILS</b>            Screened interval:            186.42 to 183.38m AMSL            4.88 to 7.92m BGS            Length: 3.05m            Diameter: 51mm            Slot Size: 10            Material: PVC            Seal:            190.69 to 186.73m AMSL            0.61 to 4.57m BGS            Material: Bentonite Chips            Sand Pack:            186.73 to 183.07m AMSL            4.57 to 8.23m BGS            Material: Sand</p>				
4	GW GRAVEL, with sand, gravel up to 10 cm, medium to coarse grained sand - wet due to drilling fluids from 3.05 to 5.49 m BGS	188.25					
6	SM SAND, silty, fine grained, light brown, wet	185.20					
	ML SILT, light brown, dry	184.90					
	MH SILT, with clay, brownish gray, moist	184.59					
8	SM SAND, silty, fine grained, gray, wet	183.98					
	MH SILT, with clay, light brown	183.38					
	- bedrock at 8.23m BGS	183.07					
	END OF BOREHOLE @ 8.23m BGS						
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 8/7/15

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW6-17

PROJECT NUMBER: 088877

DATE COMPLETED: March 22, 2017

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Morton

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541753.1 EASTING: 330407.1	GROUND SURFACE TOP OF RISER 185.50 185.38					
2	GP-GRAVEL (FILL), with sand, occasional cobble, trace silt, poorly graded, brown, moist - increase in coarseness at 0.91m BGS			1SS	X		
4	SP-SAND, with gravel, medium to coarse grained, poorly graded, grey, moist	183.21		2SS	X		
6	SP-SAND, with silt to silty sand, fine to very fine grained, grey to brown, moist	180.77		3SS	X		
8	SP-SAND, with silt and gravel, occasional till-like cobble, grey, moist	179.25		4SS	X		
10	SP-SAND (FILL), with silt and gravel, occasional cobble, very dense, grey, moist to wet	177.57		5SS	X		
12	TILL/BEDROCK, highly weathered, grey	174.22		6SS	X		
12	BEDROCK, granite, pink/red, white inclusions	173.92		7SS	X		
12	END OF BOREHOLE @ 12.19m BGS	173.31					
14							
16							
18							
20							
22							
24							
26							
28							

**WELL DETAILS**

Screened interval:  
175.75 to 174.22m AMSL  
9.75 to 11.28m BGS  
Length: 1.52m  
Diameter: 51mm  
Slot Size: 0.020  
Material: PVC  
Seal:  
177.27 to 176.35m AMSL  
8.23 to 9.14m BGS  
Material: Bentonite Chips  
Sand Pack:  
176.35 to 173.31m AMSL  
9.14 to 12.19m BGS  
Material: Sand

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
STATIC WATER LEVEL ▼ 3/22/17

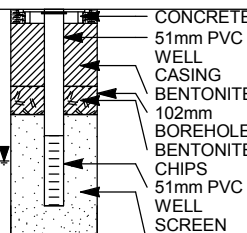
OVERBURDEN LOG 088877-WI-GPJ\_CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: MW7-17  
 DATE COMPLETED: March 14, 2017  
 DRILLING METHOD: Sonic  
 FIELD PERSONNEL: C. Ragan

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (m)	'N' VALUE	
	NORTHING: 5541691.37 EASTING: 100665.22 TOP OF RISER GROUND SURFACE	187.52 186.86						
2	GP-GRAVEL, with fine to coarse sand, with cobble, trace silt, very dense, well graded, dry to moist		 <p><b>WELL DETAILS</b>            Screened interval:            184.12 to 182.59m AMSL            2.74 to 4.27m BGS            Length: 1.52m            Diameter: 51mm            Slot Size: 0.040            Material: PVC            Seal:            185.18 to 184.57m AMSL            1.68 to 2.29m BGS            Material: Bentonite Chips            Sand Pack:            184.57 to 181.83m AMSL            2.29 to 5.03m BGS            Material: Sand</p>	1GS	X			
4	BEDROCK	182.59		181.83	1SS	X	0.00	59
	END OF BOREHOLE @ 5.03m BGS							
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ 3/14/17

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW8-17

PROJECT NUMBER: 088877

DATE COMPLETED: February 22, 2017

CLIENT: Uplands

DRILLING METHOD: Hollow Stem Auger/odex

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Morton/R. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541828.15 EASTING: 100750.08	TOP OF RISER 192.51 GROUND SURFACE 191.29					
2	SP-SAND (FILL), with gravel, trace silt and organic rootlets, well graded, red/brown	190.38		1SS	X	20.42	70
4	GP-GRAVEL, with sand, trace silt, trace to some cobble, dense to very dense, well graded, grey/brown, dry to moist	188.24		2SS	X	16.46	44
6	SP-SAND, with gravel, trace to some cobble, trace silt, dense, grey/brown, dry to moist			3SS	X	12.80	33
8	- infrequent cobble from 6.10m BGS			4SS	X	14.02	41
10				5SS	X	15.24	40
12				6SS	X	17.68	35
14	BOULDER	178.18		7SS	X	15.24	38
16	GP-GRAVEL, with sand, frequent cobble, trace silt, very dense, poorly graded, brown, wet	177.73		8SS	X		40
18	- SS9: refusal at 15.62m BGS			9SS	X	6.10	96+
20	- cobble/boulder from 16.76 to 17.07m BGS			10SS	X	21.64	64
22	- red from 17.98 to 18.14m BGS	173.15		11SS	X	12.80	21
24	SP-SAND, with gravel, very dense, medium to fine grained, poorly graded, grey, wet	172.09		12SS	X	30.48	38
26	GP-GRAVEL, with sand, occasional cobble, compact, poorly graded, grey, wet	169.34					
28	SP-SAND, with gravel, very dense, medium to fine grained, poorly graded, grey, wet						
	- trace gravel, dense below 24.38m BGS						
	END OF BOREHOLE @ 28.96m BGS	162.33					

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 2/20/17      STATIC WATER LEVEL ▼ 2/20/17

OVERBURDEN LOG 088877-MI-GPJ\_CRA\_CORP.GDT 4/17/17





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW8-17

PROJECT NUMBER: 088877

DATE COMPLETED: February 22, 2017

CLIENT: Uplands

DRILLING METHOD: Hollow Stem Auger/odex

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Morton/R. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (m)	N' VALUE	
32  34  36  38  40  42  44  46  48  50  52  54  56  58			Screened interval: 175.50 to 172.45m AMSL 15.79 to 18.84m BGS Length: 3.05m Diameter: 51mm Slot Size: 0.040 Material: PVC Seal: 179.10 to 176.05m AMSL 12.19 to 15.24m BGS Material: Bentonite Pellets Sand Pack: 176.05 to 172.45m AMSL 15.24 to 18.84m BGS Material: Sand					

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▼ 2/20/17      STATIC WATER LEVEL ▼ 2/20/17

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW9-17

PROJECT NUMBER: 088877

DATE COMPLETED: March 14, 2017

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: C. Ragan

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541911.68 EASTING: 100811.04	191.65 190.85					
2	SP-SAND (FILL), with gravel, trace silt and organic rootlets, well graded, red/brown, dry to moist	189.94	<p>CONCRETE 51mm PVC WELL CASING BENTONITE CHIPS/CUTTINGS 102mm BOREHOLE</p>	1SS	30.48	58	
4	GW-GRAVEL, with sand, with cobble, trace silt, dense to very dense, brown, dry - 0.13m diameter boulder at 1.52m BGS						
6	SP-SAND, with gravel, trace cobble, trace silt, dense to very dense, fine to coarse grained, brown, dry to moist	185.97		2SS	9.14	51	
8	- increase in gravel and cobble content at 7.32m BGS	183.23		3GS			
	GP-GRAVEL, with cobble, with medium to coarse sand, with silt, brown, moist	182.62		4SS	0.00	43	
10	SW/GW-SAND/GRAVEL, trace cobble, trace silt, dense, fine to coarse sand, fine to coarse subrounded gravel, brown, moist	181.10		5GS			
12	SP-SAND, with medium gravel, some cobble, trace silt, very dense, coarse grained, moist			6SS	9.14	85	
14	GW-GRAVEL, with cobble, with medium to coarse sand, very dense, fine to medium grained, dark grey, moist	177.13 176.52		7SS	7.62	40	
16	SP-SAND, with fine to medium gravel, some cobble, trace silt, dense, medium to coarse grained, brown, moist	175.00 174.39		8SS	9.14	95	
18	SM-SILTY SAND, with gravel, dense, fine grained, light grey, dry			9GS			
	SW/GW-SAND/GRAVEL, with cobble, with silt, dense, fine to coarse sand, fine to coarse gravel, brown, moist			10GS			
20	SM-SILTY SAND, with gravel, very dense, fine grained, poorly graded, light grey, dry to moist	171.34		11SS	9.14	126	
22	SW/GW-SAND/GRAVEL, with cobble, with silt, very dense, fine to coarse sand, fine to coarse gravel, brown, moist	170.12		12GS			
24				13SS	3.05	62	
26	GW-GRAVEL, with fine to medium sand, some cobble, trace silt, very dense, fine to coarse grained, subrounded, brown/dark grey, wet	166.16		14GS			
28	GP/SP-SAND/GRAVEL, some cobble, trace silt, dense, medium to coarse sand, fine to medium subrounded gravel, clean, brown, wet - increase in cobble up to > 7cm, heaving	163.11		15SS	3.05	21	
			16GS				

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ∇ 3/14/17      STATIC WATER LEVEL ▼ 3/14/17

OVERBURDEN LOG 088877-MI-GPJ\_CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW9-17

PROJECT NUMBER: 088877

DATE COMPLETED: March 14, 2017

CLIENT: Uplands

DRILLING METHOD: Sonic

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: C. Ragan

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	N' VALUE
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">32</div> <div style="margin-bottom: 10px;">34</div> <div style="margin-bottom: 10px;">36</div> <div style="margin-bottom: 10px;">38</div> <div style="margin-bottom: 10px;">40</div> <div style="margin-bottom: 10px;">42</div> <div style="margin-bottom: 10px;">44</div> <div style="margin-bottom: 10px;">46</div> <div style="margin-bottom: 10px;">48</div> <div style="margin-bottom: 10px;">50</div> <div style="margin-bottom: 10px;">52</div> <div style="margin-bottom: 10px;">54</div> <div style="margin-bottom: 10px;">56</div> <div style="margin-bottom: 10px;">58</div> </div>	<p>formation approx. 1.22m into casing at 29.57m BGS</p> <p>SM-SILTY SAND, trace gravel, dense, fine to medium grained, light brown/grey, wet</p> <p>END OF BOREHOLE @ 33.53m BGS</p>	<p>157.93</p> <p>157.32</p>	<p>51mm PVC WELL SCREEN SAND PACK</p> <p><b>WELL DETAILS</b>            Screened interval:            160.37 to 157.32m AMSL            30.48 to 33.53m BGS            Length: 3.05m            Diameter: 51mm            Slot Size: 0.040            Material: PVC            Seal:            161.59 to 160.37m AMSL            29.26 to 30.48m BGS            Material: Bentonite Pellets            Sand Pack:            161.59 to 157.32m AMSL            29.26 to 33.53m BGS            Material: Sand</p>	<p>17SS</p> <p>18GS</p>		<p>7.62</p>	<p>30</p>

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▼ 3/14/17      STATIC WATER LEVEL ▼ 3/14/17

OVERBURDEN LOG 088877-WI.GPJ CRA\_CORP.GDT 4/17/17



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill

HOLE DESIGNATION: MW10-17

PROJECT NUMBER: 088877

DATE COMPLETED: March 27, 2017

CLIENT: Uplands

DRILLING METHOD: Sonic/air Rotary

LOCATION: Campbell River, British Columbia

FIELD PERSONNEL: T. Morton/C. Ragan

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
	NORTHING: 5541441.67 EASTING: 331208.63	TOP OF RISER GROUND SURFACE 189.07 188.24					
2	GP-GRAVEL, with sand, intermixed with organics (rootlets), poorly graded, red/brown	188.09		1GS			
4	GP/SP-GRAVEL/SAND, with sand to with gravel, trace silt, occasional cobble, poorly graded, grey, dry	187.02		2GS			
6	GP-GRAVEL, with sand, trace silt, occasional cobble, poorly graded, grey, dry	185.19		3SS	5.18	34	
6	GP-GRAVEL/COBBLE	184.73					
6	SP-SAND, trace gravel, medium to coarse grained, poorly graded, grey, moist to wet	183.36					
6	GW/SW-SAND/GRAVEL, with cobble, trace silt, fine to medium gravel, medium to coarse sand, very dense, brown, moist						
12	GW-GRAVEL, with fine to medium sand, with silt, with cobble up to 10cm, fine to coarse gravel, very dense, brown, moist	177.57		4GS			
14	GW/SW-SAND/GRAVEL, with cobble, some silt, fine to coarse gravel, fine to coarse sand, very dense, brown, moist	174.52					
16	SM-SILTY SAND, with gravel, trace cobble, very dense, fine grained, dark grey	172.39	5GS				
18	SP-SAND, trace silt, trace gravel, dense, medium grained, clean, brown, moist	171.48					
20	- with fine gravel at 18.90m BGS						
22	GP/SP-GRAVEL/SAND, some cobble, trace silt, fine to coarse gravel, medium sand, brown, moist	167.21	6GS				
24	SP-SAND, with fine to medium gravel, trace cobble, trace silt, very dense, medium grained, brown, moist	165.08	7SS	15.24	101		
26							
28	- increase in silt content, trace gravel, fine to medium grained at 27.13m BGS		8GS				

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▼ 3/23/17      STATIC WATER LEVEL ▼ 3/27/17

OVERBURDEN LOG 088877-MW10-17.GPJ CRA\_CORP.GDT 4/17/17

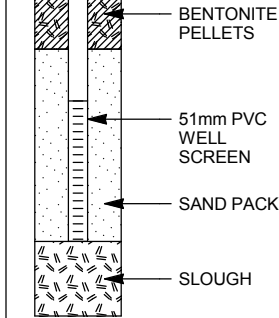


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: MW10-17  
 DATE COMPLETED: March 27, 2017  
 DRILLING METHOD: Sonic/air Rotary  
 FIELD PERSONNEL: T. Morton/C. Ragan

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	N' VALUE
32				9SS	X	15.24	87
34	SM-SILTY SAND, very dense, fine grained, some medium grained, dark grey/brown, moist	154.71		10GS	X		
36				11SS	X		120
38							
40	SP-SAND, with silt, trace gravel, medium fine to fine grained, moist to wet	148.62	▽				
42							
44			▽				
46							
48	END OF BOREHOLE @ 47.85m BGS	140.39					
50							
52							
54							
56							
58							



**WELL DETAILS**  
 Screened interval:  
 145.05 to 142.00m AMSL  
 43.19 to 46.24m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: 0.020  
 Material: PVC  
 Seal:  
 147.70 to 146.18m AMSL  
 40.54 to 42.06m BGS  
 Material: Bentonite Pellets  
 Sand Pack:  
 146.18 to 142.00m AMSL  
 42.06 to 46.24m BGS  
 Material: Sand

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 WATER FOUND ▽ 3/23/17      STATIC WATER LEVEL ▼ 3/27/17

OVERBURDEN LOG 088877-M10-GPJ\_CRA\_CORP\_GDT 4/17/17



# STRATIGRAPHIC LOG (OVERBURDEN)

PROJECT NAME: Upland  
 PROJECT NUMBER: 088877  
 CLIENT: Upland Contracting  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: BH13-18  
 DATE COMPLETED: 16 July 2018  
 DRILLING METHOD: Geoprobe HQ casing advancing the wet coring.  
 FIELD PERSONNEL: M. Dyck/B. Kempel

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	SAMPLE			
			NUMBER	INTERVAL	REC (%)	
	GROUND SURFACE	191.23				
0.5	SW/GW - SAND and GRAVEL, with cobbles, occasional boulders, medium to coarse grained sand and gravel, grey/brown.					
1.0	Drill unable to advance any further than 14.94 m bgs.					
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						
5.0						
5.5						
6.0						
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877 - BH LOGS.GPJ GHD\_Corp 26/9/18






# STRATIGRAPHIC LOG (OVERBURDEN)

PROJECT NAME: Upland  
 PROJECT NUMBER: 088877  
 CLIENT: Upland Contracting  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: BH13-18  
 DATE COMPLETED: 16 July 2018  
 DRILLING METHOD: Geoprobe HQ casing advancing the wet coring.  
 FIELD PERSONNEL: M. Dyck/B. Kempel

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	SAMPLE			
			NUMBER	INTERVAL	REC (%)	
10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 19.5		176.29				
	END OF BOREHOLE @ 14.94m BGS					

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877 - BH LOGS.GPJ GHD\_Corp 26/9/18





# STRATIGRAPHIC LOG (OVERBURDEN)

PROJECT NAME: Upland  
 PROJECT NUMBER: 088877  
 CLIENT: Upland Contracting  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: BH14-18  
 DATE COMPLETED: 16 July 2018  
 DRILLING METHOD: Geoprobe Solid Stem  
 FIELD PERSONNEL: M. Dyck/B. Kempel

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	SAMPLE			
			NUMBER	INTERVAL	REC (%)	
<div style="display: flex; align-items: center;"> <div style="width: 100px; border-right: 1px solid black; margin-right: 5px;">           10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 19.5         </div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">           0.0:0.0 0.0:0.0         </div> </div>	END OF BOREHOLE @ 10.67m BGS	181.01				

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877 - BH LOGS.GPJ GHD\_Corp 26/9/18



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland  
 PROJECT NUMBER: 088877  
 CLIENT: Upland Contracting  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW15A-18  
 DATE COMPLETED: 18 July 2018  
 DRILLING METHOD: HW Casing, HQ Coring  
 FIELD PERSONNEL: M. Dyck/B. Kempel

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)		
	TOP OF RISER GROUND SURFACE	183.07 182.41						
0.5	SW/SP - Sand with gravel, medium to coarse grain sand, brown/grey		 CONCRETE         BENTONITE CHIPS					
1.0								
1.5								
2.0								
2.5								
3.0								
3.5								
4.0								
4.5								
5.0								
5.5								
6.0								
6.5								
7.0								
7.5								
8.0								
8.5								
9.0								
9.5	END OF OVERBURDEN HOLE @ 9.14m BGS							

OVERBURDEN LOG 088877 - BH LOGS.GPJ GHD\_Corp 26/9/18

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼









# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland  
 PROJECT NUMBER: 088877  
 CLIENT: Upland Contracting  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW15B-18  
 DATE COMPLETED: 23 July 2018  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: M. Dyck  
 DRILLER: Scott Burrows

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	
10.5  11.0  11.5  12.0  12.5  13.0  13.5  14.0  14.5  15.0  15.5  16.0  16.5  17.0  17.5  18.0  18.5  19.0  19.5			Diameter: 51mm Material: PVC Schedule 40 Seal: 182.10 to 175.39m AMSL 0.30 to 7.01m BGS Material: Bentonite Chips Sand Pack: 175.39 to 173.41m AMSL 7.01 to 8.99m BGS Material: Sand 10-20				

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ July 23, 2018

OVERBURDEN LOG 088877 - BH LOGS.GPJ GHD\_Corp 26/9/18



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: MW11-19  
 DATE COMPLETED: 9 April 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N. Turl/R.M. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (m)	
	NORTHING: 5541315.22 EASTING: 331194.55	TOP OF RISER GROUND SURFACE	194.78 193.96				
2	TOPSOIL (FILL), trace fine gravel, trace woodchips, dark brown/black, moist		<p>CONCRETE BENTONITE CHIPS            51mm PVC WELL CASING            152mm BOREHOLE</p> <p>NATIVE SOIL CUTTINGS</p>	1AR			
4	GW-GRAVEL, trace topsoil, fine to coarse grained, angular, dark brown/black, moist	190.91		2AR			
6	SW-SAND, with fine angular gravel, well graded	187.86		3AR			
8				4AR			
10	- increase in sand content, angular at 9.14m BGS			5AR			
12	- increase in gravel content, coarse, angular at 12.19m BGS			6AR	15.24m -001		
14				7AR			
16				8AR			
18	GP/SP-GRAVEL/SAND, fine gravel, coarse sand	175.67		9AR			
20				10AR			
22	- increase in gravel content at 21.34m BGS						
24	GP-GRAVEL, fine grained, angular and round	169.57					
26							
28							
30					30.48m -002		

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS  

OVERBURDEN LOG 088877-WI.GPJ GHD\_Corp 24/5/19



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: MW11-19  
 DATE COMPLETED: 9 April 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N. Turl/R.M. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (m)		
34	SP-SAND, fine to medium grained	160.43	<p style="text-align: center;"><b>WELL DETAILS</b>            Screened interval:            143.51 to 140.46m AMSL            50.44 to 53.49m BGS            Length: 3.05m            Diameter: 51mm            Slot Size: 0.010            Material: SCH. 40 PVC            Seal:            147.17 to 144.12m AMSL            46.79 to 49.83m BGS            Material: BENTONITE PELLETS            Sand Pack:            147.17 to 140.46m AMSL            46.79 to 53.49m BGS            Material: 10/20 FILTER SAND</p>	11AR				
36	GW-GRAVEL, fine grained, well sorted	158.90		12AR				
38	SP-SAND, fine grained, poorly graded	157.38		13AR				
40				14AR				
42				15AR				
44				16AR	45.72m -003			
46				17AR				
48				18AR				
50								
52								
54								
56	END OF BOREHOLE @ 54.86m BGS	139.09						
58								
60								
62								

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○

OVERBURDEN LOG 088877-WI.GPJ GHD\_Corp 24/5/19



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: PZ1-19  
 DATE COMPLETED: 10 April 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N. Turl/R.M. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	PIEZOMETER	SAMPLE			
				NUMBER	INTERVAL	REC (m)	
	NORTHING: 5541391.35 EASTING: 297	TOP OF RISER GROUND SURFACE	192.12 191.25				
2	GW-GRAVEL, with fine to coarse sand, fine to medium grained, well graded, grey  - increase in sand content at 3.05m BGS		<p style="font-size: small;">SAND/NATIVE SOIL CUTTINGS BENTONITE PELLETS</p> <p style="font-size: small;">NATIVE SOIL CUTTINGS</p> <p style="font-size: small;">51mm PVC WELL CASING</p> <p style="font-size: small;">152mm BOREHOLE</p> <p style="font-size: small;">BENTONITE PELLETS</p> <p style="font-size: small;">51mm PVC WELL SCREEN SAND PACK BENTONITE PELLETS</p> <p><b>WELL DETAILS</b>            Screened interval:            172.81 to 171.29m AMSL            18.44 to 19.96m BGS            Length: 1.52m            Diameter: 51mm            Slot Size: 0.010            Material: SCH. 40 PVC            Seal:            174.94 to 173.42m AMSL            16.31 to 17.83m BGS            Material: BENTONITE PELLETS            Sand Pack:            173.42 to 171.29m AMSL            17.83 to 19.96m BGS            Material: 10/20 FILTER SAND</p>	1AR			
4				2AR			
6		185.16		3AR			
8	SW-SAND, with fine gravel, fine to coarse grained, well graded, brown/grey  - increase in gravel content from 9.14 to 12.19m BGS			4AR			
10				5AR			
12				6AR			
14		174.49		7AR			
16	GW-GRAVEL, with coarse sand, fine grained, well graded, brown/grey	172.96					
18	SW-SAND, with fine to coarse gravel, fine to coarse grained, well graded, brown/grey	171.44 171.13 170.83					
20	GM-SILTY GRAVEL, with sand, well graded, brown						
22	BEDROCK, brown/grey END OF BOREHOLE @ 20.42m BGS						

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877-WI.GPJ GHD\_Corp 24/15/19



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Upland Landfill  
 PROJECT NUMBER: 088877  
 CLIENT: Uplands  
 LOCATION: Campbell River, British Columbia

HOLE DESIGNATION: BH16-19  
 DATE COMPLETED: 10 April 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N. Turl/R.M. Rocca

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (m)	
	NORTHING: 5541534.43 EASTING: 330733.84	GROUND SURFACE 171.93					
2	SW-GRAVELLY SAND, fine to coarse angular to subangular gravel, fine to coarse grained, well graded, brown	169.80		1AR			
4	GC-CLAYEY GRAVEL, with fine to coarse sand, fine to coarse grained, low to medium plasticity, grey	168.89		2AR			
6	SW-GRAVELLY SAND, fine to coarse angular to subangular gravel, fine to coarse grained, well graded, brown	166.14		3AR			
	BEDROCK, brown/grey, iron staining	165.69					
	END OF BOREHOLE @ 6.25m BGS						
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 088877-WI.GPJ GHD\_Corp 24/5/19

# **Appendix F**

**2023 Environmental Monitoring Program  
Specification**



**Environmental Monitoring Program Specification - 2023**

**PROJECT:** New Landfill EMP  
**CLIENT:** Northwin Environmental  
**PROJECT NO.:** 11222680.15  
**PROJECT MANAGER:** Rose Marie Rocca

<b>MONITORING STAFF:</b>	<b>RESPONSIBILITY</b>
Kathleen Hasler	Field Lead
Caryn Wong	Field Technician
Stephanie Berton	Project Chemist
Tristan Habdas	Database Analyst

**LABORATORIES USED:** ALS Environmental, Burnaby, British Columbia

<b>AUTHORIZATION:</b>	<b>MONITORING EVENT(S)</b>	<b>PC/PM SIGNATURE</b>
	Mar/Apr, Jun, Aug/Sep, Nov	_____

Revision #	Date	Revision	GHD
1	January 2022	Specification was developed based on the DOCP, dated July 8, 2021	RMR
2	April 2022	Typo in 2022 EMP Spec was corrected, from MW12-17 to MW11-19.	RMR
3	August 2022	MW3-14 was added to the groundwater monitoring program as a downgradient compliance well, to be sampled semi-annually in 2022. This well was sampled in June 2022, as part of the original EMP, the analytical results will be for the New Landfill EMP as well. In 2023, this well will be sampled quarterly.	RMR
4	August 2022	MW12-22 was added to the groundwater monitoring specification as a downgradient compliance well following its installation, to be sampled quarterly.  Renamed LS1 to LDMP-1 and renamed LS2 to LDMP-2. Added LDS, LDMP-3 and LDMP-4. These changes were made to the leak detection monitoring program to account for as built conditions.  Added phenols to the leachate analytical parameter list, to be analyzed annually due to presence of wood waste.	RMR
5	September 2022	Updated QAQC Samples. Added LW-PFAS to field blank's analytical list in Q4.	KH

Revision #	Date	Revision	GHD
6	March 2023	<p>Added semi-annual water level monitoring to the full groundwater well network.</p> <p>Removed East and West surface water ditch from the EMP until final cover is placed on the New Landfill.</p> <p>Added Cell 1 West leachate sump to the quarterly leachate monitoring program. Samples will be collected following the discharge of waste to the cell.</p>	RMR
7	May 2023	<p>Perfluorinated compounds has been discontinued from the leachate analytical list since standards only apply to sites set out in Schedule 2 as item A4, C3, E10 or G1.</p> <p>For monitoring location TLIP, the sampler has been changed from GHD to Upland to reflect current field practices.</p>	RMR

Monitoring Schedule: Table 1  
Groundwater Analytical Parameters: Table 2  
Surface Water Analytical Parameters: Table 3  
Leachate Analytical Parameters Table 4  
Notes Page 7

**Note for Staff – Labelling error on casing:**

LFG1-22 labelled as “SVP1-22” on casing.  
LFG2-22 labelled as “SVP2-22” on casing.





**Environmental Monitoring Program Specification - 2023**  
**Monitoring Schedule**  
**New Landfill**

Monitoring Location	Purpose	Sample Matrix	Quarterly Hydraulic Monitoring	March/ April	June	August/ September	November
<b>Groundwater Monitoring (19 WL Locations, 12 Sampling Locations)</b>							
<b>Upgradient Monitoring Wells (5 Locations)</b>							
MW6-17	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW9-17	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW1-14	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW4A-15	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW4B-15	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
<b>Cross-Gradient Monitoring Wells (2 Locations)</b>							
MW2-14	To monitor cross-gradient groundwater quality.	WG	Q	√	√	√	√
MW2A-16	To monitor cross-gradient groundwater quality.	WG	Q	√	√	√	√
<b>Downgradient Compliance Monitoring Wells (4 Locations, 1 Proposed Location)</b>							
MW10-17	To monitor downgradient groundwater quality near the east property boundary.	WG	Q	√	√	√	√
MW12-22	To monitor downgradient groundwater quality at the south property boundary.	WG	Q	√	√	√	√
MW11-19	To monitor downgradient groundwater quality at the south east corner of the site.	WG	Q	√	√	√	√
MW3-14	To monitor groundwater quality immediately downgradient of Phase 1 East Landfill Cell.	WG	Q	√	√	√	√
MW13 (proposed)	To monitor groundwater quality immediately downgradient of the landfill. <b>Sample once installed.</b>	WG	Q	√	√	√	√
MW5A-15, MW5B-15, MW7-17, MW8-17, MW15A-18, MW15B-18, PZ1-19		WG	Q	-	-	-	-
<b>Surface Water Monitoring (4 Monitoring Locations, 2 Sampling Locations)</b>							
Rico Gauge	To <b>monitor</b> the water level in Rico Lake via surface water gauge.	N/A	Q	-	-	-	-
SW15-02	To monitor surface water quality in Rico Lake	WS	N/A	-	-	-	√
Mclvor Lake	To monitor the water level in Mclvor Lake via BC Hydro Data Records - use link in notes below. <b>Look up and record on day of monitoring event</b> - data is only available for a limited period on BC Hydro website <sup>1</sup>	N/A	Q	-	-	-	-
SW15-01	To monitor surface water quality in Mclvor Lake	WS	N/A	-	-	-	√
<b>Leachate Monitoring (3 Locations)</b>							
S06-21	To characterize leachate quality collected from the Leachate Sump at northeast end of Cell 1 West. Sampling location is from the leachate collection system sump riser pipe.	WL	N/A	√	√	√	√
TLIP	To assess leachate treatment performance and determine if changes to the treatment process are required. Upland to collect samples prior to discharge to the treated leachate infiltration pond (TLIP) to assess if quality meets the CSR DW Standards.	WL	N/A	-	-	-	-
S07-YY	To characterize leachate quality collected from the Leachate Sump in Cell 1 West. <b>Monitoring will begin once waste has been discharged to this cell.</b>	WL	N/A	√	√	√	√
<b>Leak Detection Monitoring Program (5 Locations)</b>							
LDS	To monitor leakage at the primary liner of the landfill as part of the Trigger Level Response Plan. If water is present, collect a sample. Access to the leak detection sump is on the north side of the landfill.	W	Q	√	√	√	√
LDMP-1	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the north side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-2	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the north side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-3	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the east side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-4	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the east side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
<b>Landfill Gas in Soil Monitoring (2 Locations)</b>							
LFG1-22	To monitor landfill gas migration.	n/a	Q <sup>2</sup>	-	-	-	√
LFG2-22	To monitor landfill gas migration.	n/a	Q <sup>2</sup>	-	-	-	√
<b>Field Quality Assurance/Quality Control (QA/QC)<sup>3</sup></b>							
Field Blank		WG	-	√	√	√	-
Trip Blank - BTEX/VPH Only		WL/W	-	-	-	-	√
Groundwater Duplicate		WG	-	√	√	√	√
Leachate Duplicate		WL	-	√	√	√	-

**Notes:**

<sup>1</sup> - Mclvor Lake water level. Look up current water level at the Ladore Dam: [https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver\\_island/ladore\\_ldr.html](https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver_island/ladore_ldr.html)

<sup>2</sup> - Collect water level only if screen is blocked and a landfill gas in soil cannot be measured.

<sup>3</sup> - The number of QC samples should be 20% of all samples collected within 48 hours of each other; and include duplicate, field blank, and trip blank samples for each parameter. Add QA/QC samples to the November event if 20% has not been reached.

Table 2

**Environmental Monitoring Program Specification - 2023**  
**Groundwater Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Groundwater (WG)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Dissolved CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√

Table 3

**Environmental Monitoring Program Specification - 2023**  
**Surface Water Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Surface Water (WS)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Water level at Rico Gauge	√	√	√	√
Record water level using BC Hydro Data Records - use link in Table 1.	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH) <sup>1</sup>	-	-	-	-

1 - If leachate concentrations for LEPH/HEPH are 80% within CSR 3.2 Aquatic Life Criteria, include LEPH/HEPH analysis in surface water during the next event



Table 4

**Environmental Monitoring Program Specification - 2023**  
**Leachate Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Leachate (WL)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Biological Oxygen Demand (Total) (BOD5)	√	√	√	√
Chemical Oxygen Demand (COD)	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√
BTEX/VPH	-	-	-	√
Phenols	-	-	-	√

Table 5

**Environmental Monitoring Program Specification - 2023**  
**Leak Detection Water Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Leak Detection Water (W)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Biological Oxygen Demand (BOD)	√	√	√	√
Chemical Oxygen Demand (COD)	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√
BTEX/VPH	-	-	-	√
Phenols	-	-	-	√

# **Appendix G**

**EMP Field Sample Keys and Laboratory  
Reports**

**Q1 2023 EMP FSK**  
**2023 Environmental Monitoring Program**  
**New Landfill, Upland**  
**Campbell River, British Columbia**

Sample Name	Location	Date	Time	Type	Matrix	Parent Sample Name	WaterDepth	DepthUnit	DryYesNo	Temperature	Temperature Unit	Field pH (s.u.)	ORP	ORP units	Conductivity	Conductivity Unit	Turbidity (NTU)	Dissolved Oxygen (DO)	DO Units	TDS	TDS Units
Rico Gauge~290323	Rico Gauge	03/29/2023	07:00	N	WG	-	1.88	m	No	-	-	-	-	-	-	-	-	-	-	-	-
LDS~290323	LDS	03/29/2023	07:00	N	WG	-	DRY	m BTOR	Yes	-	-	-	-	-	-	-	-	-	-	-	-
LDMP-1~290323	LDMP-1	03/29/2023	07:00	N	WG	-	DRY	m BTOR	Yes	-	-	-	-	-	-	-	-	-	-	-	-
LDMP-2~290323	LDMP-2	03/29/2023	07:00	N	WG	-	DRY	m BTOR	Yes	-	-	-	-	-	-	-	-	-	-	-	-
LDMP-3~290323	LDMP-3	03/29/2023	07:00	N	WG	-	DRY	m BTOR	Yes	-	-	-	-	-	-	-	-	-	-	-	-
LDMP-4~290323	LDMP-4	03/29/2023	07:00	N	WG	-	DRY	m BTOR	Yes	-	-	-	-	-	-	-	-	-	-	-	-
WG-11222680-280323-KH-01	MW2A-16	03/28/2023	13:00	N	WG	-	17.406	m BTOR	No	12.12	deg C	7.63	318	millivolts	62	uS/cm	3.5	8.32	mg/L	40	mg/L
WG-11222680-280323-KH-02	MW2-14	03/28/2023	14:10	N	WG	-	17.471	m BTOR	No	9.90	deg C	6.8	382	millivolts	110	uS/cm	2.8	11.07	mg/L	70	mg/L
WL-11222680-280323-KH-01	S06-21	03/28/2023	15:50	N	WG	-	17.440	m BTOR	No	16.53	deg C	7.67	-376	millivolts	3730	uS/cm	30.3	8.59	mg/L	2100	mg/L
WL-11222680-280323-KH-02	S06-21	03/28/2023	16:00	FD	WG	WL-11222680-280323-KH-01	17.440	m BTOR	No	16.53	deg C	7.67	-376	millivolts	3730	uS/cm	30.3	8.59	mg/L	2100	mg/L
WG-11222680-280323-KH-03	MW1-14	03/28/2023	17:45	N	WG	-	8.430	m BTOR	No	13.87	deg C	7.58	105	millivolts	199	uS/cm	24.0	8.96	mg/L	129	mg/L
WG-11222680-280323-KH-04	MW9-17	03/28/2023	18:45	N	WG	-	24.566	m BTOR	No	7.41	deg C	7.51	150	millivolts	45	uS/cm	3.3	10.82	mg/L	29	mg/L
WG-11222680-290323-KH-05	MW12-22	03/29/2023	10:45	N	WG	-	40.513	m BTOR	No	10.37	deg C	7.56	173	millivolts	124	uS/cm	0.5	11.53	mg/L	80	mg/L
WG-11222680-290323-KH-06	MW12-22	03/29/2023	10:55	FD	WG	WG-11222680-290323-KH-05	40.513	m BTOR	No	10.37	deg C	7.56	173	millivolts	124	uS/cm	0.5	11.53	mg/L	80	mg/L
WG-11222680-290323-KH-07	MW11-19	03/29/2023	13:45	N	WG	-	48.094	m BTOR	No	16.54	deg C	7.67	150	millivolts	171	uS/cm	18.0	-	mg/L	111	mg/L
WG-11222680-290323-KH-08	FIELD BLANK	03/29/2023	13:20	FB	WGQ	-	-	-	No	-	-	-	-	-	-	-	-	-	-	-	-
WG-11222680-290323-KH-09	MW10-17	03/29/2023	16:00	N	WG	-	42.028	m BTOR	No	12.33	deg C	7.65	140	millivolts	159	uS/cm	2.5	-	mg/L	103	mg/L
WG-11222680-KH-10	MW6-17	03/29/2023	17:00	N	WG	-	8.023	m BTOR	No	10.58	deg C	7.09	171	millivolts	432	uS/cm	800	-	mg/L	2810	mg/L







**Q4 2023 EMP FSK**  
**2023 Environmental Monitoring Program**  
**New Landfill, Upland**  
**Campbell River, British Columbia**

Location	Date Time	Sample Name	Matrix	Type	Parent Sample Name	Field pH (s.u.)	Conductivity	Conductivity Unit	Temperature	Temperature Unit	Turbidity (NTU)	ORP	ORP Units	Dissolved Oxygen (DO)	DO Units
MW9-17	11/27/2023 13:10:00	WG-11222680-271123-KH-01	WG	N	-	7.63	70	uS/cm	17.08	deg C	3.9	252	millivolts	9.13	mg/L
MW10-17	11/27/2023 14:15:00	WG-11222680-271123-KH-02	WG	N	-	7.98	350	uS/cm	10.84	deg C	3.4	256	millivolts	10.20	mg/L
MW1-14	11/27/2023 16:50:00	WG-11222680-271123-KH-05	WG	N	-	7.54	102	uS/cm	13.12	deg C	37.1	284	millivolts	9.77	mg/L
MW12-22	11/27/2023 16:00:00	WG-11222680-271123-KH-03	WG	N	-	7.25	323	uS/cm	9.48	deg C	2.6	288	millivolts	6.63	mg/L
MW12-22	11/27/2023 16:10:00	WG-11222680-271123-KH-04	WG	FD	WG-11222680-271123-KH-03	7.25	323	uS/cm	9.48	deg C	2.6	288	millivolts	6.63	mg/L
MW11-19	11/28/2023 09:30:00	WG-11222680-281123-KH-06	WG	N	-	7.37	286	uS/cm	10.72	deg C	5.6	251	millivolts	5.81	mg/L
SW15-01	11/28/2023 10:00:00	WS-11222680-281123-KH-01	WS	N	-	8.12	58	uS/cm	8.26	deg C	0	197	millivolts	7.12	mg/L
SW15-02	11/28/2023 10:30:00	WS-11222680-281123-KH-02	WS	N	-	7.57	62	uS/cm	6.33	deg C	2.0	207	millivolts	6.99	mg/L
MW2-14	11/28/2023 14:45:00	WG-11222680-281123-KH-07	WG	N	-	7.73	164	uS/cm	10.55	deg C	1.2	219	millivolts	11.37	mg/L
MW2A-16	11/28/2023 15:00:00	WG-11222680-281123-KH-08	WG	N	-	8.38	78	uS/cm	10.97	deg C	2.0	201	millivolts	10.82	mg/L
MW6-17	11/28/2023 16:30:00	WG-11222680-281123-KH-09	WG	N	-	7.19	420	uS/cm	9.64	deg C	37.8	210	millivolts	11.53	mg/L
S06-21	11/28/2023 14:45:00	WL-11222680-281123-KH-01	WL	N	-	6.53	3.35	uS/cm	9.61	deg C	9	60	millivolts	10.47	mg/L
MW3-14	11/29/2023 09:45:00	WG-11222680-291123-KH-10	WG	N	-	6.50	135	uS/cm	9.54	deg C	1.5	249	millivolts	7.26	mg/L



Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: c#689991-01-01, c#689994-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/04/05**  
 Report #: R3319089  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C322057**

**Received: 2023/03/30, 08:27**

Sample Matrix: Water  
 # Samples Received: 6

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2023/03/31	BBY6SOP-00026	SM 23 2320 B m
Biochemical Oxygen Demand	2	2023/03/31	2023/04/05	BBY6SOP-00045	SM 23 5210 B m
Chloride/Sulphate by Auto Colourimetry	6	N/A	2023/03/31	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
COD by Colorimeter	2	N/A	2023/04/01	BBY6SOP-00024	SM 23 5220 D m
Conductivity @25C	6	N/A	2023/03/31	BBY6SOP-00026	SM 23 2510 B m
Sulphide (as H2S) (1)	6	N/A	2023/04/04		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc	5	N/A	2023/04/04	BBY WI-00033	Auto Calc
Un-ionized Hydrogen Sulphide as S Calc	1	N/A	2023/04/05	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	4	N/A	2023/03/31	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	2	N/A	2023/04/05	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (2)	4	2023/04/04	2023/04/04	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Total) by CV	2	2023/04/04	2023/04/04	AB SOP-00084	BCMOE BCLM Oct2013 m
ICP-OES Dissolved Metals in Water (2)	2	N/A	2023/04/04	BBY7SOP-00018	EPA 6010d m
EPH in Water when PAH required	6	2023/04/04	2023/04/04	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2023/03/31	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (2)	4	N/A	2023/03/31	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2023/03/30	2023/04/04	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	2	2023/04/03	2023/04/04	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	6	N/A	2023/03/31	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate + Nitrite (N)	6	N/A	2023/03/31	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	6	N/A	2023/03/31	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N)	6	N/A	2023/03/31	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	6	2023/04/04	2023/04/04	BBY8SOP-00021	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (3)	6	N/A	2023/04/05	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals	6	N/A	2023/03/30	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (4)	6	N/A	2023/03/31	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide (1)	6	N/A	2023/04/04	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	6	2023/04/03	2023/04/04	BBY6SOP-00033	SM 23 2540 C m
EPH less PAH in Water by GC/FID (5)	6	N/A	2023/04/05	BBY WI-00033	Auto Calc
Total Suspended Solids (NFR)	2	2023/04/04	2023/04/05	BBY6SOP-00034	SM 24 2540 D m



Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: c#689991-01-01, c#689994-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/04/05**  
 Report #: R3319089  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C322057**

**Received: 2023/03/30, 08:27**

Sample Matrix: Water  
 # Samples Received: 6

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Field pH	5	N/A	2023/04/03	
Field Temperature	5	N/A	2023/04/03	

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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

- (1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
- (2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) Total PAHs in Water include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.
- (4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (5) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)
- HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)



Your P.O. #: 735-002640-3  
Your Project #: 11222680-15.1  
Site#: GROUNDWATER  
Site Location: NEW LANDFILL  
Your C.O.C. #: c#689991-01-01, c#689994-01-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/04/05**  
Report #: R3319089  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C322057**

**Received: 2023/03/30, 08:27**

Encryption Key



Bureau Veritas  
05 Apr 2023 16:17:43

Please direct all questions regarding this Certificate of Analysis to:  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response  
Email: Brody.Andersen@bureauveritas.com  
Phone# (780)577-7120

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



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BOG477	BOG478	BOG479	BOG480		
Sampling Date		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45	2023/03/28 17:45		
COC Number		c#689991-01-01	c#689991-01-01	c#689991-01-01	c#689991-01-01		
	UNITS	WG-11222680-280323 -KH-01	WG-11222680-280323 -KH-02	WG-11222680-280323 -KH-04	WG-11222680-280323 -KH-03	RDL	QC Batch
<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	0.0171	0.0050	A925477
<b>Calculated Parameters</b>							
Filter and HNO3 Preservatio	N/A	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.037	0.245	0.027	1.68	0.020	A923718
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	A923617
<b>Field Parameters</b>							
Field pH	pH	7.63	6.80	7.51	7.58	N/A	ONSITE
Field Temperature	°C	12.12	9.90	7.41	13.87	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	74	130	53	170	2.0	A925432
Total Dissolved Solids	mg/L	64	92	46	94	10	A926922
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	A925434
Alkalinity (Total as CaCO3)	mg/L	34	50	23	52	1.0	A925434
Bicarbonate (HCO3)	mg/L	41	62	28	63	1.0	A925434
Carbonate (CO3)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	A925434
Hydroxide (OH)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	A925434
Total Sulphide	mg/L	<0.0018	<0.0018	<0.0018	<0.0018	0.0018	A926674
Chloride (Cl)	mg/L	<1.0	3.3	<1.0	14	1.0	A925528
Sulphate (SO4)	mg/L	2.4	7.0	2.4	2.8	1.0	A925528
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	<0.015	<0.015	<0.015	0.015	A925542
Orthophosphate (P)	mg/L	0.030	0.0051	0.0037	0.0057	0.0030	A924129
Nitrate plus Nitrite (N)	mg/L	0.037	0.245	0.027	1.70	0.020	A925471
RDL = Reportable Detection Limit N/A = Not Applicable							



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BOG483	BOG483	BOG484		
Sampling Date		2023/03/28 16:00	2023/03/28 16:00	2023/03/28 15:50		
COC Number		c#689994-01-01	c#689994-01-01	c#689994-01-01		
	UNITS	WL-11222680-280323-KH-02	WL-11222680-280323-KH-02 Lab-Dup	WL-11222680-280323-KH-01	RDL	QC Batch
<b>ANIONS</b>						
Nitrite (N)	mg/L	0.0053	N/A	<0.0050	0.0050	A925477
<b>Calculated Parameters</b>						
Filter and HNO3 Preservatio	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Dissolved Hardness (CaCO3)	mg/L	1040	N/A	1010	0.50	A924022
Nitrate (N)	mg/L	<0.020	N/A	<0.020	0.020	A923718
Sulphide (as H2S)	mg/L	13	N/A	13	0.19	A923617
<b>Demand Parameters</b>						
Biochemical Oxygen Demand	mg/L	27	29	26	3.0	A924844
Chemical Oxygen Demand	mg/L	392	N/A	370	10	A925066
<b>Field Parameters</b>						
Field pH	pH	N/A	N/A	7.67	N/A	ONSITE
Field Temperature	°C	N/A	N/A	16.53	N/A	ONSITE
<b>Misc. Inorganics</b>						
Conductivity	uS/cm	3200	N/A	3200	2.0	A925432
Total Dissolved Solids	mg/L	2300	N/A	2300	10	A926922
Total Suspended Solids	mg/L	59	N/A	38	1.0	A927556
<b>Anions</b>						
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	<1.0	1.0	A925434
Alkalinity (Total as CaCO3)	mg/L	830	N/A	840	1.0	A925434
Bicarbonate (HCO3)	mg/L	1000	N/A	1000	1.0	A925434
Carbonate (CO3)	mg/L	<1.0	N/A	<1.0	1.0	A925434
Hydroxide (OH)	mg/L	<1.0	N/A	<1.0	1.0	A925434
Total Sulphide	mg/L	12	N/A	12	0.18	A926674
Chloride (Cl)	mg/L	190	N/A	190	5.0	A925528
Sulphate (SO4)	mg/L	720	N/A	730	25	A925528
<b>Nutrients</b>						
Total Ammonia (N)	mg/L	62	N/A	61	1.5	A925542
Orthophosphate (P)	mg/L	0.19	N/A	0.18	0.0030	A924129
Nitrate plus Nitrite (N)	mg/L	<0.020	N/A	<0.020	0.020	A925471
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable						





Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Bureau Veritas ID</b>		BOG483	BOG484		
<b>Sampling Date</b>		2023/03/28 16:00	2023/03/28 15:50		
<b>COC Number</b>		c#689994-01-01	c#689994-01-01		
	<b>UNITS</b>	<b>WL-11222680-280323- KH-02</b>	<b>WL-11222680-280323- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Dissolved Metals by ICP</b>					
Dissolved Calcium (Ca)	mg/L	354	339	0.50	A927966
Dissolved Magnesium (Mg)	mg/L	38.5	38.5	0.050	A927966
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
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 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BOG477	BOG478	BOG479		
<b>Sampling Date</b>		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45		
<b>COC Number</b>		c#689991-01-01	c#689991-01-01	c#689991-01-01		
	<b>UNITS</b>	<b>WG-11222680-280323-KH-01</b>	<b>WG-11222680-280323-KH-02</b>	<b>WG-11222680-280323-KH-04</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as H2	mg/L	<0.0050	<0.0050	<0.0050	0.0050	A924313
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BOG480	BOG483	BOG484		
<b>Sampling Date</b>		2023/03/28 17:45	2023/03/28 16:00	2023/03/28 15:50		
<b>COC Number</b>		c#689991-01-01	c#689994-01-01	c#689994-01-01		
	<b>UNITS</b>	<b>WG-11222680-280323-KH-03</b>	<b>WL-11222680-280323-KH-02</b>	<b>WL-11222680-280323-KH-01</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as H2	mg/L	<0.0050	CALCERROR	2.4	0.0050	A924313
RDL = Reportable Detection Limit						



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOG477	BOG478	BOG479	BOG480		
Sampling Date		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45	2023/03/28 17:45		
COC Number		c#689991-01-01	c#689991-01-01	c#689991-01-01	c#689991-01-01		
	UNITS	WG-11222680-280323 -KH-01	WG-11222680-280323 -KH-02	WG-11222680-280323 -KH-04	WG-11222680-280323 -KH-03	RDL	QC Batch

Calculated Parameters							
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A924067
High Molecular Weight PAH`	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A924067
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A924067

Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A927637
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A927637
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A927637
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A927637
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	A927637
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A927637
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	A927637
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637

Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A924068
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A924068

Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A927641
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A927641

RDL = Reportable Detection Limit



Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOG477	BOG478	BOG479	BOG480		
Sampling Date		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45	2023/03/28 17:45		
COC Number		c#689991-01-01	c#689991-01-01	c#689991-01-01	c#689991-01-01		
	<b>UNITS</b>	<b>WG-11222680-280323 -KH-01</b>	<b>WG-11222680-280323 -KH-02</b>	<b>WG-11222680-280323 -KH-04</b>	<b>WG-11222680-280323 -KH-03</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	101	100	97	100	N/A	A927641
D10-ANTHRACENE (sur.)	%	97	98	96	99	N/A	A927637
D8-ACENAPHTHYLENE (sur.)	%	88	88	85	89	N/A	A927637
D8-NAPHTHALENE (sur.)	%	83	82	80	84	N/A	A927637
TERPHENYL-D14 (sur.)	%	86	85	83	86	N/A	A927637
RDL = Reportable Detection Limit N/A = Not Applicable							



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOG483		BOG484		
Sampling Date		2023/03/28 16:00		2023/03/28 15:50		
COC Number		c#689994-01-01		c#689994-01-01		
	UNITS	WL-11222680-280323-KH-02	RDL	WL-11222680-280323-KH-01	RDL	QC Batch
<b>Calculated Parameters</b>						
Low Molecular Weight PAH's	ug/L	4.2	0.10	4.0	0.10	A924067
High Molecular Weight PAH`	ug/L	0.066	0.050	0.064	0.050	A924067
Total PAH	ug/L	4.2	0.10	4.0	0.10	A924067
<b>Polycyclic Aromatics</b>						
Quinoline	ug/L	<0.039 (1)	0.039	<0.037 (1)	0.037	A927637
Naphthalene	ug/L	3.1	0.10	3.0	0.10	A927637
1-Methylnaphthalene	ug/L	0.19	0.050	0.19	0.050	A927637
2-Methylnaphthalene	ug/L	0.28	0.10	0.27	0.10	A927637
Acenaphthylene	ug/L	<0.050	0.050	<0.050	0.050	A927637
Acenaphthene	ug/L	0.23	0.050	0.23	0.050	A927637
Fluorene	ug/L	0.11	0.050	0.10	0.050	A927637
Phenanthrene	ug/L	0.10	0.050	0.10	0.050	A927637
Anthracene	ug/L	0.026	0.010	0.025	0.010	A927637
Acridine	ug/L	0.096	0.050	0.093	0.050	A927637
Fluoranthene	ug/L	0.035	0.020	0.034	0.020	A927637
Pyrene	ug/L	0.031	0.020	0.030	0.020	A927637
Benzo(a)anthracene	ug/L	<0.010	0.010	<0.010	0.010	A927637
Chrysene	ug/L	<0.020	0.020	<0.020	0.020	A927637
Benzo(b&j)fluoranthene	ug/L	<0.030	0.030	<0.030	0.030	A927637
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	A927637
Benzo(a)pyrene	ug/L	<0.0050	0.0050	<0.0050	0.0050	A927637
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	A927637
Dibenz(a,h)anthracene	ug/L	<0.0030	0.0030	<0.0030	0.0030	A927637
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	<0.050	0.050	A927637
<b>Calculated Parameters</b>						
LEPH (C10-C19 less PAH)	mg/L	0.43	0.20	0.42	0.20	A924068
HEPH (C19-C32 less PAH)	mg/L	0.22	0.20	0.23	0.20	A924068
<b>Ext. Pet. Hydrocarbon</b>						
EPH (C10-C19)	mg/L	0.43	0.20	0.42	0.20	A927641
EPH (C19-C32)	mg/L	0.22	0.20	0.23	0.20	A927641
RDL = Reportable Detection Limit						
(1) Detection limit raised due to matrix interference.						



Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

<b>Bureau Veritas ID</b>		BOG483		BOG484		
<b>Sampling Date</b>		2023/03/28 16:00		2023/03/28 15:50		
<b>COC Number</b>		c#689994-01-01		c#689994-01-01		
	<b>UNITS</b>	<b>WL-11222680-280323- KH-02</b>	<b>RDL</b>	<b>WL-11222680-280323- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Surrogate Recovery (%)</b>						
O-TERPHENYL (sur.)	%	95	N/A	96	N/A	A927641
D10-ANTHRACENE (sur.)	%	88	N/A	88	N/A	A927637
D8-ACENAPHTHYLENE (sur.)	%	94	N/A	94	N/A	A927637
D8-NAPHTHALENE (sur.)	%	84	N/A	84	N/A	A927637
TERPHENYL-D14 (sur.)	%	79	N/A	80	N/A	A927637
RDL = Reportable Detection Limit N/A = Not Applicable						



**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

<b>Bureau Veritas ID</b>		BOG477	BOG478	BOG479	BOG480		
<b>Sampling Date</b>		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45	2023/03/28 17:45		
<b>COC Number</b>		c#689991-01-01	c#689991-01-01	c#689991-01-01	c#689991-01-01		
	<b>UNITS</b>	<b>WG-11222680-280323 -KH-01</b>	<b>WG-11222680-280323 -KH-02</b>	<b>WG-11222680-280323 -KH-04</b>	<b>WG-11222680-280323 -KH-03</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	33.8	55.2	24.6	78.4	0.50	A924022
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A927497
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	9.2	<3.0	<3.0	<3.0	3.0	A924870
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A924870
Dissolved Arsenic (As)	ug/L	0.96	<0.10	<0.10	<0.10	0.10	A924870
Dissolved Barium (Ba)	ug/L	2.0	1.4	<1.0	1.5	1.0	A924870
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A924870
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A924870
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	A924870
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A924870
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A924870
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A924870
Dissolved Copper (Cu)	ug/L	<0.20	0.26	<0.20	<0.20	0.20	A924870
Dissolved Iron (Fe)	ug/L	10.7	<5.0	<5.0	<5.0	5.0	A924870
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A924870
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A924870
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A924870
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A924870
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A924870
Dissolved Phosphorus (P)	ug/L	34	<10	<10	11	10	A924870
Dissolved Selenium (Se)	ug/L	<0.10	0.18	<0.10	0.14	0.10	A924870
Dissolved Silicon (Si)	ug/L	4210	5590	2610	5860	100	A924870
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A924870
Dissolved Strontium (Sr)	ug/L	13.7	28.0	10.6	41.9	1.0	A924870
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A924870
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A924870
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A924870
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A924870
Dissolved Vanadium (V)	ug/L	7.5	<5.0	<5.0	<5.0	5.0	A924870

RDL = Reportable Detection Limit





Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOG477	BOG478	BOG479	BOG480		
Sampling Date		2023/03/28 13:00	2023/03/28 14:10	2023/03/28 18:45	2023/03/28 17:45		
COC Number		c#689991-01-01	c#689991-01-01	c#689991-01-01	c#689991-01-01		
	UNITS	WG-11222680-280323 -KH-01	WG-11222680-280323 -KH-02	WG-11222680-280323 -KH-04	WG-11222680-280323 -KH-03	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A924870
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A924870
Dissolved Calcium (Ca)	mg/L	11.0	17.3	8.30	26.1	0.050	A924024
Dissolved Magnesium (Mg)	mg/L	1.50	2.91	0.940	3.23	0.050	A924024
Dissolved Potassium (K)	mg/L	0.177	0.201	0.112	0.264	0.050	A924024
Dissolved Sodium (Na)	mg/L	1.02	3.16	0.653	4.67	0.050	A924024
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	3.0	A924024
RDL = Reportable Detection Limit							



**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOG483	BOG484		
Sampling Date		2023/03/28 16:00	2023/03/28 15:50		
COC Number		c#689994-01-01	c#689994-01-01		
	UNITS	WL-11222680-280323-KH-02	WL-11222680-280323-KH-01	RDL	QC Batch
<b>Elements</b>					
Total Mercury (Hg)	ug/L	<0.038 (1)	<0.038 (1)	0.038	A927551
<b>Total Metals by ICPMS</b>					
Total Aluminum (Al)	ug/L	482	488	30	A926714
Total Antimony (Sb)	ug/L	<5.0	<5.0	5.0	A926714
Total Arsenic (As)	ug/L	19.1	19.3	1.0	A926714
Total Barium (Ba)	ug/L	120	124	10	A926714
Total Beryllium (Be)	ug/L	<1.0	<1.0	1.0	A926714
Total Bismuth (Bi)	ug/L	<10	<10	10	A926714
Total Boron (B)	ug/L	11600	12200	500	A926714
Total Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	A926714
Total Chromium (Cr)	ug/L	20	19	10	A926714
Total Cobalt (Co)	ug/L	2.6	2.9	2.0	A926714
Total Copper (Cu)	ug/L	7.2	7.5	5.0	A926714
Total Iron (Fe)	ug/L	2160	2290	100	A926714
Total Lead (Pb)	ug/L	<2.0	<2.0	2.0	A926714
Total Lithium (Li)	ug/L	<20	<20	20	A926714
Total Manganese (Mn)	ug/L	923	957	10	A926714
Total Molybdenum (Mo)	ug/L	<10	<10	10	A926714
Total Nickel (Ni)	ug/L	27	18	10	A926714
Total Phosphorus (P)	ug/L	558	572	100	A926714
Total Selenium (Se)	ug/L	<1.0	<1.0	1.0	A926714
Total Silicon (Si)	ug/L	14600	15000	1000	A926714
Total Silver (Ag)	ug/L	<0.20	<0.20	0.20	A926714
Total Strontium (Sr)	ug/L	2300	2370	10	A926714
Total Thallium (Tl)	ug/L	<0.10	<0.10	0.10	A926714
Total Tin (Sn)	ug/L	<50	<50	50	A926714
Total Titanium (Ti)	ug/L	<50	<50	50	A926714
Total Uranium (U)	ug/L	<1.0	<1.0	1.0	A926714
Total Vanadium (V)	ug/L	<50	<50	50	A926714
Total Zinc (Zn)	ug/L	<50	51	50	A926714
RDL = Reportable Detection Limit					
(1) Detection limit raised based on sample volume used and sample matrix					



Bureau Veritas Job #: C322057  
 Report Date: 2023/04/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOG483	BOG484		
Sampling Date		2023/03/28 16:00	2023/03/28 15:50		
COC Number		c#689994-01-01	c#689994-01-01		
	UNITS	WL-11222680-280323- KH-02	WL-11222680-280323- KH-01	RDL	QC Batch
Total Zirconium (Zr)	ug/L	1.4	1.5	1.0	A926714
Total Calcium (Ca)	mg/L	357	366	0.50	A924188
Total Magnesium (Mg)	mg/L	41.1	41.9	0.50	A924188
Total Potassium (K)	mg/L	48.9	50.0	0.50	A924188
Total Sodium (Na)	mg/L	235	240	0.50	A924188
Total Sulphur (S)	mg/L	241	248	30	A924188
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C322057  
Report Date: 2023/04/05

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### GENERAL COMMENTS

Results relate only to the items tested.



### QUALITY ASSURANCE REPORT

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A927637	D10-ANTHRACENE (sur.)	2023/04/04			94	50 - 140	104	%		
A927637	D8-ACENAPHTHYLENE (sur.)	2023/04/04			91	50 - 140	93	%		
A927637	D8-NAPHTHALENE (sur.)	2023/04/04			84	50 - 140	87	%		
A927637	TERPHENYL-D14 (sur.)	2023/04/04			87	50 - 140	92	%		
A927641	O-TERPHENYL (sur.)	2023/04/04			96	60 - 140	103	%		
A924129	Orthophosphate (P)	2023/03/31	97	80 - 120	101	80 - 120	<0.0030	mg/L	2.7 (1)	20
A924844	Biochemical Oxygen Demand	2023/04/05			93	85 - 115	<2.0	mg/L	7.7 (2)	20
A924870	Dissolved Aluminum (Al)	2023/03/31	97	80 - 120	102	80 - 120	<3.0	ug/L	5.1 (1)	20
A924870	Dissolved Antimony (Sb)	2023/03/31	101	80 - 120	104	80 - 120	<0.50	ug/L	NC (1)	20
A924870	Dissolved Arsenic (As)	2023/03/31	104	80 - 120	103	80 - 120	<0.10	ug/L	2.0 (1)	20
A924870	Dissolved Barium (Ba)	2023/03/31	NC	80 - 120	102	80 - 120	<1.0	ug/L	0.72 (1)	20
A924870	Dissolved Beryllium (Be)	2023/03/31	93	80 - 120	98	80 - 120	<0.10	ug/L	NC (1)	20
A924870	Dissolved Bismuth (Bi)	2023/03/31	93	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
A924870	Dissolved Boron (B)	2023/03/31	95	80 - 120	101	80 - 120	<50	ug/L	1.7 (1)	20
A924870	Dissolved Cadmium (Cd)	2023/03/31	96	80 - 120	102	80 - 120	<0.010	ug/L	NC (1)	20
A924870	Dissolved Chromium (Cr)	2023/03/31	95	80 - 120	102	80 - 120	<1.0	ug/L	NC (1)	20
A924870	Dissolved Cobalt (Co)	2023/03/31	91	80 - 120	98	80 - 120	<0.20	ug/L	1.0 (1)	20
A924870	Dissolved Copper (Cu)	2023/03/31	89	80 - 120	98	80 - 120	<0.20	ug/L	3.9 (1)	20
A924870	Dissolved Iron (Fe)	2023/03/31	NC	80 - 120	105	80 - 120	<5.0	ug/L	0.37 (1)	20
A924870	Dissolved Lead (Pb)	2023/03/31	93	80 - 120	100	80 - 120	<0.20	ug/L	NC (1)	20
A924870	Dissolved Lithium (Li)	2023/03/31	89	80 - 120	95	80 - 120	<2.0	ug/L	4.8 (1)	20
A924870	Dissolved Manganese (Mn)	2023/03/31	NC	80 - 120	102	80 - 120	<1.0	ug/L	0.21 (1)	20
A924870	Dissolved Molybdenum (Mo)	2023/03/31	101	80 - 120	107	80 - 120	<1.0	ug/L	1.6 (1)	20
A924870	Dissolved Nickel (Ni)	2023/03/31	94	80 - 120	101	80 - 120	<1.0	ug/L	1.1 (1)	20
A924870	Dissolved Phosphorus (P)	2023/03/31	106	80 - 120	104	80 - 120	<10	ug/L	3.9 (1)	20
A924870	Dissolved Selenium (Se)	2023/03/31	104	80 - 120	103	80 - 120	<0.10	ug/L	NC (1)	20
A924870	Dissolved Silicon (Si)	2023/03/31	NC	80 - 120	109	80 - 120	<100	ug/L	0.75 (1)	20
A924870	Dissolved Silver (Ag)	2023/03/31	96	80 - 120	103	80 - 120	<0.020	ug/L	NC (1)	20
A924870	Dissolved Strontium (Sr)	2023/03/31	NC	80 - 120	102	80 - 120	<1.0	ug/L	0.55 (1)	20
A924870	Dissolved Thallium (Tl)	2023/03/31	96	80 - 120	102	80 - 120	<0.010	ug/L	NC (1)	20
A924870	Dissolved Tin (Sn)	2023/03/31	97	80 - 120	104	80 - 120	<5.0	ug/L	NC (1)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A924870	Dissolved Titanium (Ti)	2023/03/31	98	80 - 120	104	80 - 120	<5.0	ug/L	NC (1)	20
A924870	Dissolved Uranium (U)	2023/03/31	99	80 - 120	103	80 - 120	<0.10	ug/L	3.4 (1)	20
A924870	Dissolved Vanadium (V)	2023/03/31	97	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
A924870	Dissolved Zinc (Zn)	2023/03/31	NC	80 - 120	105	80 - 120	<5.0	ug/L	0.94 (1)	20
A924870	Dissolved Zirconium (Zr)	2023/03/31	99	80 - 120	104	80 - 120	<0.10	ug/L	8.3 (1)	20
A925066	Chemical Oxygen Demand	2023/04/01	NC	80 - 120	99	80 - 120	<10	mg/L	1.0 (1)	20
A925432	Conductivity	2023/03/31			102	80 - 120	<2.0	uS/cm		
A925434	Alkalinity (PP as CaCO3)	2023/03/31					<1.0	mg/L	NC (1)	20
A925434	Alkalinity (Total as CaCO3)	2023/03/31	NC	80 - 120	91	80 - 120	<1.0	mg/L	0.96 (1)	20
A925434	Bicarbonate (HCO3)	2023/03/31					<1.0	mg/L	0.96 (1)	20
A925434	Carbonate (CO3)	2023/03/31					<1.0	mg/L	NC (1)	20
A925434	Hydroxide (OH)	2023/03/31					<1.0	mg/L	NC (1)	20
A925471	Nitrate plus Nitrite (N)	2023/03/31	NC	80 - 120	104	80 - 120	<0.020	mg/L	0.51 (1)	25
A925477	Nitrite (N)	2023/03/31	97	80 - 120	98	80 - 120	<0.0050	mg/L	NC (1)	20
A925528	Chloride (Cl)	2023/03/31	104	80 - 120	99	80 - 120	<1.0	mg/L	1.5 (1)	20
A925528	Sulphate (SO4)	2023/03/31	NC	80 - 120	100	80 - 120	<1.0	mg/L	1.4 (1)	20
A925542	Total Ammonia (N)	2023/03/31	107	80 - 120	104	80 - 120	<0.015	mg/L	2.3 (1)	20
A926674	Total Sulphide	2023/04/04	85	80 - 120	81	80 - 120	<0.0018	mg/L	8.0 (1)	20
A926714	Total Aluminum (Al)	2023/04/04	102	80 - 120	102	80 - 120	<3.0	ug/L	5.4 (1)	20
A926714	Total Antimony (Sb)	2023/04/04	103	80 - 120	101	80 - 120	<0.50	ug/L	NC (1)	20
A926714	Total Arsenic (As)	2023/04/04	106	80 - 120	101	80 - 120	<0.10	ug/L	3.6 (1)	20
A926714	Total Barium (Ba)	2023/04/04	98	80 - 120	99	80 - 120	<1.0	ug/L	0.60 (1)	20
A926714	Total Beryllium (Be)	2023/04/04	95	80 - 120	100	80 - 120	<0.10	ug/L	NC (1)	20
A926714	Total Bismuth (Bi)	2023/04/04	95	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
A926714	Total Boron (B)	2023/04/04	NC	80 - 120	110	80 - 120	<50	ug/L	1.0 (1)	20
A926714	Total Cadmium (Cd)	2023/04/04	95	80 - 120	100	80 - 120	<0.010	ug/L	NC (1)	20
A926714	Total Chromium (Cr)	2023/04/04	99	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
A926714	Total Cobalt (Co)	2023/04/04	92	80 - 120	94	80 - 120	<0.20	ug/L	3.7 (1)	20
A926714	Total Copper (Cu)	2023/04/04	93	80 - 120	96	80 - 120	<0.50	ug/L	2.3 (1)	20
A926714	Total Iron (Fe)	2023/04/04	113	80 - 120	114	80 - 120	<10	ug/L	NC (1)	20
A926714	Total Lead (Pb)	2023/04/04	93	80 - 120	99	80 - 120	<0.20	ug/L	NC (1)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A926714	Total Lithium (Li)	2023/04/04	89	80 - 120	96	80 - 120	<2.0	ug/L	4.5 (1)	20
A926714	Total Manganese (Mn)	2023/04/04	NC	80 - 120	101	80 - 120	<1.0	ug/L	4.5 (1)	20
A926714	Total Molybdenum (Mo)	2023/04/04	143 (3)	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
A926714	Total Nickel (Ni)	2023/04/04	92	80 - 120	99	80 - 120	<1.0	ug/L	NC (1)	20
A926714	Total Phosphorus (P)	2023/04/04	107	80 - 120	102	80 - 120	<10	ug/L	NC (1)	20
A926714	Total Selenium (Se)	2023/04/04	104	80 - 120	102	80 - 120	<0.10	ug/L	NC (1)	20
A926714	Total Silicon (Si)	2023/04/04	103	80 - 120	111	80 - 120	<100	ug/L	0.15 (1)	20
A926714	Total Silver (Ag)	2023/04/04	100	80 - 120	100	80 - 120	<0.020	ug/L	NC (1)	20
A926714	Total Strontium (Sr)	2023/04/04	NC	80 - 120	101	80 - 120	<1.0	ug/L	2.4 (1)	20
A926714	Total Thallium (Tl)	2023/04/04	100	80 - 120	101	80 - 120	<0.010	ug/L	NC (1)	20
A926714	Total Tin (Sn)	2023/04/04	107	80 - 120	100	80 - 120	<5.0	ug/L	NC (1)	20
A926714	Total Titanium (Ti)	2023/04/04	108	80 - 120	100	80 - 120	<5.0	ug/L	NC (1)	20
A926714	Total Uranium (U)	2023/04/04	99	80 - 120	102	80 - 120	<0.10	ug/L	NC (1)	20
A926714	Total Vanadium (V)	2023/04/04	104	80 - 120	101	80 - 120	<5.0	ug/L	NC (1)	20
A926714	Total Zinc (Zn)	2023/04/04	89	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
A926714	Total Zirconium (Zr)	2023/04/04	96	80 - 120	101	80 - 120	<0.10	ug/L	NC (1)	20
A926922	Total Dissolved Solids	2023/04/04	98	80 - 120	102	80 - 120	<10	mg/L	5.7 (1)	20
A927497	Dissolved Mercury (Hg)	2023/04/04	95	80 - 120	100	80 - 120	<0.0019	ug/L	NC (1)	20
A927551	Total Mercury (Hg)	2023/04/04	95	80 - 120	96	80 - 120	<0.0019	ug/L	NC (1)	20
A927556	Total Suspended Solids	2023/04/05	103	80 - 120	103	80 - 120	<1.0	mg/L	NC (1)	20
A927637	1-Methylnaphthalene	2023/04/04			91	50 - 140	<0.050	ug/L		
A927637	2-Methylnaphthalene	2023/04/04			87	50 - 140	<0.10	ug/L		
A927637	Acenaphthene	2023/04/04			91	50 - 140	<0.050	ug/L		
A927637	Acenaphthylene	2023/04/04			89	50 - 140	<0.050	ug/L		
A927637	Acridine	2023/04/04			98	50 - 140	<0.050	ug/L		
A927637	Anthracene	2023/04/04			96	50 - 140	<0.010	ug/L		
A927637	Benzo(a)anthracene	2023/04/04			94	50 - 140	<0.010	ug/L		
A927637	Benzo(a)pyrene	2023/04/04			95	50 - 140	<0.0050	ug/L		
A927637	Benzo(b&j)fluoranthene	2023/04/04			94	50 - 140	<0.030	ug/L		
A927637	Benzo(g,h,i)perylene	2023/04/04			89	50 - 140	<0.050	ug/L		
A927637	Benzo(k)fluoranthene	2023/04/04			99	50 - 140	<0.050	ug/L		





**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A927637	Chrysene	2023/04/04			98	50 - 140	<0.020	ug/L		
A927637	Dibenz(a,h)anthracene	2023/04/04			90	50 - 140	<0.0030	ug/L		
A927637	Fluoranthene	2023/04/04			85	50 - 140	<0.020	ug/L		
A927637	Fluorene	2023/04/04			89	50 - 140	<0.050	ug/L		
A927637	Indeno(1,2,3-cd)pyrene	2023/04/04			92	50 - 140	<0.050	ug/L		
A927637	Naphthalene	2023/04/04			88	50 - 140	<0.10	ug/L		
A927637	Phenanthrene	2023/04/04			87	50 - 140	<0.050	ug/L		
A927637	Pyrene	2023/04/04			84	50 - 140	<0.020	ug/L		
A927637	Quinoline	2023/04/04			107	50 - 140	<0.020	ug/L		
A927641	EPH (C10-C19)	2023/04/04			86	70 - 130	<0.20	mg/L		
A927641	EPH (C19-C32)	2023/04/04			108	70 - 130	<0.20	mg/L		
A927966	Dissolved Calcium (Ca)	2023/04/04	NC (4)	80 - 120	99	80 - 120	<0.050	mg/L		
A927966	Dissolved Magnesium (Mg)	2023/04/04	NC (4)	80 - 120	91	80 - 120	<0.050	mg/L		

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Duplicate Parent ID [BOG483-09]

(3) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(4) Matrix Spike Parent ID [BOG483-03]



Bureau Veritas Job #: C322057  
Report Date: 2023/04/05

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Saya Hatton, Sample Logistics – PSS



Automated Statchk

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.


1/2

INVOICE TO:		Report Information				Project Information				Laboratory Use Only							
Company Name: #163 GHD Limited		Company Name: GHD Limited				Quotation #: C30090				Bureau Veritas Job #							
Contact Name: AP Invoices - 735		Contact Name: Stephanie Berton				P.O. #: 735-002640-3				Bottle Order #:							
Address: 455 PHILLIP STREET		Address: stephanie.berton@ghd.com				Project #: 11222680-15.1				Chain Of Custody Record							
Address: WATERLOO ON N2L 3X2		Address: kathleen.hasler@ghd.com				Project Name: Upland-Newland Hill				Project Manager							
Phone: (519) 884-0510		Phone: rosemarie.rocco@ghd.com				Site #: Groundwater				Bottle Anderson							
Email: APInvoices735@ghd.com		Email: NationalEODSupport@mbouah.ca, stephanie.berton@ghd.com				Sampled By: Kathleen Hasler				CE05091-01-01							
Regulatory Criteria:		Special Instructions: ghd.com metals All bottles were filtered as required.				ANALYSIS REQUESTED (PLEASE BE SPECIFIC)				Turnaround Time (TAT) Required:							
<input type="checkbox"/> CDR		Metals Field Filtered? (Y/N)				Conductivity, Cl, SO4, NO2, NO3, N-N, PO4				Regular (Standard) TAT: (not to be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are > 5 days - contact your Project Manager for details.							
<input type="checkbox"/> CCME														Speciated Alkalinity			
<input type="checkbox"/> BC Water Quality		Sulphide + H2S Calc (Total)				1 DAY <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: _____				Rush Confirmation Number: _____ (call lab for #)							
<input type="checkbox"/> Other _____		Sulphide, Un-ionized (as H2S) (Calc)				Total Dissolved Solids (Filt. Residue)				Rush Confirmation Number: _____ (call lab for #)							
		Ammonia-N (Total)				LEPHEPH with subtracted parts (incl. PAM/EPH)											
		Dissolved Metals with CV Hg, Hardness (also with Hg, Al, Mn, Ni)				Field pH											
		Field Temperature				Field Temperature											
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																	
Sample Barcode Label	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4	Speciated Alkalinity	Sulphide + H2S Calc (Total)	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness (also with Hg, Al, Mn, Ni)	Total Dissolved Solids (Filt. Residue)	LEPHEPH with subtracted parts (incl. PAM/EPH)	Field pH	Field Temperature	# of Bottles	Comments
WG-11222680-280323-KH-01		28/03/23	1300	W	Y	X	X	X	X	X	X	X	X				
WG-11222680-280323-KH-02		28/03/23	1410	W	Y	X	X	X	X	X	X	X	X				
WG-11222680-280323-KH-04		28/03/23	1845	W	Y	X	X	X	X	X	X	X	X				
WG-11222680-280323-KH-03		28/03/23	1745	W	Y	X	X	X	X	X	X	X	X				
RELINQUISHED BY: (Signature/Print)		Date: (YYMMDD)		Time		RECEIVED BY: (Signature/Print)		Date: (YYMMDD)		Time		# Jars used and not subsampled		Lab Use Only		Cavity Seal Intact on Cooler?	
Kathleen Hasler		23/03/23		0600		Stephanie Berton		23/03/23		0627				Temp/Time		Temperature (°C) on Receipt: 4, 4, 4	
* UNLESS OTHERWISE ADVISED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL/LABORATORIES/RESOURCES/SCOC-TERMS-AND-CONDITIONS.												Wet: Bureau Veritas		Wet: Client			
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.																	



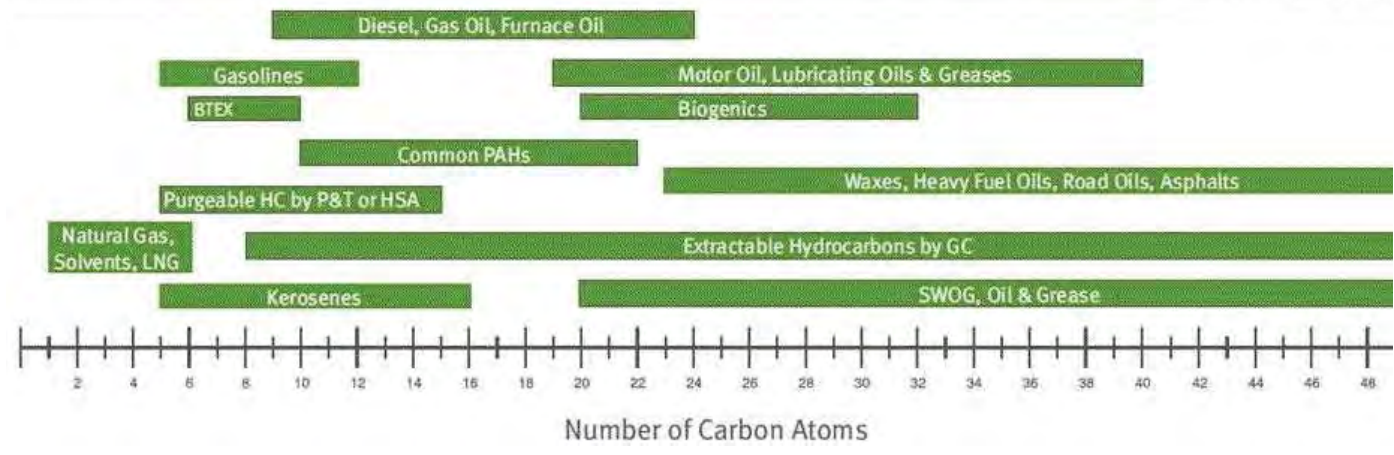
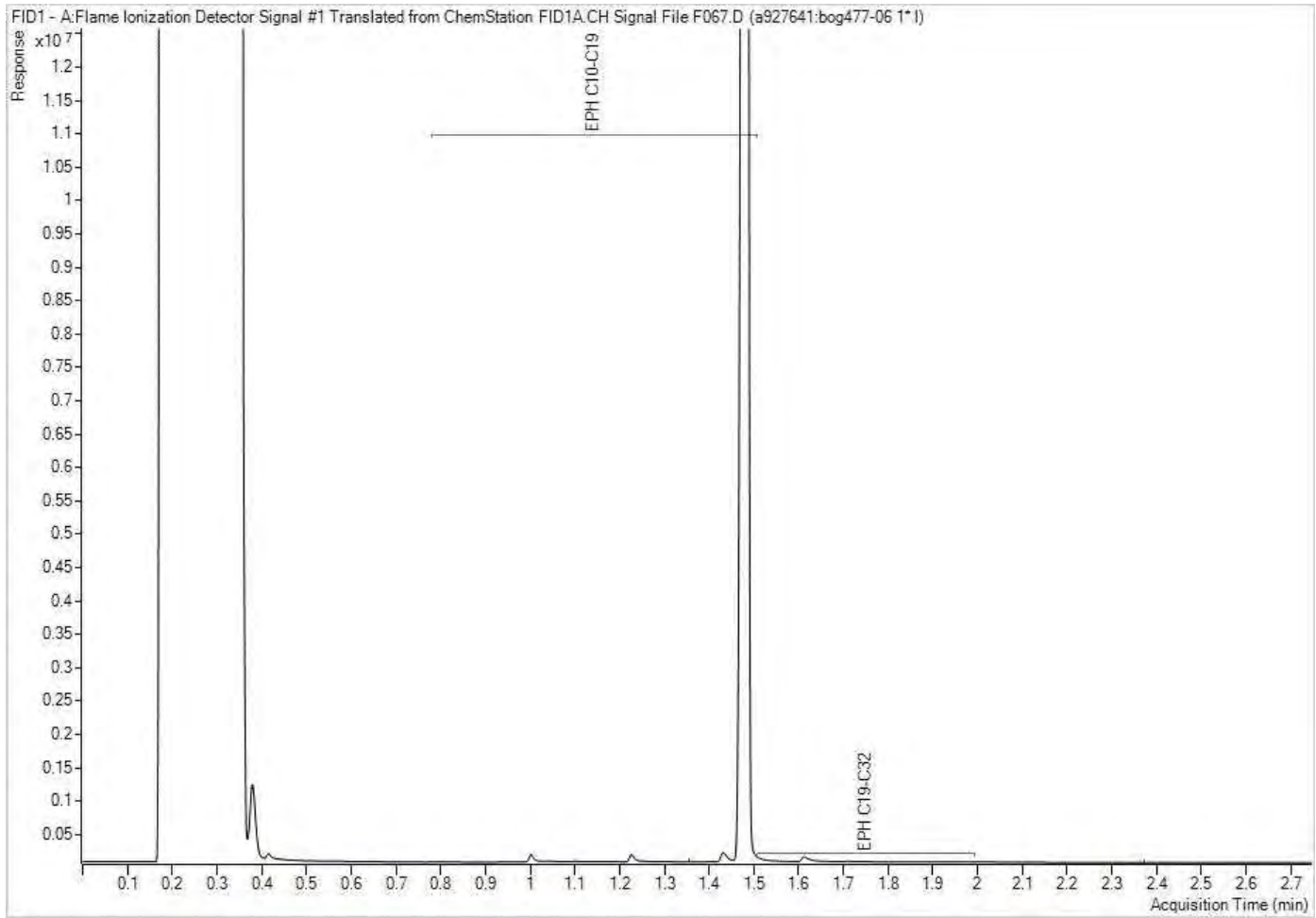
ice jef



INVOICE TO:		Report Information				Project Information				Laboratory Use Only							
Conpany Name: #163 GHD Limited Contact Name: AP Invoices - 735 Address: 455 PHILLIP STREET WATERLOO ON N2L 3X2 Phone: (519) 884-0510 Fax: (519) 725-1394 Email: <del>APinvoices@ghd.com</del> <del>invoices@canada.g</del>		Company Name: GHD Limited Contact Name: Stephanie Berton Address: Stephanie.berlon@ghd.com Rosemarie.nocca@ghd.com Email: NationalEODSupport@maxam.ca; stephanie.berlon@ghd.com				Quotation #: C30090 P.O #: 735-002640-3 Project #: 11222680-15 Project Name: Upward Landfill Site #: Leachate Water Sampled By: Kathleen Hasler				Bureau Veritas Job #: Bottle Order #:  Chain Of Custody Record: Project Manager: Brody Anderson: C659994-01-01							
Regulatory Criteria: <input type="checkbox"/> CSR <input type="checkbox"/> CCME <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other:		Special Instructions: dissolved hardness bottles field filtered as required				ANALYSIS REQUESTED (PLEASE BE SPECIFIC): Metals Field Filtered? (Y/N) Conductivity, Cl, SO4, NO2, NO3, N-N, PO4, TDS, TSS, Sp. Ak Total Sulphide, Total H2S, Un-ionized (as H2S) - based on total Ammonia-N (Total) Total Metals with CV Hg (NO-NH4) HARDNESS Total Biochemical Oxygen Demand COD Dissolved Hardness LEPM/MEP with subtracted PAHs (incl. PAH/LEPH) Field pH Field Temperature				Turnaround Time (TAT) Required: Please provide advance notice for rush projects. Regular (Standard) TAT: (will be applied if Rush TAT is not specified). Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Oxidins/Furans are > 5 days - contact your Project Manager for details. <input checked="" type="checkbox"/> Regular (Standard) TAT Job Specific Rush TAT (if applies to entire submission) 1 DAY <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: <input type="checkbox"/> Rush Confirmation Number: (call lab for #)							
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4, TDS, TSS, Sp. Ak	Total Sulphide, Total H2S, Un-ionized (as H2S) - based on total	Ammonia-N (Total)	Total Metals with CV Hg (NO-NH4) HARDNESS	Total Biochemical Oxygen Demand	COD	Dissolved Hardness	LEPM/MEP with subtracted PAHs (incl. PAH/LEPH)	Field pH	Field Temperature	# of Bottles	Comments
WL-11222680-280323-KH-01	28/03/23	1600	W		X	X	X	X	X	X	X	X	X				
WL-11222680-280323-KH-01	28/03/23	1550	W		X	X	X	X	X	X	X	X	X				
RELINQUISHED BY: (Signature/Print) Kathleen Hasler		Date: (YYMMDD) 23/03/23	Time 0600	RECEIVED BY: (Signature/Print) Brody Anderson		Date: (YYMMDD) 23/03/23	Time 0817	# Jars used and not submitted		Lab Use Only Test sensitive <input type="checkbox"/> Temperature (°C) on Receipt: 4.1, 4		Custody Seal intact on Receipt? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
* UNLESS OTHERWISE AGREED TO BY WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORY-SERVICES/COC-TERMS-AND-CONDITIONS.												Yellow: Client					
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.												Yellow: Client					

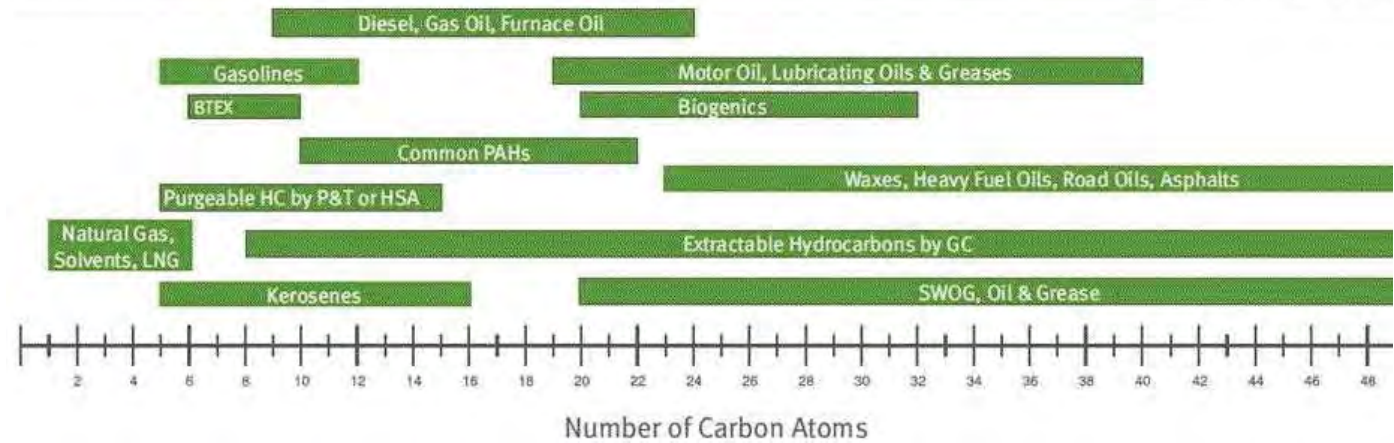
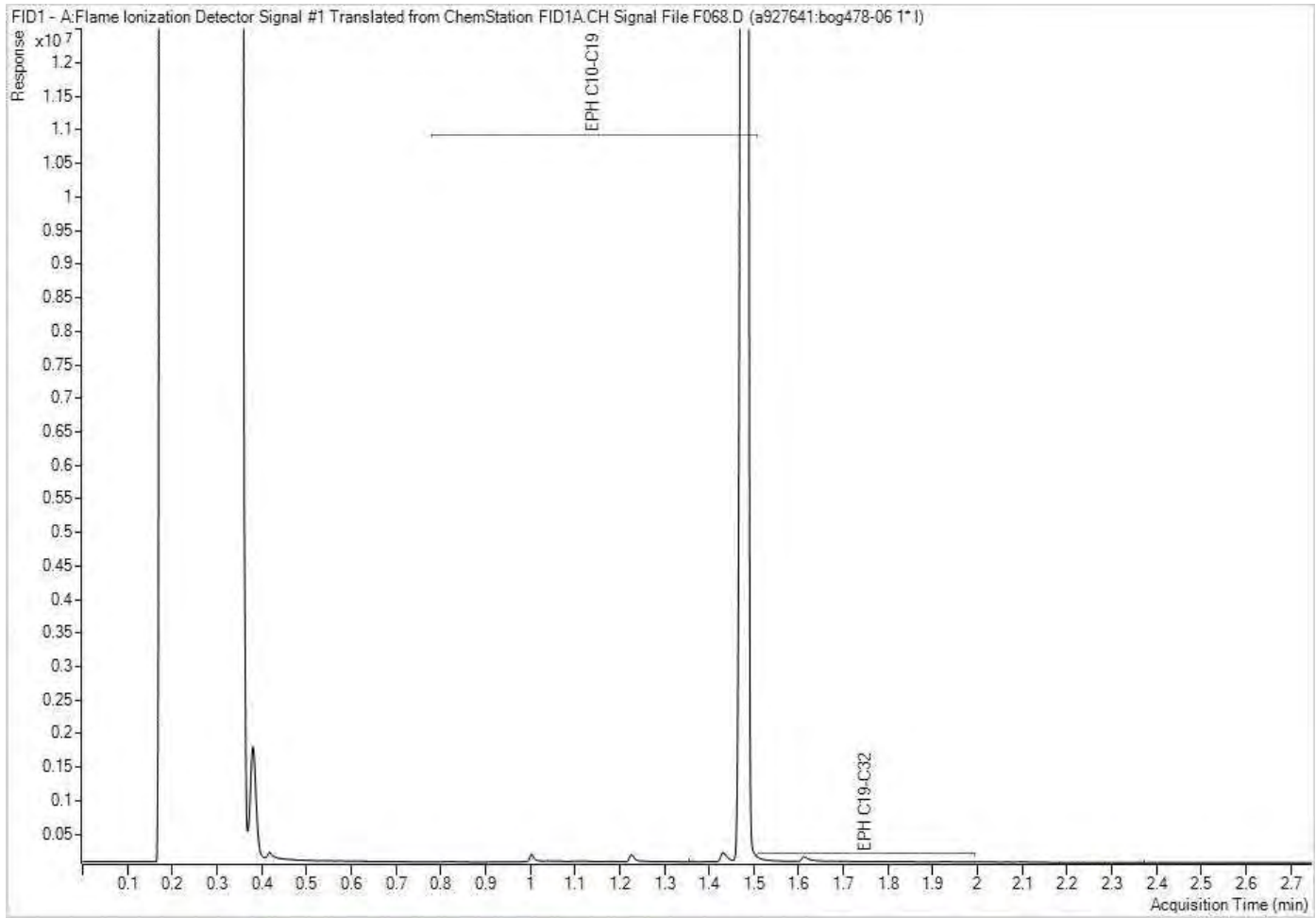


**EPH in Water when PAH required Chromatogram**



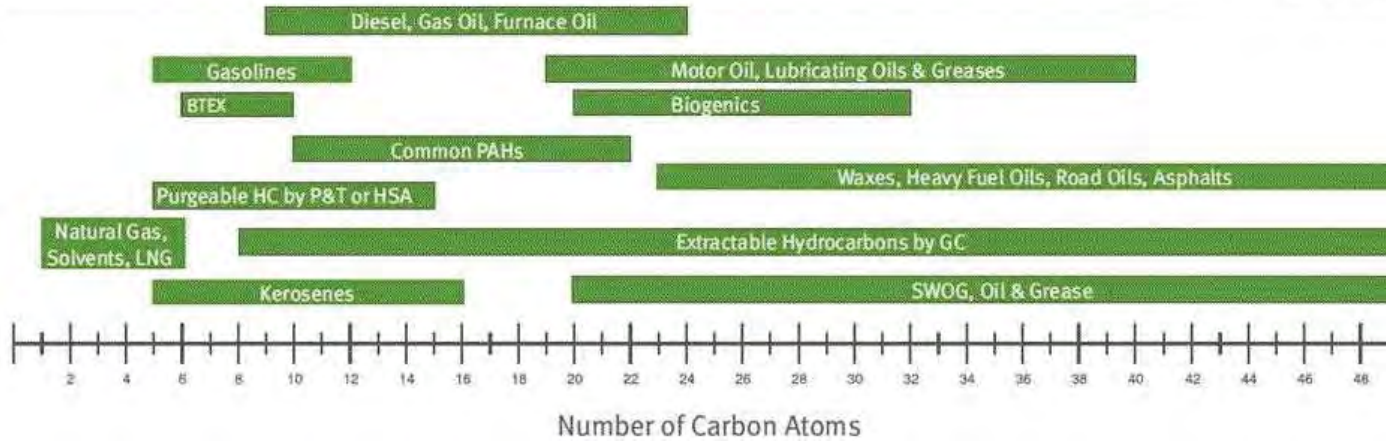
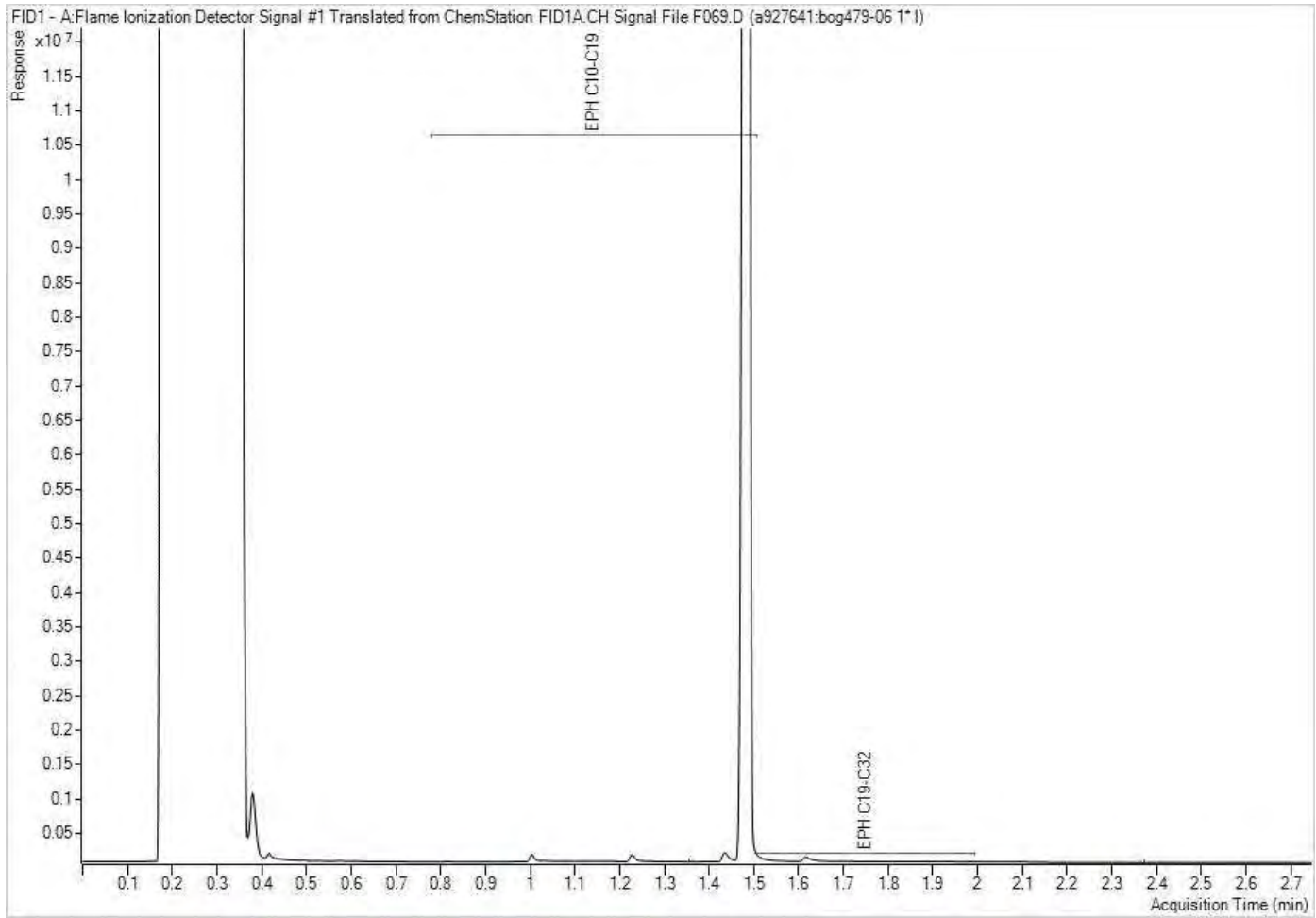
**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

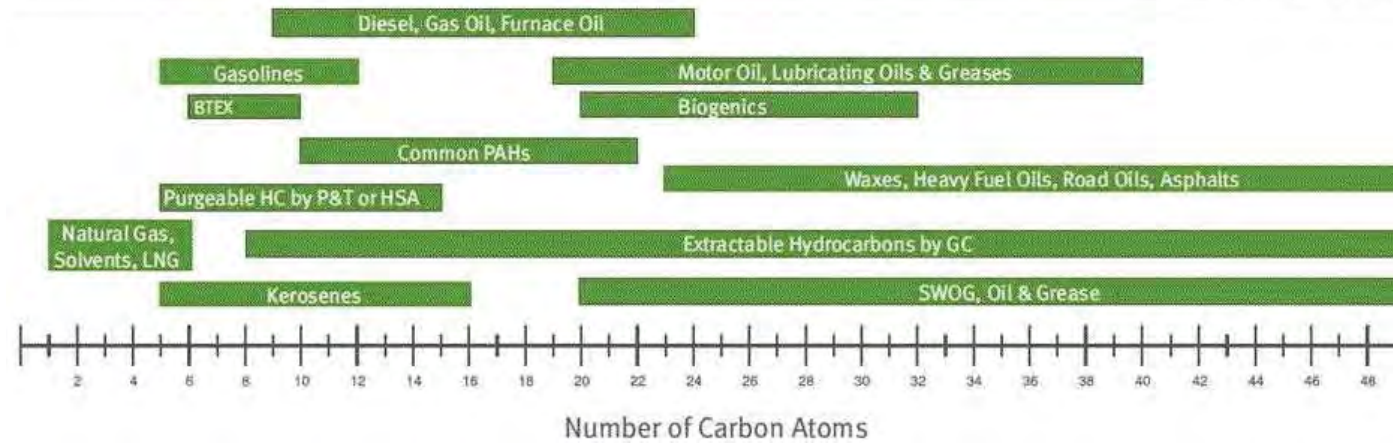
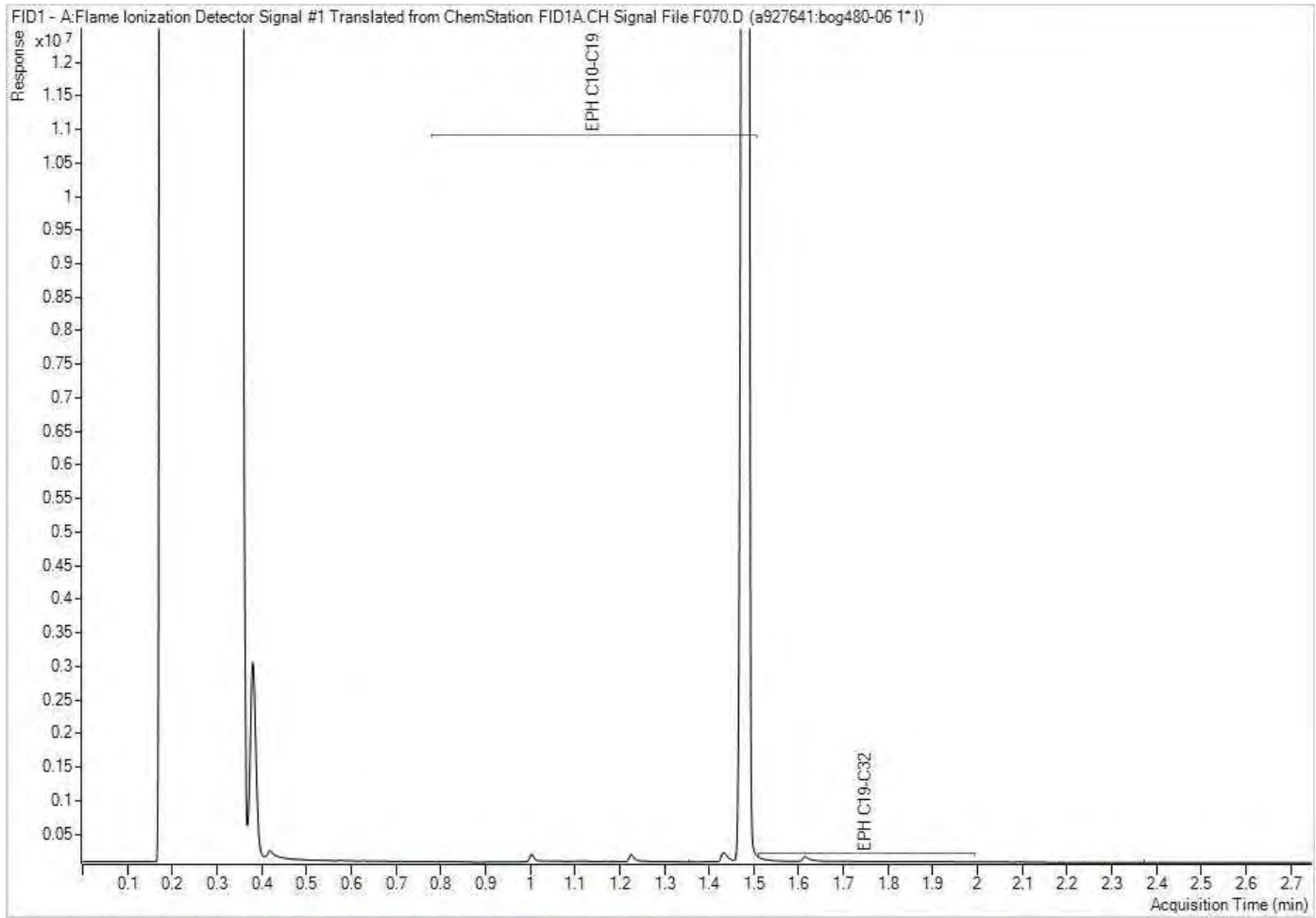
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

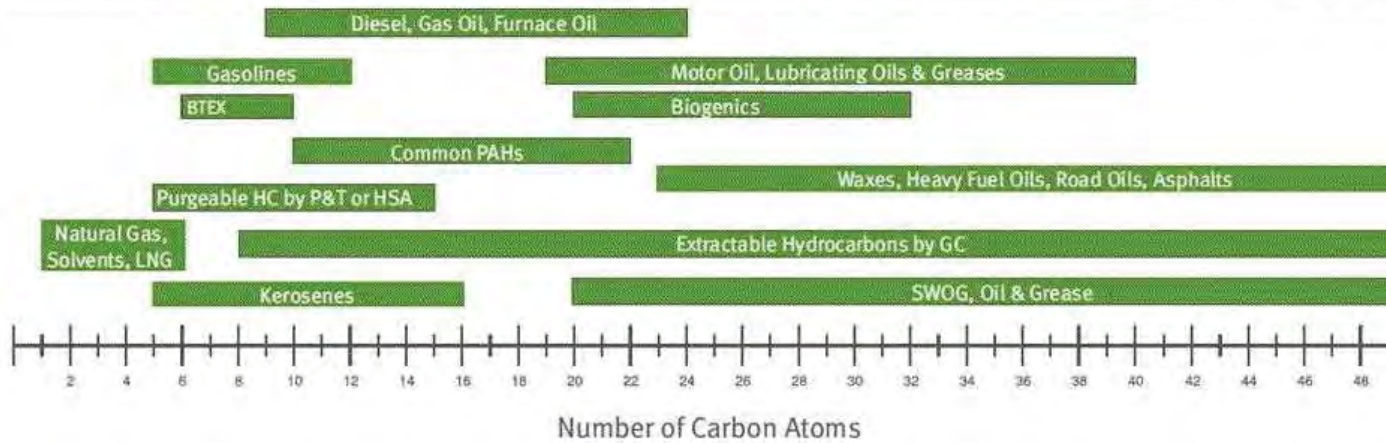
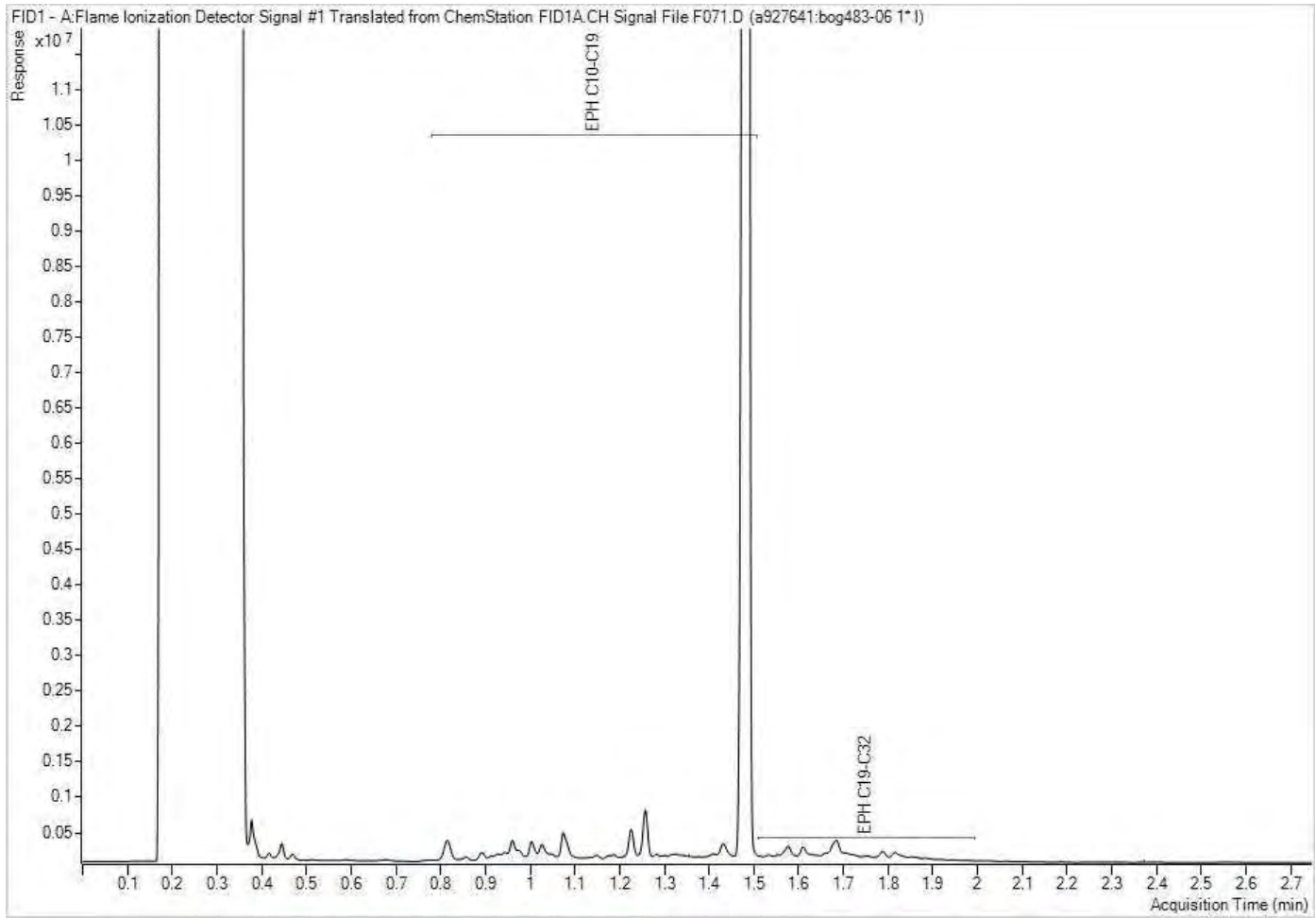


EPH in Water when PAH required Chromatogram



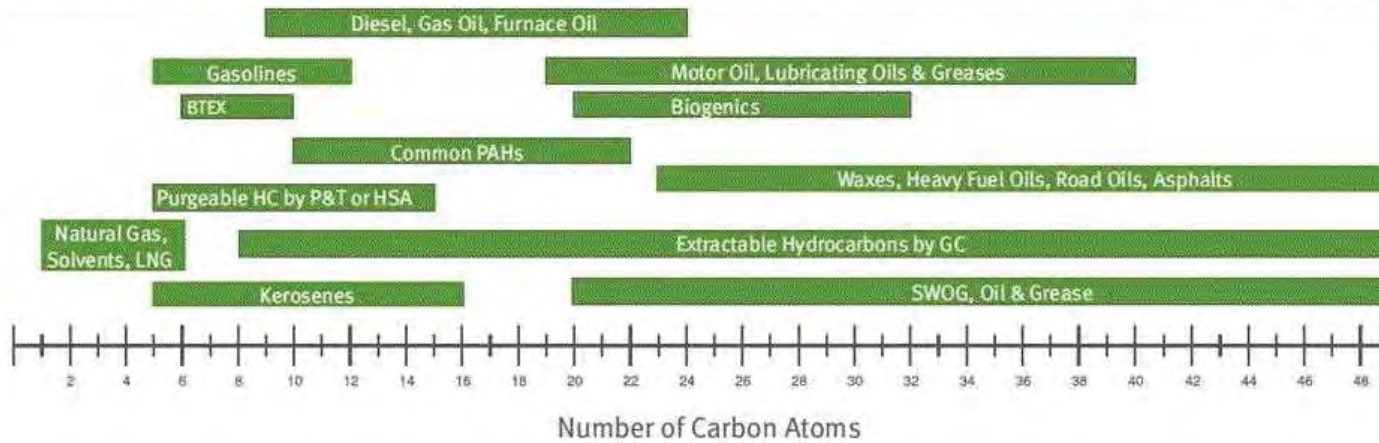
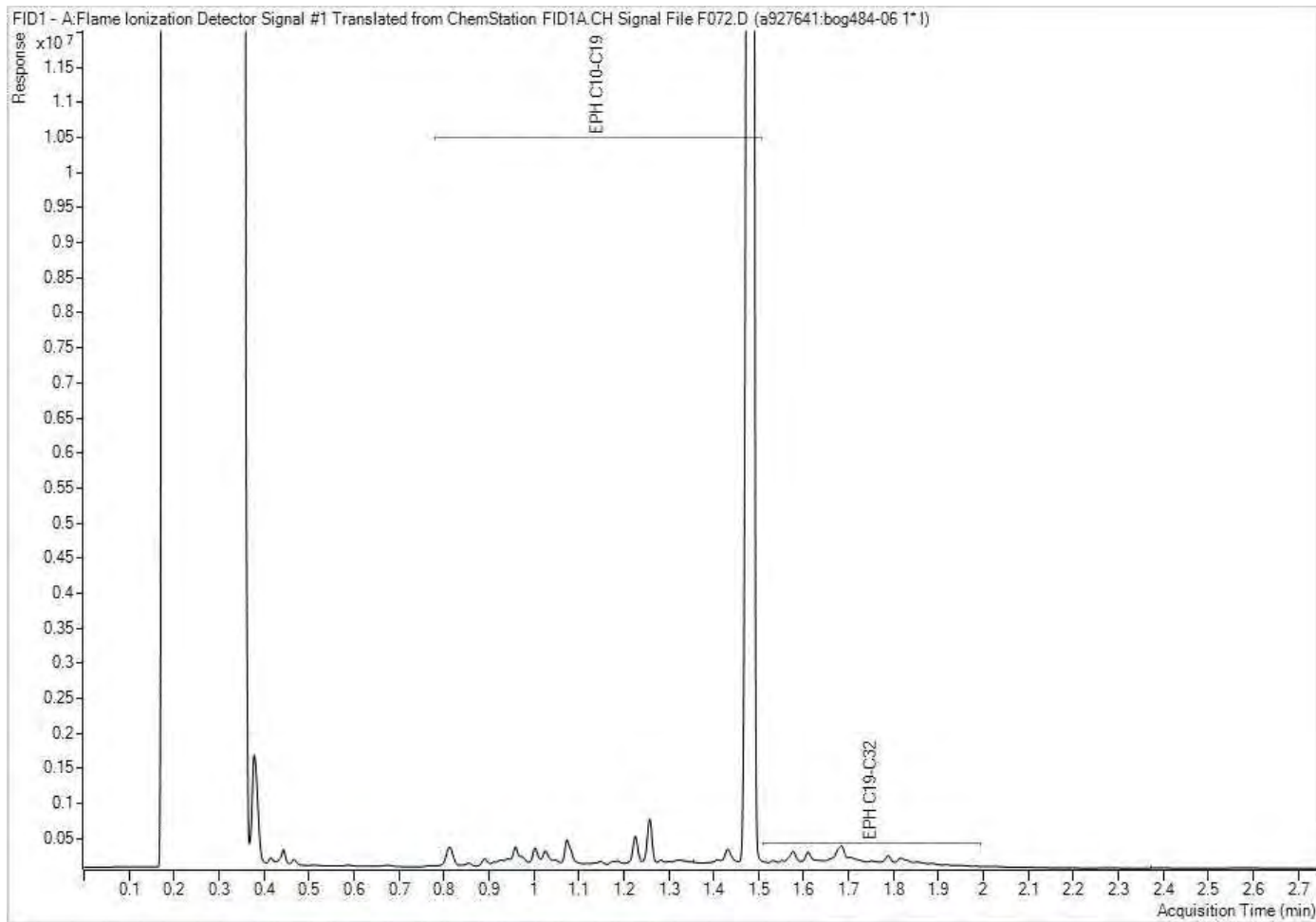
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 689991-03-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/04/12**  
 Report #: R3321133  
 Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BUREAU VERITAS JOB #: C322498**

**Received: 2023/03/31, 14:06**

Sample Matrix: Water  
 # Samples Received: 6

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH Chloride/Sulphate by Auto Colourimetry	6	N/A	2023/04/03	BBY6SOP-00026	SM 23 2320 B m
	6	N/A	2023/04/03	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Conductivity @25C	6	N/A	2023/04/03	BBY6SOP-00026	SM 23 2510 B m
Sulphide (as H2S) (1)	6	N/A	2023/04/04		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc	6	N/A	2023/04/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	6	N/A	2023/04/04	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (2)	6	2023/04/04	2023/04/04	AB SOP-00084	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	6	2023/04/04	2023/04/04	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2023/04/04	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (2)	6	N/A	2023/04/03	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	6	N/A	2023/04/03	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate + Nitrite (N)	6	N/A	2023/04/01	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	6	N/A	2023/04/01	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N)	6	N/A	2023/04/03	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	2	2023/04/04	2023/04/04	BBY8SOP-00021	BCMOE BCLM Jul2017m
PAH in Water by GC/MS (SIM)	4	2023/04/04	2023/04/05	BBY8SOP-00021	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (3)	6	N/A	2023/04/05	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals	6	N/A	2023/04/01	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (4)	6	N/A	2023/04/01	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide (1)	6	N/A	2023/04/04	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	6	2023/04/03	2023/04/04	BBY6SOP-00033	SM 23 2540 C m
EPH less PAH in Water by GC/FID (5)	6	N/A	2023/04/05	BBY WI-00033	Auto Calc
Field pH	5	N/A	2023/04/03		
Field Temperature	5	N/A	2023/04/03		

**Remarks:**

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are



Your P.O. #: 735-002640-3  
Your Project #: 11222680-15.1  
Site#: GROUNDWATER  
Site Location: NEW LANDFILL  
Your C.O.C. #: 689991-03-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/04/12**  
Report #: R3321133  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BUREAU VERITAS JOB #: C322498**

**Received: 2023/03/31, 14:06**

reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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

- (1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
- (2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) Total PAHs in Water include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.
- (4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (5) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)  
HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)

Encryption Key

Brody Andersen  
Program Specialist-Emergency Spill  
Response  
12 Apr 2023 11:41:07

Please direct all questions regarding this Certificate of Analysis to:  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response  
Email: Brody.Andersen@bureauveritas.com  
Phone# (780)577-7120

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





**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BOI518	BOI518	BOI519	BOI520		
<b>Sampling Date</b>		2023/03/29 10:45	2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45		
<b>COC Number</b>		689991-03-01	689991-03-01	689991-03-01	689991-03-01		
	<b>UNITS</b>	<b>WG-11222680-290323 -KH-05</b>	<b>WG-11222680-290323 -KH-05 Lab-Dup</b>	<b>WG-11222680-290323 -KH-06</b>	<b>WG-11222680-290323 -KH-07</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	N/A	<0.0050	<0.0050	0.0050	A925902
<b>Calculated Parameters</b>							
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.700	N/A	0.699	0.408	0.020	A925845
Sulphide (as H2S)	mg/L	<0.0020	N/A	<0.0020	0.0023	0.0020	A925610
<b>Field Parameters</b>							
Field pH	pH	7.56	N/A	7.56	7.67	N/A	ONSITE
Field Temperature	°C	10.37	N/A	10.37	16.54	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	150	N/A	150	210	2.0	A927157
Total Dissolved Solids	mg/L	130	N/A	100	140	10	A926922
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	<1.0	<1.0	1.0	A927158
Alkalinity (Total as CaCO3)	mg/L	66	N/A	65	90	1.0	A927158
Bicarbonate (HCO3)	mg/L	80	N/A	80	110	1.0	A927158
Carbonate (CO3)	mg/L	<1.0	N/A	<1.0	<1.0	1.0	A927158
Hydroxide (OH)	mg/L	<1.0	N/A	<1.0	<1.0	1.0	A927158
Total Sulphide	mg/L	<0.0018	N/A	<0.0018	0.0022	0.0018	A927544
Chloride (Cl)	mg/L	2.3	N/A	2.3	6.2	1.0	A927135
Sulphate (SO4)	mg/L	4.4	N/A	4.4	6.3	1.0	A927135
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	<0.015	<0.015	<0.015	0.015	A927155
Orthophosphate (P)	mg/L	0.0049	0.0050	0.0054	0.011	0.0030	A925886
Nitrate plus Nitrite (N)	mg/L	0.700	N/A	0.699	0.408	0.020	A925901

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BOI521	BOI522	BOI523		
Sampling Date		2023/03/29 13:20	2023/03/29 16:00	2023/03/29 17:00		
COC Number		689991-03-01	689991-03-01	689991-03-01		
	UNITS	WG-11222680-290323 -KH-08	WG-11222680-290323 -KH-09	WG-11222680-290323 -KH-10	RDL	QC Batch
<b>ANIONS</b>						
Nitrite (N)	mg/L	<0.0050	0.0166	<0.0050	0.0050	A925902
<b>Calculated Parameters</b>						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	<0.020	1.17	0.680	0.020	A925845
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	0.034	0.0020	A925610
<b>Field Parameters</b>						
Field pH	pH	N/A	7.65	7.09	N/A	ONSITE
Field Temperature	°C	N/A	12.33	10.58	N/A	ONSITE
<b>Misc. Inorganics</b>						
Conductivity	uS/cm	<2.0	200	530	2.0	A927157
Total Dissolved Solids	mg/L	<10	100	340	10	A926922
<b>Anions</b>						
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	<1.0	1.0	A927158
Alkalinity (Total as CaCO3)	mg/L	<1.0	77	120	1.0	A927158
Bicarbonate (HCO3)	mg/L	<1.0	94	150	1.0	A927158
Carbonate (CO3)	mg/L	<1.0	<1.0	<1.0	1.0	A927158
Hydroxide (OH)	mg/L	<1.0	<1.0	<1.0	1.0	A927158
Total Sulphide	mg/L	<0.0018	<0.0018	0.032	0.0018	A927544
Chloride (Cl)	mg/L	<1.0	6.0	84	1.0	A927135
Sulphate (SO4)	mg/L	<1.0	7.2	5.1	1.0	A927135
<b>Nutrients</b>						
Total Ammonia (N)	mg/L	<0.015	<0.015	<0.015	0.015	A927155
Orthophosphate (P)	mg/L	<0.0030	0.010	0.0069	0.0030	A925886
Nitrate plus Nitrite (N)	mg/L	<0.020	1.19	0.680	0.020	A925901
RDL = Reportable Detection Limit N/A = Not Applicable						





Bureau Veritas Job #: C322498  
 Report Date: 2023/04/12

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3

**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BOI518	BOI519	BOI520		
<b>Sampling Date</b>		2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45		
<b>COC Number</b>		689991-03-01	689991-03-01	689991-03-01		
	<b>UNITS</b>	<b>WG-11222680-290323 -KH-05</b>	<b>WG-11222680-290323 -KH-06</b>	<b>WG-11222680-290323 -KH-07</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	A925844
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	A925844
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BOI521	BOI522	BOI523		
<b>Sampling Date</b>		2023/03/29 13:20	2023/03/29 16:00	2023/03/29 17:00		
<b>COC Number</b>		689991-03-01	689991-03-01	689991-03-01		
	<b>UNITS</b>	<b>WG-11222680-290323 -KH-08</b>	<b>WG-11222680-290323 -KH-09</b>	<b>WG-11222680-290323 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	NA	<0.0050	0.017	0.0050	A925844
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	NA	<0.0050	0.018	0.0050	A925844
RDL = Reportable Detection Limit						



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOI518	BOI519	BOI520	BOI521		
Sampling Date		2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45	2023/03/29 13:20		
COC Number		689991-03-01	689991-03-01	689991-03-01	689991-03-01		
	UNITS	WG-11222680-290323 -KH-05	WG-11222680-290323 -KH-06	WG-11222680-290323 -KH-07	WG-11222680-290323 -KH-08	RDL	QC Batch

Calculated Parameters							
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A925710
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A925710
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A925710

Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A927637
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A927637
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A927637
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A927637
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A927637
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	A927637
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A927637
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	A927637
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A927637

Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A925708
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A925708

Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A927641
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A927641

RDL = Reportable Detection Limit



Bureau Veritas Job #: C322498  
 Report Date: 2023/04/12

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOI518	BOI519	BOI520	BOI521		
Sampling Date		2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45	2023/03/29 13:20		
COC Number		689991-03-01	689991-03-01	689991-03-01	689991-03-01		
	UNITS	WG-11222680-290323 -KH-05	WG-11222680-290323 -KH-06	WG-11222680-290323 -KH-07	WG-11222680-290323 -KH-08	RDL	QC Batch

Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	101	100	100	101	N/A	A927641
D10-ANTHRACENE (sur.)	%	103	100	100	102	N/A	A927637
D8-ACENAPHTHYLENE (sur.)	%	91	89	88	90	N/A	A927637
D8-NAPHTHALENE (sur.)	%	83	81	80	83	N/A	A927637
TERPHENYL-D14 (sur.)	%	87	86	86	88	N/A	A927637

RDL = Reportable Detection Limit  
 N/A = Not Applicable



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BOI522	BOI523		
Sampling Date		2023/03/29 16:00	2023/03/29 17:00		
COC Number		689991-03-01	689991-03-01		
	UNITS	WG-11222680-290323 -KH-09	WG-11222680-290323 -KH-10	RDL	QC Batch
<b>Calculated Parameters</b>					
Low Molecular Weight PAH's	ug/L	<0.10	0.26	0.10	A925710
High Molecular Weight PAH's	ug/L	<0.050	<0.050	0.050	A925710
Total PAH	ug/L	<0.10	0.28	0.10	A925710
<b>Polycyclic Aromatics</b>					
Quinoline	ug/L	<0.020	<0.020	0.020	A927637
Naphthalene	ug/L	<0.10	0.15	0.10	A927637
1-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	A927637
2-Methylnaphthalene	ug/L	<0.10	0.11	0.10	A927637
Acenaphthylene	ug/L	<0.050	<0.050	0.050	A927637
Acenaphthene	ug/L	<0.050	<0.050	0.050	A927637
Fluorene	ug/L	<0.050	<0.050	0.050	A927637
Phenanthrene	ug/L	<0.050	<0.050	0.050	A927637
Anthracene	ug/L	<0.010	<0.010	0.010	A927637
Acridine	ug/L	<0.050	<0.050	0.050	A927637
Fluoranthene	ug/L	<0.020	<0.020	0.020	A927637
Pyrene	ug/L	<0.020	0.021	0.020	A927637
Benzo(a)anthracene	ug/L	<0.010	<0.010	0.010	A927637
Chrysene	ug/L	<0.020	<0.020	0.020	A927637
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	0.030	A927637
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	A927637
Benzo(a)pyrene	ug/L	<0.0050	0.0062	0.0050	A927637
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	A927637
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	0.0030	A927637
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	A927637
<b>Calculated Parameters</b>					
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	0.20	A925708
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	0.20	A925708
<b>Ext. Pet. Hydrocarbon</b>					
EPH (C10-C19)	mg/L	<0.20	<0.20	0.20	A927641
EPH (C19-C32)	mg/L	<0.20	<0.20	0.20	A927641
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C322498  
 Report Date: 2023/04/12

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

<b>Bureau Veritas ID</b>		BOI522	BOI523		
<b>Sampling Date</b>		2023/03/29 16:00	2023/03/29 17:00		
<b>COC Number</b>		689991-03-01	689991-03-01		
	<b>UNITS</b>	<b>WG-11222680-290323 -KH-09</b>	<b>WG-11222680-290323 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Surrogate Recovery (%)</b>					
O-TERPHENYL (sur.)	%	99	99	N/A	A927641
D10-ANTHRACENE (sur.)	%	105	100	N/A	A927637
D8-ACENAPHTHYLENE (sur.)	%	91	89	N/A	A927637
D8-NAPHTHALENE (sur.)	%	84	83	N/A	A927637
TERPHENYL-D14 (sur.)	%	89	88	N/A	A927637
RDL = Reportable Detection Limit N/A = Not Applicable					



**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

<b>Bureau Veritas ID</b>		BOI518	BOI519	BOI520	BOI521		
<b>Sampling Date</b>		2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45	2023/03/29 13:20		
<b>COC Number</b>		689991-03-01	689991-03-01	689991-03-01	689991-03-01		
	<b>UNITS</b>	<b>WG-11222680-290323 -KH-05</b>	<b>WG-11222680-290323 -KH-06</b>	<b>WG-11222680-290323 -KH-07</b>	<b>WG-11222680-290323 -KH-08</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	65.3	65.3	95.1	0.77	0.50	A925748
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A927497
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	11.4	<3.0	<3.0	<3.0	3.0	A925968
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A925968
Dissolved Arsenic (As)	ug/L	0.24	<0.10	0.25	<0.10	0.10	A925968
Dissolved Barium (Ba)	ug/L	3.5	3.1	5.7	<1.0	1.0	A925968
Dissolved Beryllium (Be)	ug/L	0.19	0.12	<0.10	<0.10	0.10	A925968
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A925968
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	A925968
Dissolved Cadmium (Cd)	ug/L	0.167	<0.010	<0.010	0.011	0.010	A925968
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A925968
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A925968
Dissolved Copper (Cu)	ug/L	2.17	<0.20	0.53	<0.20	0.20	A925968
Dissolved Iron (Fe)	ug/L	24.1	11.5	<5.0	17.0	5.0	A925968
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A925968
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A925968
Dissolved Manganese (Mn)	ug/L	9.6	5.8	<1.0	<1.0	1.0	A925968
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A925968
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A925968
Dissolved Phosphorus (P)	ug/L	31	<10	15	<10	10	A925968
Dissolved Selenium (Se)	ug/L	0.28	0.18	0.20	0.12	0.10	A925968
Dissolved Silicon (Si)	ug/L	7630	7690	8900	<100	100	A925968
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A925968
Dissolved Strontium (Sr)	ug/L	32.4	27.5	45.2	<1.0	1.0	A925968
Dissolved Thallium (Tl)	ug/L	0.032	<0.010	<0.010	<0.010	0.010	A925968
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A925968
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A925968
Dissolved Uranium (U)	ug/L	0.16	<0.10	<0.10	<0.10	0.10	A925968
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A925968
RDL = Reportable Detection Limit							



**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOI518	BOI519	BOI520	BOI521		
Sampling Date		2023/03/29 10:45	2023/03/29 10:55	2023/03/29 13:45	2023/03/29 13:20		
COC Number		689991-03-01	689991-03-01	689991-03-01	689991-03-01		
	UNITS	WG-11222680-290323 -KH-05	WG-11222680-290323 -KH-06	WG-11222680-290323 -KH-07	WG-11222680-290323 -KH-08	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	A925968
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A925968
Dissolved Calcium (Ca)	mg/L	20.4	20.3	30.2	0.310	0.050	A925749
Dissolved Magnesium (Mg)	mg/L	3.47	3.53	4.77	<0.050	0.050	A925749
Dissolved Potassium (K)	mg/L	0.326	0.275	0.392	<0.050	0.050	A925749
Dissolved Sodium (Na)	mg/L	5.22	5.03	5.67	<0.050	0.050	A925749
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	3.0	A925749

RDL = Reportable Detection Limit





**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOI522		BOI523		
Sampling Date		2023/03/29 16:00		2023/03/29 17:00		
COC Number		689991-03-01		689991-03-01		
	UNITS	WG-11222680-290323 -KH-09	QC Batch	WG-11222680-290323 -KH-10	RDL	QC Batch
<b>Calculated Parameters</b>						
Dissolved Hardness (CaCO3)	mg/L	85.8	A925748	175	0.50	A925748
<b>Elements</b>						
Dissolved Mercury (Hg)	ug/L	<0.0019	A927497	<0.0019	0.0019	A927770
<b>Dissolved Metals by ICPMS</b>						
Dissolved Aluminum (Al)	ug/L	3.7	A925968	13.4	3.0	A925968
Dissolved Antimony (Sb)	ug/L	<0.50	A925968	<0.50	0.50	A925968
Dissolved Arsenic (As)	ug/L	0.40	A925968	0.25	0.10	A925968
Dissolved Barium (Ba)	ug/L	3.7	A925968	18.1	1.0	A925968
Dissolved Beryllium (Be)	ug/L	0.15	A925968	<0.10	0.10	A925968
Dissolved Bismuth (Bi)	ug/L	<1.0	A925968	<1.0	1.0	A925968
Dissolved Boron (B)	ug/L	490	A925968	<50	50	A925968
Dissolved Cadmium (Cd)	ug/L	0.034	A925968	0.077	0.010	A925968
Dissolved Chromium (Cr)	ug/L	1.6	A925968	<1.0	1.0	A925968
Dissolved Cobalt (Co)	ug/L	<0.20	A925968	<0.20	0.20	A925968
Dissolved Copper (Cu)	ug/L	2.34	A925968	1.66	0.20	A925968
Dissolved Iron (Fe)	ug/L	11.9	A925968	16.5	5.0	A925968
Dissolved Lead (Pb)	ug/L	<0.20	A925968	<0.20	0.20	A925968
Dissolved Lithium (Li)	ug/L	<2.0	A925968	<2.0	2.0	A925968
Dissolved Manganese (Mn)	ug/L	1.0	A925968	28.1	1.0	A925968
Dissolved Molybdenum (Mo)	ug/L	<1.0	A925968	<1.0	1.0	A925968
Dissolved Nickel (Ni)	ug/L	<1.0	A925968	<1.0	1.0	A925968
Dissolved Phosphorus (P)	ug/L	20	A925968	23	10	A925968
Dissolved Selenium (Se)	ug/L	0.23	A925968	<0.10	0.10	A925968
Dissolved Silicon (Si)	ug/L	6950	A925968	13600	100	A925968
Dissolved Silver (Ag)	ug/L	<0.020	A925968	<0.020	0.020	A925968
Dissolved Strontium (Sr)	ug/L	37.6	A925968	107	1.0	A925968
Dissolved Thallium (Tl)	ug/L	<0.010	A925968	0.018	0.010	A925968
Dissolved Tin (Sn)	ug/L	<5.0	A925968	<5.0	5.0	A925968
Dissolved Titanium (Ti)	ug/L	<5.0	A925968	<5.0	5.0	A925968
Dissolved Uranium (U)	ug/L	<0.10	A925968	<0.10	0.10	A925968
Dissolved Vanadium (V)	ug/L	<5.0	A925968	<5.0	5.0	A925968
RDL = Reportable Detection Limit						



**CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BOI522		BOI523		
Sampling Date		2023/03/29 16:00		2023/03/29 17:00		
COC Number		689991-03-01		689991-03-01		
	UNITS	WG-11222680-290323 -KH-09	QC Batch	WG-11222680-290323 -KH-10	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	A925968	<5.0	5.0	A925968
Dissolved Zirconium (Zr)	ug/L	<0.10	A925968	<0.10	0.10	A925968
Dissolved Calcium (Ca)	mg/L	27.5	A925749	46.3	0.050	A925749
Dissolved Magnesium (Mg)	mg/L	4.16	A925749	14.4	0.050	A925749
Dissolved Potassium (K)	mg/L	0.365	A925749	1.05	0.050	A925749
Dissolved Sodium (Na)	mg/L	5.79	A925749	26.3	0.050	A925749
Dissolved Sulphur (S)	mg/L	<3.0	A925749	<3.0	3.0	A925749
RDL = Reportable Detection Limit						



Bureau Veritas Job #: C322498  
Report Date: 2023/04/12

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3

### GENERAL COMMENTS

Version 2: Report reissued to update the sampling date of all samples from 2023/03/23 to 2023/03/29 as per client request on 2023/04/12.

**Results relate only to the items tested.**



### QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A927637	D10-ANTHRACENE (sur.)	2023/04/04			94	50 - 140	104	%		
A927637	D8-ACENAPHTHYLENE (sur.)	2023/04/04			91	50 - 140	93	%		
A927637	D8-NAPHTHALENE (sur.)	2023/04/04			84	50 - 140	87	%		
A927637	TERPHENYL-D14 (sur.)	2023/04/04			87	50 - 140	92	%		
A927641	O-TERPHENYL (sur.)	2023/04/04			96	60 - 140	103	%		
A925886	Orthophosphate (P)	2023/04/01	104 (1)	80 - 120	96	80 - 120	<0.0030	mg/L	0.99 (2)	20
A925901	Nitrate plus Nitrite (N)	2023/04/01	96	80 - 120	109	80 - 120	<0.020	mg/L	1.6 (3)	25
A925902	Nitrite (N)	2023/04/01	98	80 - 120	106	80 - 120	<0.0050	mg/L	NC (3)	20
A925968	Dissolved Aluminum (Al)	2023/04/03	118	80 - 120	104	80 - 120	<3.0	ug/L	1.3 (3)	20
A925968	Dissolved Antimony (Sb)	2023/04/03	NC	80 - 120	105	80 - 120	<0.50	ug/L	0.14 (3)	20
A925968	Dissolved Arsenic (As)	2023/04/03	119	80 - 120	104	80 - 120	<0.10	ug/L	0.12 (3)	20
A925968	Dissolved Barium (Ba)	2023/04/03	119	80 - 120	104	80 - 120	<1.0	ug/L	0.74 (3)	20
A925968	Dissolved Beryllium (Be)	2023/04/03	99	80 - 120	100	80 - 120	<0.10	ug/L	NC (3)	20
A925968	Dissolved Bismuth (Bi)	2023/04/03	106	80 - 120	104	80 - 120	<1.0	ug/L	NC (3)	20
A925968	Dissolved Boron (B)	2023/04/03	110	80 - 120	112	80 - 120	<50	ug/L	NC (3)	20
A925968	Dissolved Cadmium (Cd)	2023/04/03	109	80 - 120	102	80 - 120	<0.010	ug/L	NC (3)	20
A925968	Dissolved Chromium (Cr)	2023/04/03	109	80 - 120	102	80 - 120	<1.0	ug/L	NC (3)	20
A925968	Dissolved Cobalt (Co)	2023/04/03	102	80 - 120	96	80 - 120	<0.20	ug/L	NC (3)	20
A925968	Dissolved Copper (Cu)	2023/04/03	99	80 - 120	96	80 - 120	<0.20	ug/L	NC (3)	20
A925968	Dissolved Iron (Fe)	2023/04/03	104	80 - 120	106	80 - 120	<5.0	ug/L	7.7 (3)	20
A925968	Dissolved Lead (Pb)	2023/04/03	107	80 - 120	102	80 - 120	<0.20	ug/L	NC (3)	20
A925968	Dissolved Lithium (Li)	2023/04/03	94	80 - 120	98	80 - 120	<2.0	ug/L	3.8 (3)	20
A925968	Dissolved Manganese (Mn)	2023/04/03	110	80 - 120	101	80 - 120	<1.0	ug/L	3.1 (3)	20
A925968	Dissolved Molybdenum (Mo)	2023/04/03	NC	80 - 120	107	80 - 120	<1.0	ug/L	1.0 (3)	20
A925968	Dissolved Nickel (Ni)	2023/04/03	104	80 - 120	100	80 - 120	<1.0	ug/L	NC (3)	20
A925968	Dissolved Phosphorus (P)	2023/04/03	122 (4)	80 - 120	106	80 - 120	<10	ug/L	1.6 (3)	20
A925968	Dissolved Selenium (Se)	2023/04/03	100	80 - 120	102	80 - 120	<0.10	ug/L	3.0 (3)	20
A925968	Dissolved Silicon (Si)	2023/04/03	106	80 - 120	110	80 - 120	<100	ug/L	0.85 (3)	20
A925968	Dissolved Silver (Ag)	2023/04/03	109	80 - 120	103	80 - 120	<0.020	ug/L	NC (3)	20
A925968	Dissolved Strontium (Sr)	2023/04/03	NC	80 - 120	104	80 - 120	<1.0	ug/L	0.081 (3)	20
A925968	Dissolved Thallium (Tl)	2023/04/03	111	80 - 120	104	80 - 120	<0.010	ug/L	NC (3)	20
A925968	Dissolved Tin (Sn)	2023/04/03	114	80 - 120	105	80 - 120	<5.0	ug/L	NC (3)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A925968	Dissolved Titanium (Ti)	2023/04/03	114	80 - 120	102	80 - 120	<5.0	ug/L	NC (3)	20
A925968	Dissolved Uranium (U)	2023/04/03	119	80 - 120	105	80 - 120	<0.10	ug/L	0.53 (3)	20
A925968	Dissolved Vanadium (V)	2023/04/03	114	80 - 120	102	80 - 120	<5.0	ug/L	NC (3)	20
A925968	Dissolved Zinc (Zn)	2023/04/03	104	80 - 120	103	80 - 120	<5.0	ug/L	NC (3)	20
A925968	Dissolved Zirconium (Zr)	2023/04/03	119	80 - 120	102	80 - 120	<0.10	ug/L	NC (3)	20
A926922	Total Dissolved Solids	2023/04/04	98	80 - 120	102	80 - 120	<10	mg/L	5.7 (3)	20
A927135	Chloride (Cl)	2023/04/03	104	80 - 120	100	80 - 120	<1.0	mg/L	NC (3)	20
A927135	Sulphate (SO4)	2023/04/03	98	80 - 120	96	80 - 120	<1.0	mg/L	1.0 (3)	20
A927155	Total Ammonia (N)	2023/04/03	105 (5)	80 - 120	106	80 - 120	<0.015	mg/L	NC (6)	20
A927157	Conductivity	2023/04/03			101	80 - 120	<2.0	uS/cm	0.41 (3)	10
A927158	Alkalinity (PP as CaCO3)	2023/04/03					<1.0	mg/L	NC (3)	20
A927158	Alkalinity (Total as CaCO3)	2023/04/03	NC	80 - 120	95	80 - 120	<1.0	mg/L	1.3 (3)	20
A927158	Bicarbonate (HCO3)	2023/04/03					<1.0	mg/L	1.3 (3)	20
A927158	Carbonate (CO3)	2023/04/03					<1.0	mg/L	NC (3)	20
A927158	Hydroxide (OH)	2023/04/03					<1.0	mg/L	NC (3)	20
A927497	Dissolved Mercury (Hg)	2023/04/04	95	80 - 120	100	80 - 120	<0.0019	ug/L	NC (3)	20
A927544	Total Sulphide	2023/04/04	45 (4)	80 - 120	91	80 - 120	<0.0018	mg/L	NC (3)	20
A927637	1-Methylnaphthalene	2023/04/04			91	50 - 140	<0.050	ug/L		
A927637	2-Methylnaphthalene	2023/04/04			87	50 - 140	<0.10	ug/L		
A927637	Acenaphthene	2023/04/04			91	50 - 140	<0.050	ug/L		
A927637	Acenaphthylene	2023/04/04			89	50 - 140	<0.050	ug/L		
A927637	Acridine	2023/04/04			98	50 - 140	<0.050	ug/L		
A927637	Anthracene	2023/04/04			96	50 - 140	<0.010	ug/L		
A927637	Benzo(a)anthracene	2023/04/04			94	50 - 140	<0.010	ug/L		
A927637	Benzo(a)pyrene	2023/04/04			95	50 - 140	<0.0050	ug/L		
A927637	Benzo(b&j)fluoranthene	2023/04/04			94	50 - 140	<0.030	ug/L		
A927637	Benzo(g,h,i)perylene	2023/04/04			89	50 - 140	<0.050	ug/L		
A927637	Benzo(k)fluoranthene	2023/04/04			99	50 - 140	<0.050	ug/L		
A927637	Chrysene	2023/04/04			98	50 - 140	<0.020	ug/L		
A927637	Dibenz(a,h)anthracene	2023/04/04			90	50 - 140	<0.0030	ug/L		
A927637	Fluoranthene	2023/04/04			85	50 - 140	<0.020	ug/L		
A927637	Fluorene	2023/04/04			89	50 - 140	<0.050	ug/L		



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A927637	Indeno(1,2,3-cd)pyrene	2023/04/04			92	50 - 140	<0.050	ug/L		
A927637	Naphthalene	2023/04/04			88	50 - 140	<0.10	ug/L		
A927637	Phenanthrene	2023/04/04			87	50 - 140	<0.050	ug/L		
A927637	Pyrene	2023/04/04			84	50 - 140	<0.020	ug/L		
A927637	Quinoline	2023/04/04			107	50 - 140	<0.020	ug/L		
A927641	EPH (C10-C19)	2023/04/04			86	70 - 130	<0.20	mg/L		
A927641	EPH (C19-C32)	2023/04/04			108	70 - 130	<0.20	mg/L		
A927770	Dissolved Mercury (Hg)	2023/04/04	99	80 - 120	94	80 - 120	<0.0019	ug/L	NC (3)	20

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Matrix Spike Parent ID [BOI518-01]

(2) Duplicate Parent ID [BOI518-01]

(3) Duplicate Parent ID

(4) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(5) Matrix Spike Parent ID [BOI518-06]

(6) Duplicate Parent ID [BOI518-06]



Bureau Veritas Job #: C322498  
Report Date: 2023/04/12

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist



Automated Statchk

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.





Bureau Veritas  
4000 Connaught Way, Torrance, 90508 Canada V5D 1A5 Tel (904) 734 7270 Toll-free 800-563-5225 Fax (904) 731 2306 www.bv.com

Page 1 of 1

<b>INVOICE TO:</b>		<b>Report Information</b>		<b>Project Information</b>		 <b>C322498_COC</b>	Order # 80901
Company Name <b>#163 GHD Limited</b>	Company Name <b>GHD Limited</b>	Customer # <b>C30080</b>	Contract Name <b>Stephanie Berton</b>	A.C.# <b>735-002640-3</b>	Project # <b>11222680-15.1</b>		
Contact Name <b>AP Invoices - 735</b>	Contact Name <b>Stephanie Berton</b>	Project Name <b>Groundwater</b>	Address <b>Stephanie.berton@ghd.com</b>	Site #	Client Of Custody Record 	Project Manager	Site #
Address <b>455 PHILLIP STREET WATERLOO ON N2L 3X2</b>	Address <b>Stephanie.berton@ghd.com</b>	Site #	Phone <b>rosemarie.roche@ghd.com</b>	Site #	Client Of Custody Record <b>040001-03-01</b>	Project Manager	Site #
Phone <b>(519) 884-0510</b>	Phone <b>National.EDDSupport@maxdhn.ca, stephanie.berton@ghd.com</b>	Site #	Fac <b>(519) 725-1394</b>	Site #	Client Of Custody Record <b>040001-03-01</b>	Project Manager	Site #
Email <b>ADInvoices-735@ghd.com</b>	Invoice # <b>invoicing-canada@ghd.com</b>	Site #		Site #		Project Manager	Site #

Regulatory Criteria: <input type="checkbox"/> CS-1 <input type="checkbox"/> CS-2 <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other	Special Instructions <b>WSP</b>	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b>										<b>Turnaround Time (TAT) Required:</b> Please provide reference for each analysis.	
		Metal Panel Filtered (1/1/1/1) Conductivity, Cl, SO4, NO2, NO3, N-N, PO4	Speciated Alkalinity	Sulfide + H2S Calc (Total)	Sulfide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Ag, Hardness	Total Dissolved Solids (Filt, Residue)	PESTICIDES with substituted PAHs <b>TRT, PAH (EPA)</b>	Field pH	Field Temperature	Regular (Standard) TAT: (will be added if field TAT is not specified) Standard TAT is 7 working days for most labs. Please note standard TAT for some tests such as DOC and BOD are 14 days - contact your Project Manager for details.	<input checked="" type="checkbox"/>

**SAMPLES MUST BE KEPT COOL (< 4°C) FROM THE TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS**

Sample No	Sample No code label	Sample Location / Identification	Depth (m)	Time Collected	Matrix	Metal Panel Filtered (1/1/1/1)	Conductivity	Speciated Alkalinity	Sulfide + H2S Calc (Total)	Sulfide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Ag, Hardness	Total Dissolved Solids (Filt, Residue)	PESTICIDES with substituted PAHs (TRT, PAH (EPA))	Field pH	Field Temperature	# of Jars	Comments
1																		
2	WG-11222680-290323-KH-05		29-03-23	10.45	W	X	X	X	X	X	X	X	X	X	X	X		
3	WG-11222680-290323-KH-06		29-03-23	10.55	W	X	X	X	X	X	X	X	X	X	X	X		
4	WG-11222680-290323-KH-07		29-03-23	13.45	W	X	X	X	X	X	X	X	X	X	X	X		
5	WG-11222680-290323-KH-08		29-03-23	13.20	W	X	X	X	X	X	X	X	X	X	X	X		
6	WG-11222680-290323-KH-09		29-03-23	16.00	W	X	X	X	X	X	X	X	X	X	X	X		
7	WG-11222680-290323-KH-10		29-03-23	17.00	W	X	X	X	X	X	X	X	X	X	X	X		Please put sample on hold

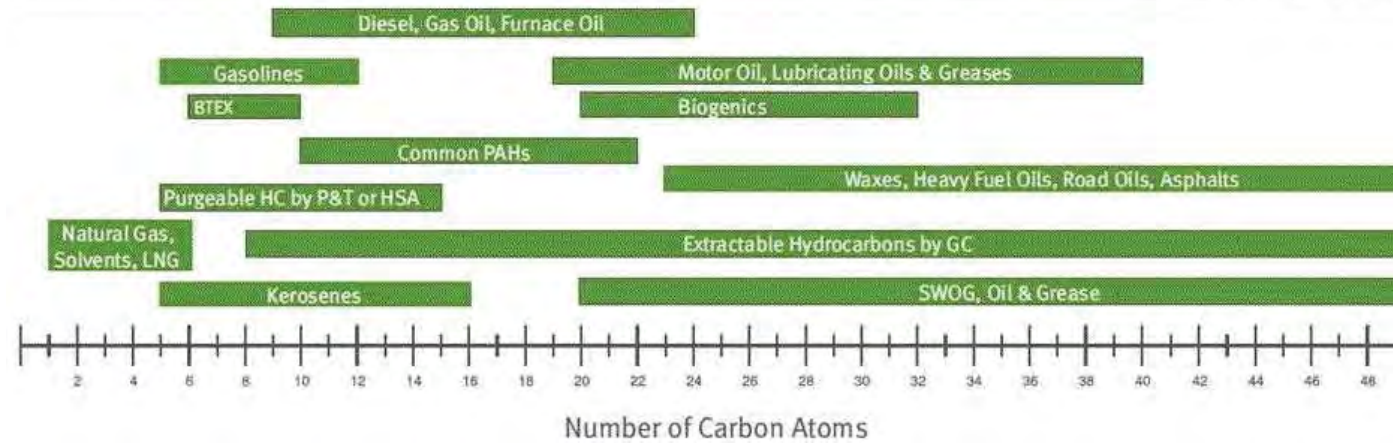
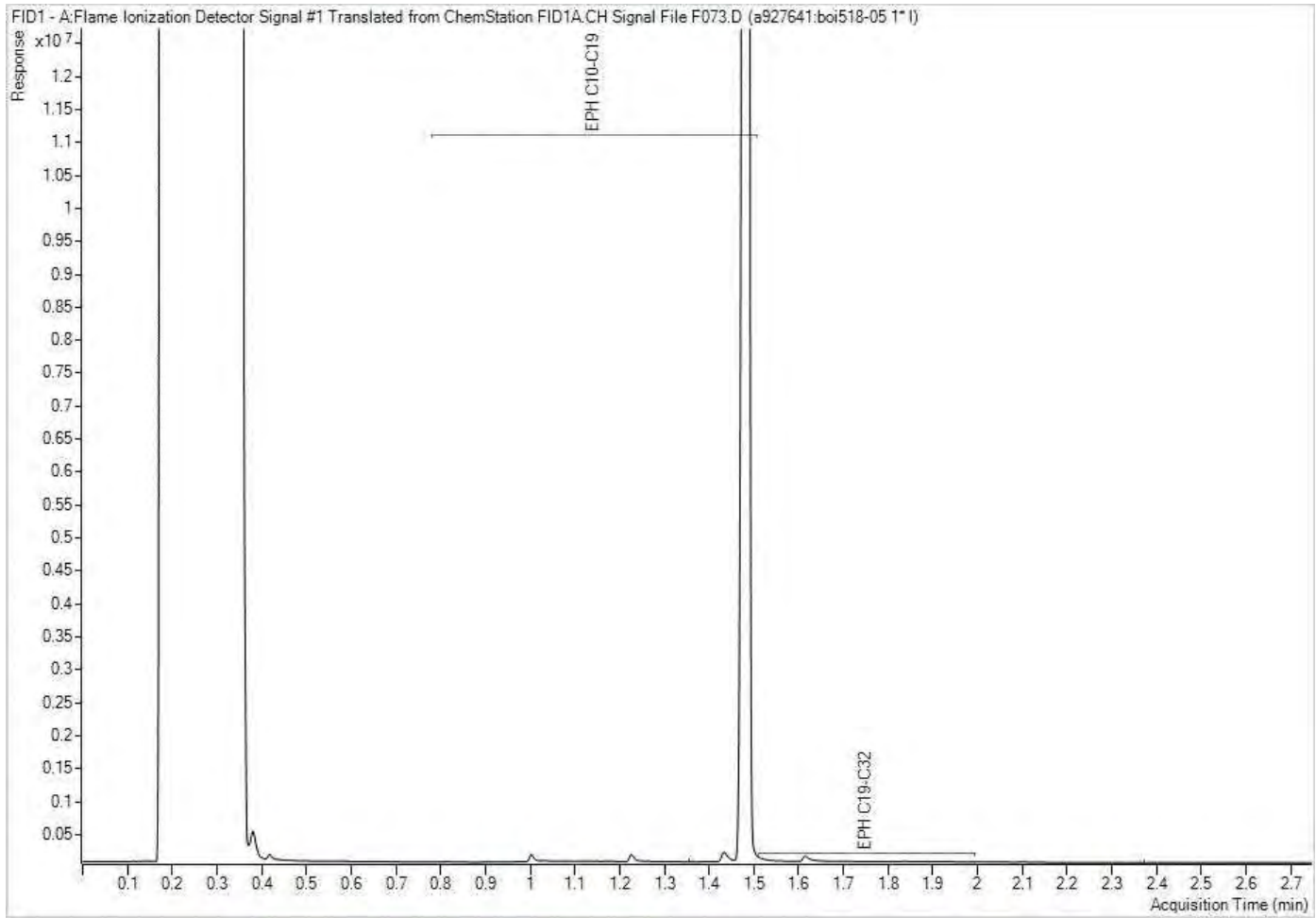
REQUISITIONED BY (Signature/Print) <b>Kathleen Hoyer</b>	Date (YYYYMMDD) <b>23/10/29</b>	Time <b>20:00</b>	RECEIVED BY (Signature/Print) <b>Michelle Carone (Moi)</b>	Date (YYYYMMDD) <b>2023/10/31</b>	Time <b>14:06</b>	If any jars are not submitted	Lab Use Only This Sample <input type="checkbox"/> Temperature (°C) on Receipt <b>2, 2, 3</b>	Custody Seal Used on Contact <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
---	------------------------------------	----------------------	---	--------------------------------------	----------------------	-------------------------------	---	---

UNLESS OTHERWISE AGREED TO IN WRITING FROM BUREAU VERITAS OR THE CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THE CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BV.COM/EN/RESOURCES/COC-TERMS-AND-CONDITIONS.  
 IT IS THE RESPONSIBILITY OF THE REQUISITIONER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Bureau Veritas Canada (2019) Inc.

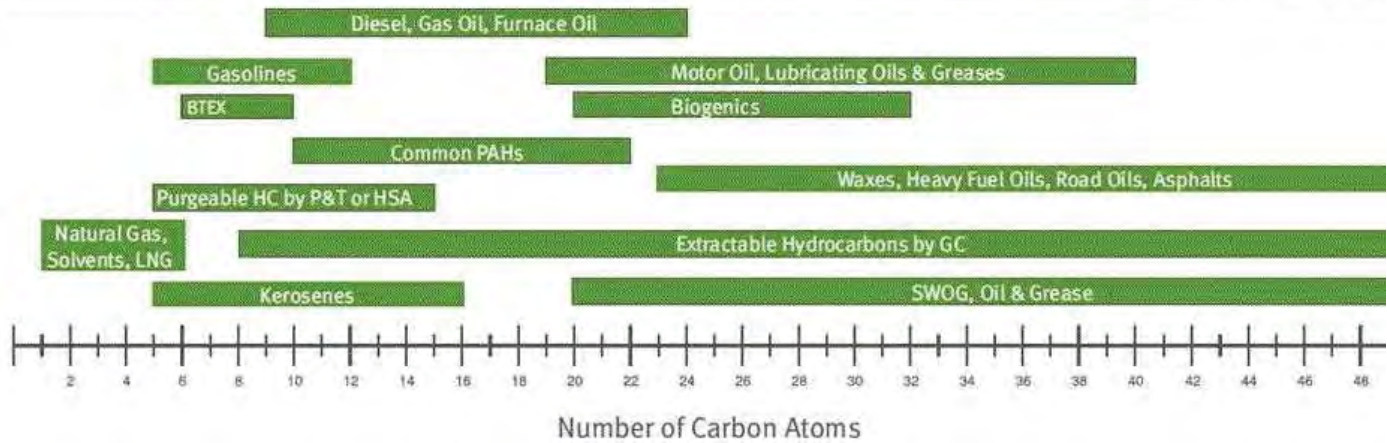
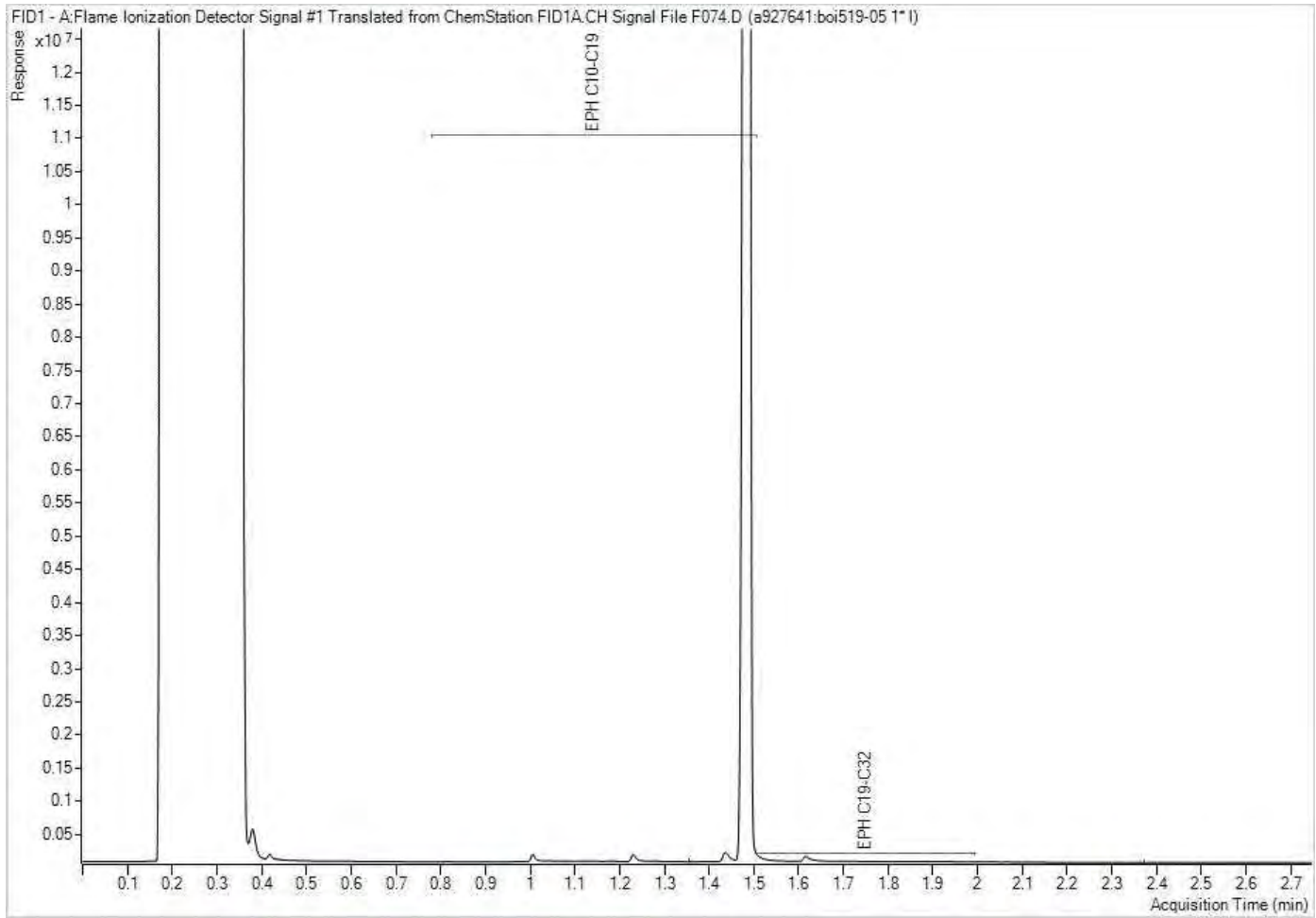
ice: gjs

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

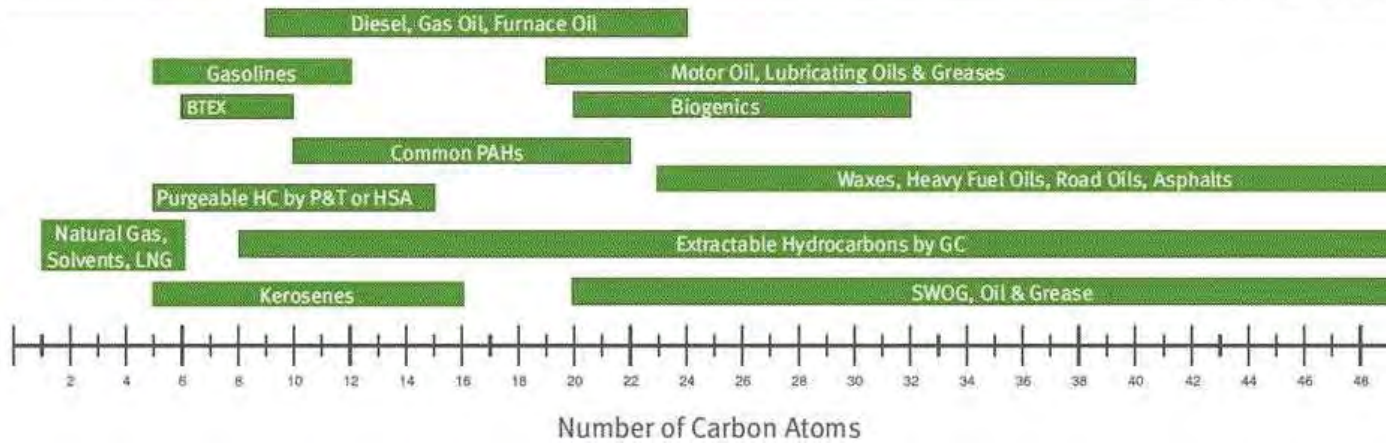
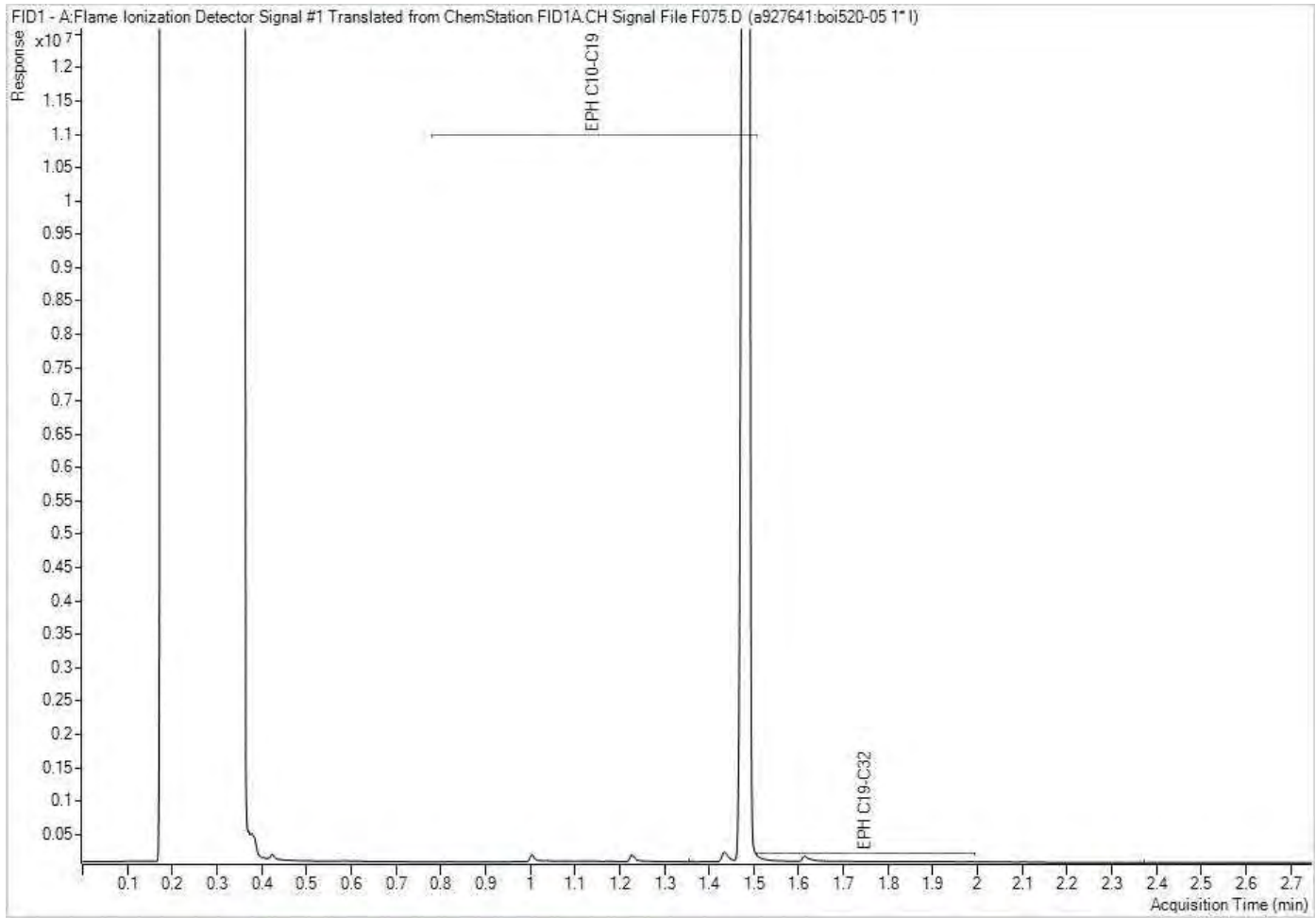
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

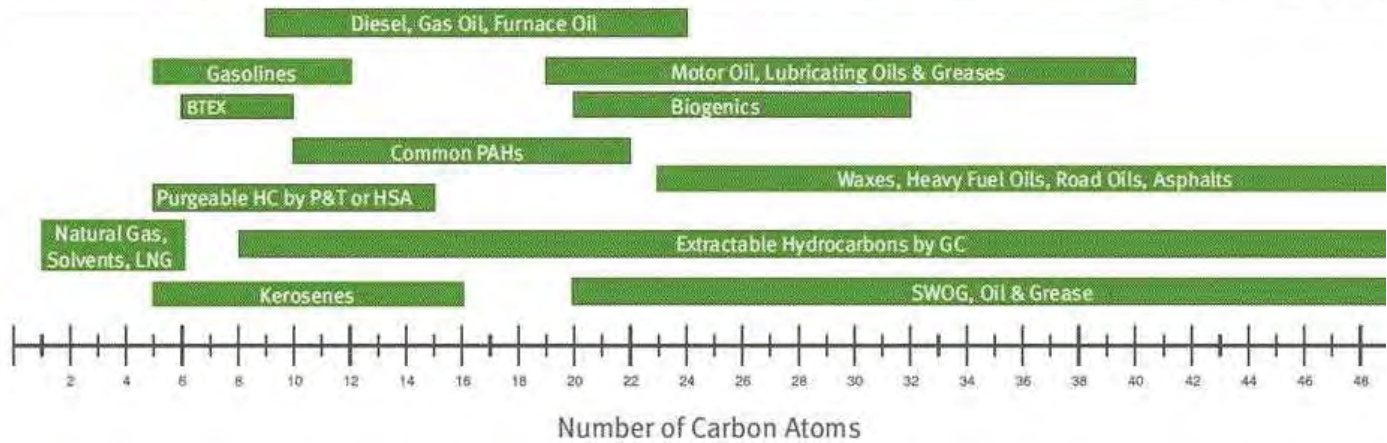
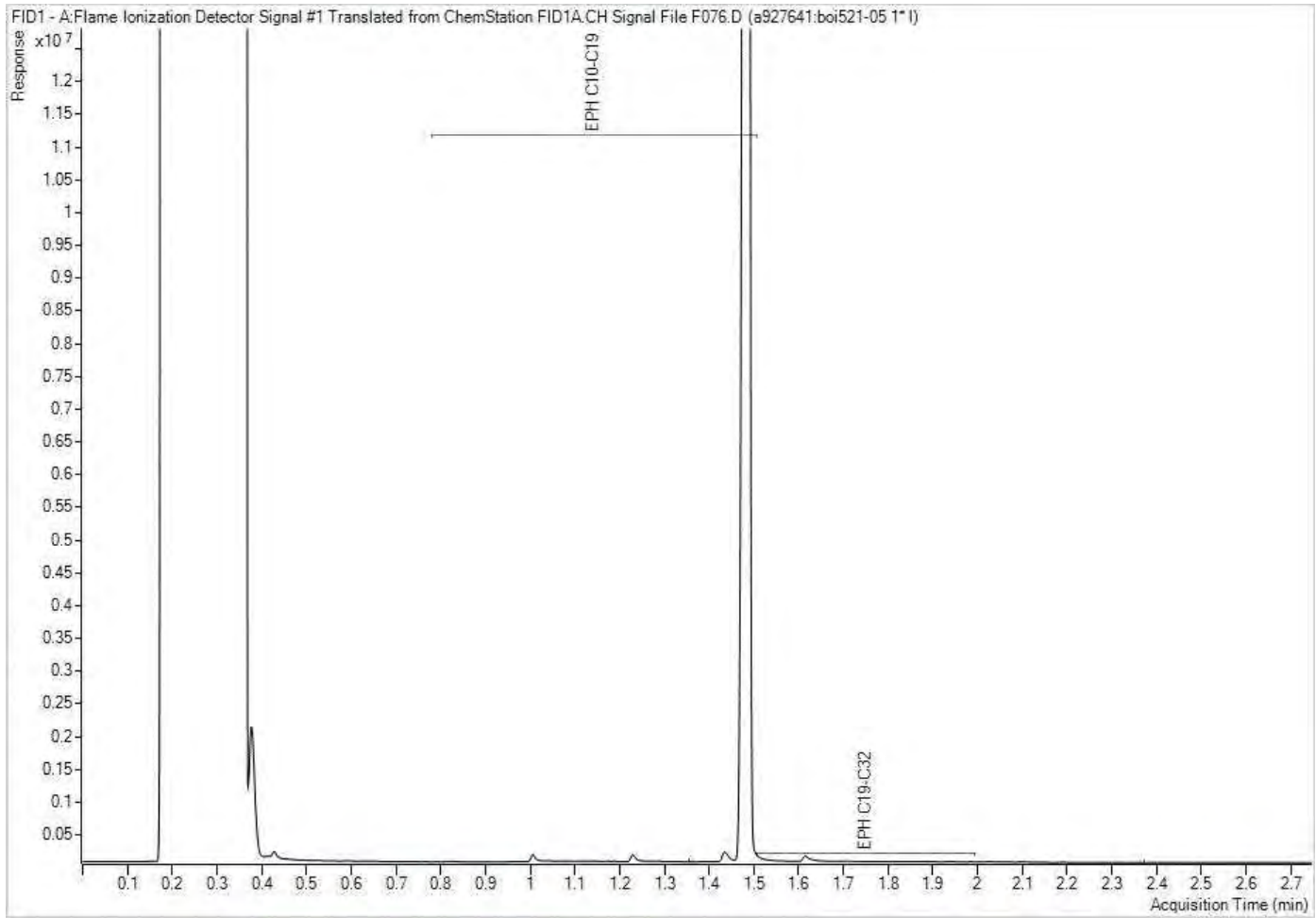


EPH in Water when PAH required Chromatogram



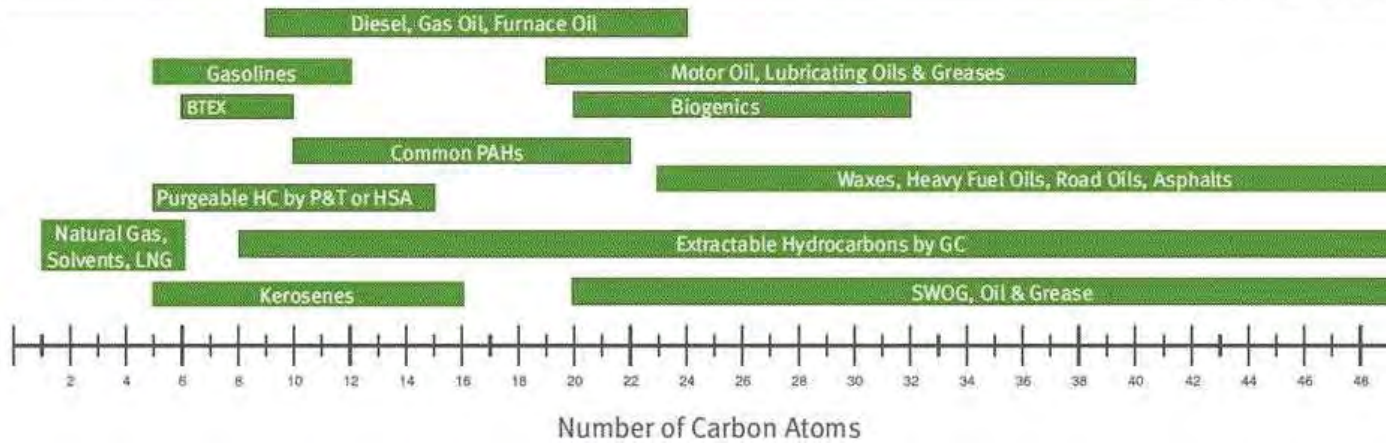
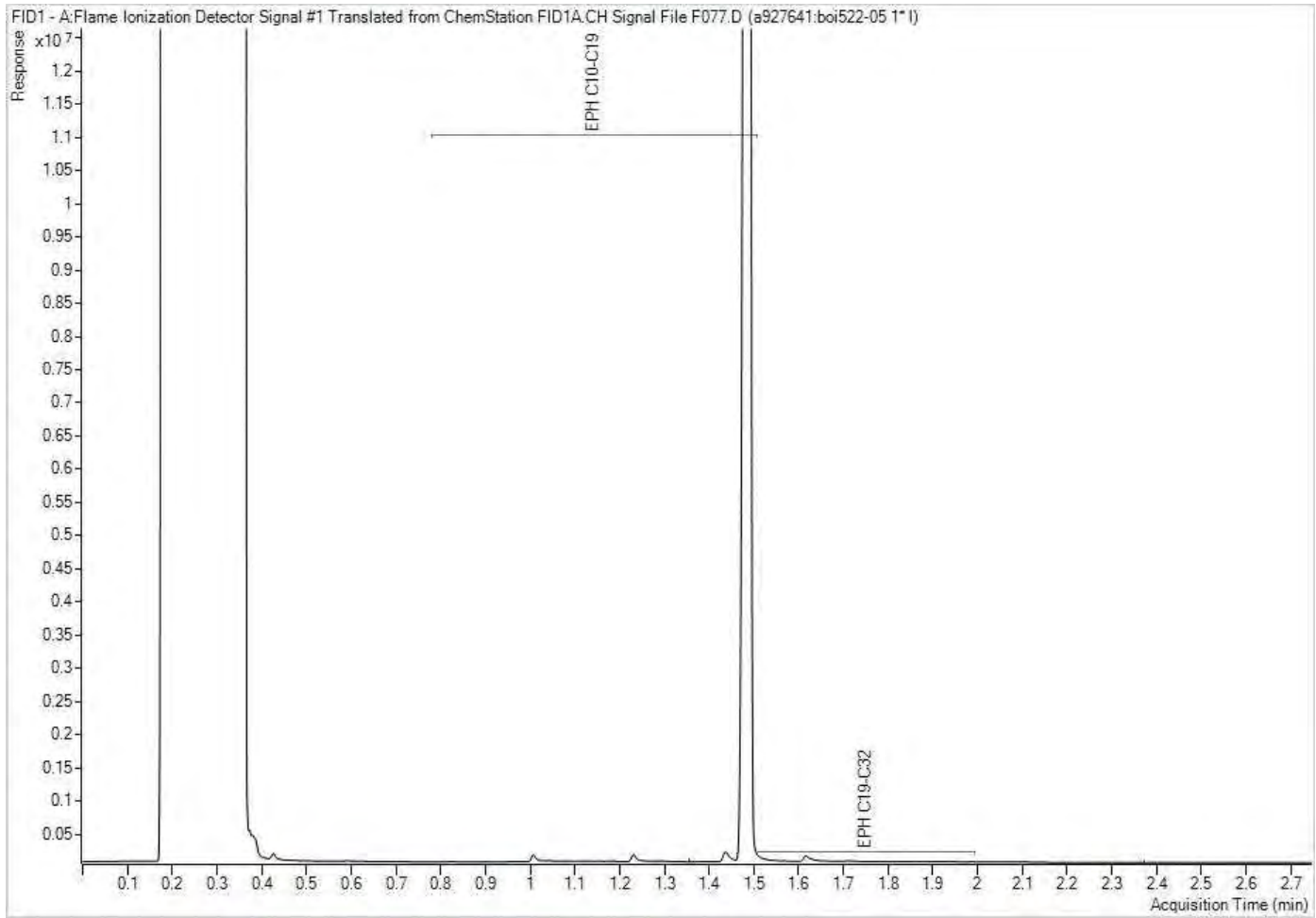
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



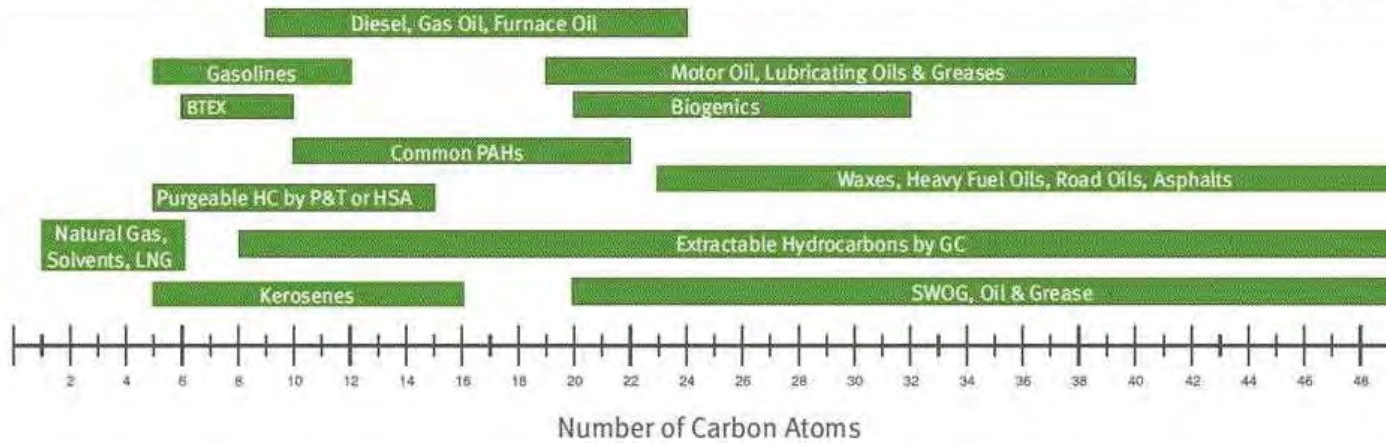
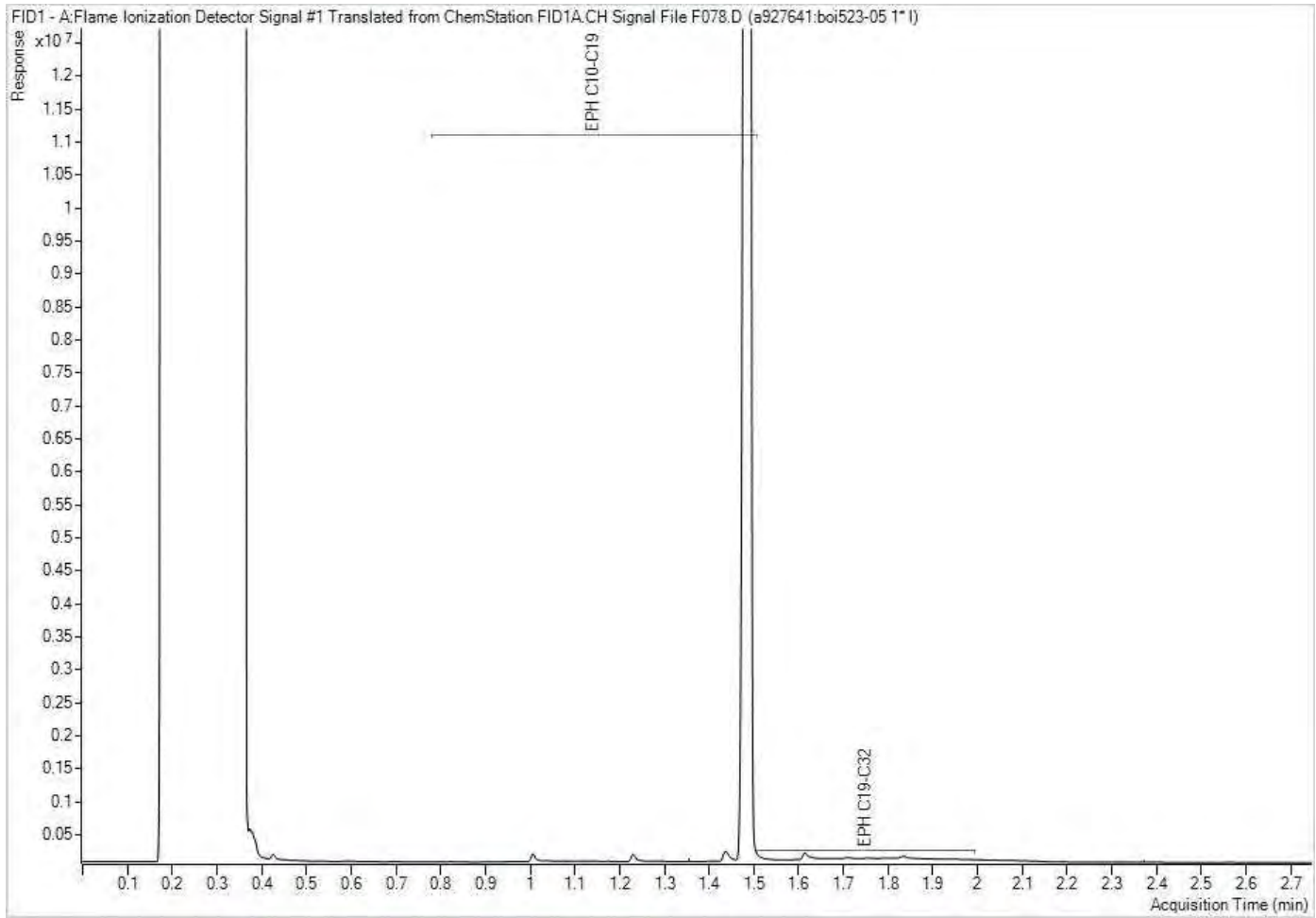
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.





Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site#: Groundwater  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 694569-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/07/27**  
 Report #: R3372034  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C354929**

**Received: 2023/07/19, 10:15**

Sample Matrix: Water  
 # Samples Received: 4

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH Chloride/Sulphate by Auto Colourimetry	4	N/A	2023/07/20	BBY6SOP-00026	SM 24 2320 B m
	4	N/A	2023/07/24	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Conductivity @25C	4	N/A	2023/07/20	BBY6SOP-00026	SM 24 2510 B m
Sulphide (as H2S) (1)	4	N/A	2023/07/24		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc (1)	4	N/A	2023/07/25		
Hardness (calculated as CaCO3)	4	N/A	2023/07/24	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (2)	4	2023/07/26	2023/07/26	AB SOP-00084	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	4	2023/07/21	2023/07/21	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2023/07/24	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (2)	4	N/A	2023/07/22	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	4	N/A	2023/07/25	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	4	N/A	2023/07/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	4	N/A	2023/07/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N)	4	N/A	2023/07/21	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	4	2023/07/21	2023/07/21	BBY8SOP-00021	BCMOE BCLM Jul2017m
Orthophosphate by Konelab (3)	4	N/A	2023/07/20	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (1)	4	N/A	2023/07/24	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	4	2023/07/21	2023/07/24	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (4)	4	N/A	2023/07/24	BBY WI-00033	Auto Calc
Field pH	4	N/A	2023/07/20		
Field Temperature	4	N/A	2023/07/20		

**Remarks:**

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

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



Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site#: Groundwater  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 694569-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/07/27**  
 Report #: R3372034  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C354929**

**Received: 2023/07/19, 10:15**

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

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

- (1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
- (2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (4) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)  
 HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)

Encryption Key



Bureau Veritas  
 27 Jul 2023 11:29:09

Please direct all questions regarding this Certificate of Analysis to:  
 Brody Andersen, B.Sc., B.Sc., Program Specialist—Emergency Spill Response  
 Email: Brody.Andersen@bureauveritas.com  
 Phone# (780)577-7120

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



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BUZ014	BUZ014	BUZ015	BUZ015		
<b>Sampling Date</b>		2023/07/17 15:15	2023/07/17 15:15	2023/07/17 16:15	2023/07/17 16:15		
<b>COC Number</b>		694569-01-01	694569-01-01	694569-01-01	694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-01</b>	<b>WG-11222680-170723 -KH-01 Lab-Dup</b>	<b>WG-11222680-170723 -KH-02</b>	<b>WG-11222680-170723 -KH-02 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	N/A	<0.0050	<0.0050	0.0050	B041712
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	0.653	N/A	0.298	N/A	0.020	B040742
Sulphide (as H2S)	mg/L	<0.0020	N/A	<0.0020	N/A	0.0020	B041248
<b>Field Parameters</b>							
Field pH	pH	7.24	N/A	7.75	N/A	N/A	ONSITE
Field Temperature	°C	16.19	N/A	13.68	N/A	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	160	160	150	N/A	2.0	B041783
Total Dissolved Solids	mg/L	92	N/A	38	N/A	10	B042634
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	<1.0	N/A	1.0	B041787
Alkalinity (Total as CaCO3)	mg/L	73	73	63	N/A	1.0	B041787
Bicarbonate (HCO3)	mg/L	89	90	77	N/A	1.0	B041787
Carbonate (CO3)	mg/L	<1.0	<1.0	<1.0	N/A	1.0	B041787
Hydroxide (OH)	mg/L	<1.0	<1.0	<1.0	N/A	1.0	B041787
Total Sulphide	mg/L	<0.0018	N/A	<0.0018	N/A	0.0018	B045000
Chloride (Cl)	mg/L	<1.0	N/A	3.4	N/A	1.0	B045835
Sulphate (SO4)	mg/L	3.8	N/A	7.0	N/A	1.0	B045835
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	N/A	<0.015	N/A	0.015	B046614
Orthophosphate (P)	mg/L	0.0048	N/A	0.010	N/A	0.0030	B041593
Nitrate plus Nitrite (N)	mg/L	0.653	N/A	0.298	0.299	0.020	B041707
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BUZ016	BUZ017		
Sampling Date		2023/07/17 17:20	2023/07/17 17:30		
COC Number		694569-01-01	694569-01-01		
	UNITS	WG-11222680-170723 -KH-03	WG-11222680-170723 -KH-04	RDL	QC Batch
<b>ANIONS</b>					
Nitrite (N)	mg/L	<0.0050	<0.0050	0.0050	B041712
<b>Calculated Parameters</b>					
Nitrate (N)	mg/L	0.046	0.045	0.020	B040742
Sulphide (as H <sub>2</sub> S)	mg/L	<0.0020	<0.0020	0.0020	B041248
<b>Field Parameters</b>					
Field pH	pH	7.84	7.84	N/A	ONSITE
Field Temperature	°C	19.42	19.42	N/A	ONSITE
<b>Misc. Inorganics</b>					
Conductivity	uS/cm	60	60	2.0	B041783
Total Dissolved Solids	mg/L	42	46	10	B042634
<b>Anions</b>					
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041787
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	25	26	1.0	B041787
Bicarbonate (HCO <sub>3</sub> )	mg/L	31	32	1.0	B041787
Carbonate (CO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041787
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	B041787
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	B045000
Chloride (Cl)	mg/L	<1.0	<1.0	1.0	B045835
Sulphate (SO <sub>4</sub> )	mg/L	2.2	2.2	1.0	B045835
<b>Nutrients</b>					
Total Ammonia (N)	mg/L	<0.015	0.020	0.015	B046614
Orthophosphate (P)	mg/L	<0.0030	<0.0030	0.0030	B041593
Nitrate plus Nitrite (N)	mg/L	0.046	0.045	0.020	B041707
RDL = Reportable Detection Limit N/A = Not Applicable					



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		BUZ014	BUZ015	BUZ016	BUZ017		
Sampling Date		2023/07/17 15:15	2023/07/17 16:15	2023/07/17 17:20	2023/07/17 17:30		
COC Number		694569-01-01	694569-01-01	694569-01-01	694569-01-01		
	UNITS	WG-11222680-170723 -KH-01	WG-11222680-170723 -KH-02	WG-11222680-170723 -KH-03	WG-11222680-170723 -KH-04	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042787
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B042787
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B042787
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B042787
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B042787
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B042787
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B042787
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B042787
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B042787
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B042787
<b>Surrogate Recovery (%)</b>							
D10-ANTHRACENE (sur.)	%	89	90	88	88	N/A	B042787
D8-ACENAPHTHYLENE (sur.)	%	88	89	88	87	N/A	B042787
D8-NAPHTHALENE (sur.)	%	85	83	82	82	N/A	B042787
TERPHENYL-D14 (sur.)	%	82	83	82	82	N/A	B042787
RDL = Reportable Detection Limit N/A = Not Applicable							



Bureau Veritas Job #: C354929  
 Report Date: 2023/07/27

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Bureau Veritas ID		BUZ014	BUZ015	BUZ016	BUZ017		
Sampling Date		2023/07/17 15:15	2023/07/17 16:15	2023/07/17 17:20	2023/07/17 17:30		
COC Number		694569-01-01	694569-01-01	694569-01-01	694569-01-01		
	UNITS	WG-11222680-170723 -KH-01	WG-11222680-170723 -KH-02	WG-11222680-170723 -KH-03	WG-11222680-170723 -KH-04	RDL	QC Batch
<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B041128
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B041128
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B042796
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B042796
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	100	101	101	99	N/A	B042796
RDL = Reportable Detection Limit N/A = Not Applicable							



**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BUZ014	BUZ015	BUZ016		
<b>Sampling Date</b>		2023/07/17 15:15	2023/07/17 16:15	2023/07/17 17:20		
<b>COC Number</b>		694569-01-01	694569-01-01	694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-01</b>	<b>WG-11222680-170723 -KH-02</b>	<b>WG-11222680-170723 -KH-03</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BUZ017		
<b>Sampling Date</b>		2023/07/17 17:30		
<b>COC Number</b>		694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-04</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>				
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	0.0050	B041137
RDL = Reportable Detection Limit				





**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ014	BUZ014	BUZ015	BUZ016		
<b>Sampling Date</b>		2023/07/17 15:15	2023/07/17 15:15	2023/07/17 16:15	2023/07/17 17:20		
<b>COC Number</b>		694569-01-01	694569-01-01	694569-01-01	694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-01</b>	<b>WG-11222680-170723 -KH-01 Lab-Dup</b>	<b>WG-11222680-170723 -KH-02</b>	<b>WG-11222680-170723 -KH-03</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	65.3	N/A	59.1	26.4	0.50	B040635
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	N/A	<0.0019	<0.0019	0.0019	B048284
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	8.8	3.0	B042783
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B042783
Dissolved Arsenic (As)	ug/L	<0.10	<0.10	0.39	<0.10	0.10	B042783
Dissolved Barium (Ba)	ug/L	2.4	2.4	2.7	<1.0	1.0	B042783
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Boron (B)	ug/L	<50	<50	92	<50	50	B042783
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B042783
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B042783
Dissolved Copper (Cu)	ug/L	<0.20	<0.20	0.70	<0.20	0.20	B042783
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B042783
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B042783
Dissolved Manganese (Mn)	ug/L	2.5	2.5	<1.0	<1.0	1.0	B042783
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Phosphorus (P)	ug/L	<10	<10	14	<10	10	B042783
Dissolved Selenium (Se)	ug/L	0.11	0.11	<0.10	<0.10	0.10	B042783
Dissolved Silicon (Si)	ug/L	7520	7620	6410	2570	100	B042783
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B042783
Dissolved Strontium (Sr)	ug/L	28.2	28.2	27.7	11.5	1.0	B042783
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B042783
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BUZ014	BUZ014	BUZ015	BUZ016		
Sampling Date		2023/07/17 15:15	2023/07/17 15:15	2023/07/17 16:15	2023/07/17 17:20		
COC Number		694569-01-01	694569-01-01	694569-01-01	694569-01-01		
	UNITS	WG-11222680-170723 -KH-01	WG-11222680-170723 -KH-01 Lab-Dup	WG-11222680-170723 -KH-02	WG-11222680-170723 -KH-03	RDL	QC Batch
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Calcium (Ca)	mg/L	20.0	N/A	18.7	8.75	0.050	B040637
Dissolved Magnesium (Mg)	mg/L	3.70	N/A	3.02	1.11	0.050	B040637
Dissolved Potassium (K)	mg/L	0.278	N/A	0.338	0.115	0.050	B040637
Dissolved Sodium (Na)	mg/L	5.18	N/A	6.21	0.688	0.050	B040637
Dissolved Sulphur (S)	mg/L	<3.0	N/A	<3.0	<3.0	3.0	B040637

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ017		
<b>Sampling Date</b>		2023/07/17 17:30		
<b>COC Number</b>		694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-04</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Dissolved Hardness (CaCO3)	mg/L	26.0	0.50	B040635
<b>Elements</b>				
Dissolved Mercury (Hg)	ug/L	<0.0019	0.0019	B048535
<b>Dissolved Metals by ICPMS</b>				
Dissolved Aluminum (Al)	ug/L	<3.0	3.0	B042783
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	B042783
Dissolved Arsenic (As)	ug/L	<0.10	0.10	B042783
Dissolved Barium (Ba)	ug/L	<1.0	1.0	B042783
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	B042783
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	B042783
Dissolved Boron (B)	ug/L	<50	50	B042783
Dissolved Cadmium (Cd)	ug/L	<0.010	0.010	B042783
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	B042783
Dissolved Cobalt (Co)	ug/L	<0.20	0.20	B042783
Dissolved Copper (Cu)	ug/L	<0.20	0.20	B042783
Dissolved Iron (Fe)	ug/L	<5.0	5.0	B042783
Dissolved Lead (Pb)	ug/L	<0.20	0.20	B042783
Dissolved Lithium (Li)	ug/L	<2.0	2.0	B042783
Dissolved Manganese (Mn)	ug/L	<1.0	1.0	B042783
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	B042783
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	B042783
Dissolved Phosphorus (P)	ug/L	<10	10	B042783
Dissolved Selenium (Se)	ug/L	<0.10	0.10	B042783
Dissolved Silicon (Si)	ug/L	2580	100	B042783
Dissolved Silver (Ag)	ug/L	<0.020	0.020	B042783
Dissolved Strontium (Sr)	ug/L	11.5	1.0	B042783
Dissolved Thallium (Tl)	ug/L	<0.010	0.010	B042783
Dissolved Tin (Sn)	ug/L	<5.0	5.0	B042783
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	B042783
Dissolved Uranium (U)	ug/L	<0.10	0.10	B042783
Dissolved Vanadium (V)	ug/L	<5.0	5.0	B042783
RDL = Reportable Detection Limit				



Bureau Veritas Job #: C354929  
 Report Date: 2023/07/27

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ017		
<b>Sampling Date</b>		2023/07/17 17:30		
<b>COC Number</b>		694569-01-01		
	<b>UNITS</b>	<b>WG-11222680-170723 -KH-04</b>	<b>RDL</b>	<b>QC Batch</b>
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	B042783
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B042783
Dissolved Calcium (Ca)	mg/L	8.64	0.050	B040637
Dissolved Magnesium (Mg)	mg/L	1.07	0.050	B040637
Dissolved Potassium (K)	mg/L	0.111	0.050	B040637
Dissolved Sodium (Na)	mg/L	0.698	0.050	B040637
Dissolved Sulphur (S)	mg/L	<3.0	3.0	B040637
RDL = Reportable Detection Limit				



Bureau Veritas Job #: C354929  
Report Date: 2023/07/27

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### GENERAL COMMENTS

Results relate only to the items tested.



**QUALITY ASSURANCE REPORT**

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042787	D10-ANTHRACENE (sur.)	2023/07/21			90	50 - 140	89	%		
B042787	D8-ACENAPHTHYLENE (sur.)	2023/07/21			93	50 - 140	89	%		
B042787	D8-NAPHTHALENE (sur.)	2023/07/21			85	50 - 140	80	%		
B042787	TERPHENYL-D14 (sur.)	2023/07/21			86	50 - 140	82	%		
B042796	O-TERPHENYL (sur.)	2023/07/21			94	60 - 140	98	%		
B041593	Orthophosphate (P)	2023/07/20	102	80 - 120	109	80 - 120	<0.0030	mg/L	1.4 (1)	20
B041707	Nitrate plus Nitrite (N)	2023/07/20	102 (2)	80 - 120	107	80 - 120	<0.020	mg/L	0.47 (3)	25
B041712	Nitrite (N)	2023/07/20	100 (2)	80 - 120	103	80 - 120	<0.0050	mg/L	NC (3)	20
B041783	Conductivity	2023/07/20			101	90 - 110	<2.0	uS/cm	0.50 (4)	10
B041787	Alkalinity (PP as CaCO3)	2023/07/20					<1.0	mg/L	NC (4)	20
B041787	Alkalinity (Total as CaCO3)	2023/07/20			99	80 - 120	<1.0	mg/L	0.14 (4)	20
B041787	Bicarbonate (HCO3)	2023/07/20					<1.0	mg/L	0.14 (4)	20
B041787	Carbonate (CO3)	2023/07/20					<1.0	mg/L	NC (4)	20
B041787	Hydroxide (OH)	2023/07/20					<1.0	mg/L	NC (4)	20
B042634	Total Dissolved Solids	2023/07/24	101	80 - 120	97	80 - 120	<10	mg/L	2.5 (1)	20
B042783	Dissolved Aluminum (Al)	2023/07/22	99 (5)	80 - 120	103	80 - 120	<3.0	ug/L	NC (6)	20
B042783	Dissolved Antimony (Sb)	2023/07/22	100 (5)	80 - 120	103	80 - 120	<0.50	ug/L	NC (6)	20
B042783	Dissolved Arsenic (As)	2023/07/22	101 (5)	80 - 120	103	80 - 120	<0.10	ug/L	NC (6)	20
B042783	Dissolved Barium (Ba)	2023/07/22	95 (5)	80 - 120	99	80 - 120	<1.0	ug/L	2.4 (6)	20
B042783	Dissolved Beryllium (Be)	2023/07/22	102 (5)	80 - 120	104	80 - 120	<0.10	ug/L	NC (6)	20
B042783	Dissolved Bismuth (Bi)	2023/07/22	98 (5)	80 - 120	98	80 - 120	<1.0	ug/L	NC (6)	20
B042783	Dissolved Boron (B)	2023/07/22	102 (5)	80 - 120	107	80 - 120	<50	ug/L	NC (6)	20
B042783	Dissolved Cadmium (Cd)	2023/07/22	97 (5)	80 - 120	101	80 - 120	<0.010	ug/L	NC (6)	20
B042783	Dissolved Chromium (Cr)	2023/07/22	96 (5)	80 - 120	99	80 - 120	<1.0	ug/L	NC (6)	20
B042783	Dissolved Cobalt (Co)	2023/07/22	93 (5)	80 - 120	98	80 - 120	<0.20	ug/L	NC (6)	20
B042783	Dissolved Copper (Cu)	2023/07/22	93 (5)	80 - 120	98	80 - 120	<0.20	ug/L	NC (6)	20
B042783	Dissolved Iron (Fe)	2023/07/22	103 (5)	80 - 120	105	80 - 120	<5.0	ug/L	NC (6)	20
B042783	Dissolved Lead (Pb)	2023/07/22	104 (5)	80 - 120	101	80 - 120	<0.20	ug/L	NC (6)	20
B042783	Dissolved Lithium (Li)	2023/07/22	100 (5)	80 - 120	102	80 - 120	<2.0	ug/L	NC (6)	20
B042783	Dissolved Manganese (Mn)	2023/07/22	96 (5)	80 - 120	100	80 - 120	<1.0	ug/L	0.52 (6)	20
B042783	Dissolved Molybdenum (Mo)	2023/07/22	101 (5)	80 - 120	104	80 - 120	<1.0	ug/L	NC (6)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042783	Dissolved Nickel (Ni)	2023/07/22	94 (5)	80 - 120	99	80 - 120	<1.0	ug/L	NC (6)	20
B042783	Dissolved Phosphorus (P)	2023/07/22	100 (5)	80 - 120	103	80 - 120	<10	ug/L	NC (6)	20
B042783	Dissolved Selenium (Se)	2023/07/22	100 (5)	80 - 120	102	80 - 120	<0.10	ug/L	0.55 (6)	20
B042783	Dissolved Silicon (Si)	2023/07/22	NC (5)	80 - 120	111	80 - 120	<100	ug/L	1.2 (6)	20
B042783	Dissolved Silver (Ag)	2023/07/22	97 (5)	80 - 120	100	80 - 120	<0.020	ug/L	NC (6)	20
B042783	Dissolved Strontium (Sr)	2023/07/22	99 (5)	80 - 120	101	80 - 120	<1.0	ug/L	0.26 (6)	20
B042783	Dissolved Thallium (Tl)	2023/07/22	99 (5)	80 - 120	99	80 - 120	<0.010	ug/L	NC (6)	20
B042783	Dissolved Tin (Sn)	2023/07/22	97 (5)	80 - 120	105	80 - 120	<5.0	ug/L	NC (6)	20
B042783	Dissolved Titanium (Ti)	2023/07/22	97 (5)	80 - 120	101	80 - 120	<5.0	ug/L	NC (6)	20
B042783	Dissolved Uranium (U)	2023/07/22	103 (5)	80 - 120	100	80 - 120	<0.10	ug/L	NC (6)	20
B042783	Dissolved Vanadium (V)	2023/07/22	97 (5)	80 - 120	101	80 - 120	<5.0	ug/L	NC (6)	20
B042783	Dissolved Zinc (Zn)	2023/07/22	98 (5)	80 - 120	102	80 - 120	<5.0	ug/L	NC (6)	20
B042783	Dissolved Zirconium (Zr)	2023/07/22	100 (5)	80 - 120	101	80 - 120	<0.10	ug/L	NC (6)	20
B042787	Acenaphthene	2023/07/21			82	50 - 140	<0.050	ug/L		
B042787	Acridine	2023/07/21			89	50 - 140	<0.050	ug/L		
B042787	Anthracene	2023/07/21			84	50 - 140	<0.010	ug/L		
B042787	Benzo(a)anthracene	2023/07/21			81	50 - 140	<0.010	ug/L		
B042787	Benzo(a)pyrene	2023/07/21			83	50 - 140	<0.0050	ug/L		
B042787	Fluoranthene	2023/07/21			77	50 - 140	<0.020	ug/L		
B042787	Fluorene	2023/07/21			81	50 - 140	<0.050	ug/L		
B042787	Naphthalene	2023/07/21			81	50 - 140	<0.10	ug/L		
B042787	Phenanthrene	2023/07/21			80	50 - 140	<0.050	ug/L		
B042787	Pyrene	2023/07/21			77	50 - 140	<0.020	ug/L		
B042796	EPH (C10-C19)	2023/07/21			103	70 - 130	<0.20	mg/L		
B042796	EPH (C19-C32)	2023/07/21			108	70 - 130	<0.20	mg/L		
B045000	Total Sulphide	2023/07/24	100	80 - 120	93	80 - 120	<0.0018	mg/L	NC (1)	20
B045835	Chloride (Cl)	2023/07/25	106	80 - 120	101	80 - 120	<1.0	mg/L	NC (1)	20
B045835	Sulphate (SO4)	2023/07/25	120	80 - 120	98	80 - 120	<1.0	mg/L	3.7 (1)	20
B046614	Total Ammonia (N)	2023/07/25	124 (7)	80 - 120	109	80 - 120	<0.015	mg/L	NC (1)	20
B048284	Dissolved Mercury (Hg)	2023/07/26	90	80 - 120	98	80 - 120	<0.0019	ug/L	NC (1)	20





**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B048535	Dissolved Mercury (Hg)	2023/07/26	99	80 - 120	98	80 - 120	<0.0019	ug/L	NC (1)	20

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [BUZ015-01]

(3) Duplicate Parent ID [BUZ015-01]

(4) Duplicate Parent ID [BUZ014-01]

(5) Matrix Spike Parent ID [BUZ014-03]

(6) Duplicate Parent ID [BUZ014-03]

(7) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



Bureau Veritas Job #: C354929  
Report Date: 2023/07/27

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.



<b>INVOICE TO:</b>		<b>Report Information</b>		<b>Project Information</b>		<b>Laboratory Use Only</b>	
Company Name #163 GHD Limited	Contact Name AP Invoices - 735	Company Name GHD Limited	Contact Name Stephanie Berton	Quotation # C30090	P.O. # 735-002640-3	Bureau Veritas Job #	Bottle Order #:
Address 455 PHILLIP STREET WATERLOO ON N2L 3X2	Phone (519) 684-0510	Address per PO	Phone NationalEDDSupport@maxxam.ca, stephanie.berton@g	Project # 11222680-15.1	Project Name upland	Chain Of Custody Record	Project Manager
Fax (519) 684-0510	Email APInvoices-735@ghd.com	Fax (519) 725-1394	Email NationalEDDSupport@maxxam.ca, stephanie.berton@g	Site # Groundwater	Sampled By Kamreen HASPER	Barcode CR094569-01-01	Brody Andersen

<b>Regulatory Criteria</b> <input checked="" type="checkbox"/> CSR <input type="checkbox"/> CCME <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other _____	<b>Special Instructions</b> bottles were labeled, filtered in the field and preserved as indicated on the labels.	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b> Metals Field Filtered 7 (S/N) Conductivity, Cl, SO4, NO2, NO3, N-N, PO4 Speciated Alkalinity Sulphide + H2S Calc Sulphide, Un-ionized (as H2S) (Calc) Ammonia-N (Total) Dissolved Metals with CV Hg, Hardness Total Dissolved Solids (Fit, Residue) LEPTHEPH with subtracted PANTS Field pH Field Temperature	<b>Turnaround Time (TAT) Required:</b> Please provide advance notice for rush projects <b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are + 5 days - contact your Project Manager for details.
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SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered 7 (S/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness	Total Dissolved Solids (Fit, Residue)	LEPTHEPH with subtracted PANTS	Field pH	Field Temperature	# of Bottles	Comments
1	WH-11222680-170723-KH-01	17107123	15:15	W	✓	X	X	X	X	X	X	X	X	7.24	16.19		
2	WH-11222680-170723-KH-02	17107123	16:15	W	✓	X	X	X	X	X	X	X	X	7.75	13.68		
3	WH-11222680-170723-KH-03	17107123	17:20	W	✓	X	X	X	X	X	X	X	X	7.84	19.42		
4	WH-11222680-170723-KH-04	17107123	17:30	W	✓	X	X	X	X	X	X	X	X	7.84	19.42		
5																	
6																	
7																	
8																	
9																	
10																	

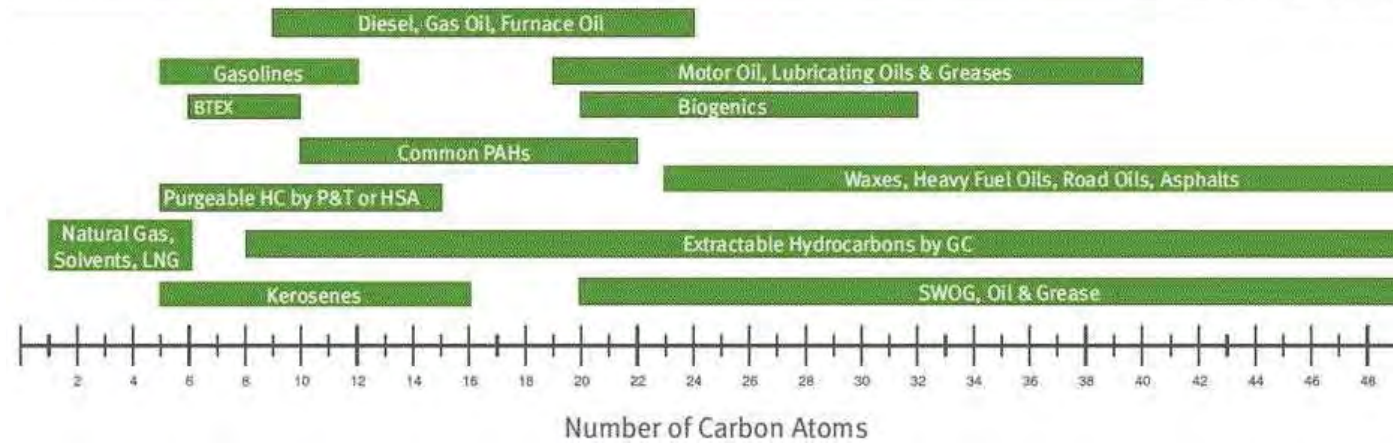
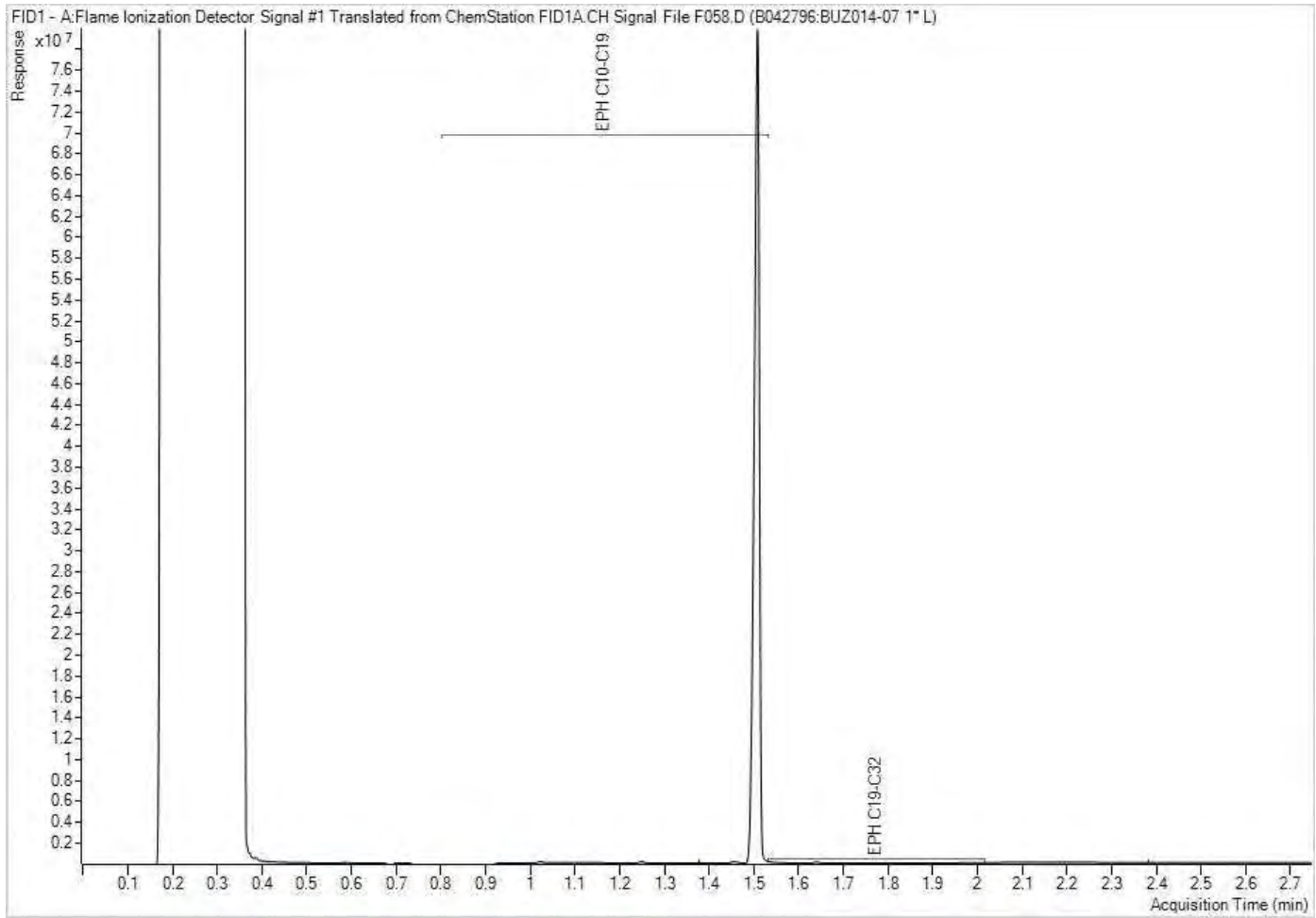


<b>RELINQUISHED BY: (Signature/Print)</b> Kamreen HASPER	<b>Date: (YYMMDD)</b> 23/07/17	<b>Time</b> 17:30	<b>RECEIVED BY: (Signature/Print)</b> DELANE CACOLI	<b>Date: (YYMMDD)</b> 23/07/17	<b>Time</b> 09:20	<b># jars used and not submitted</b>	<b>Time Sensitive</b> <input type="checkbox"/>	<b>Temperature (°C) on Receipt</b> 5, 3, 2	<b>Custody Seal Intact on Cooler?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.  
 \* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

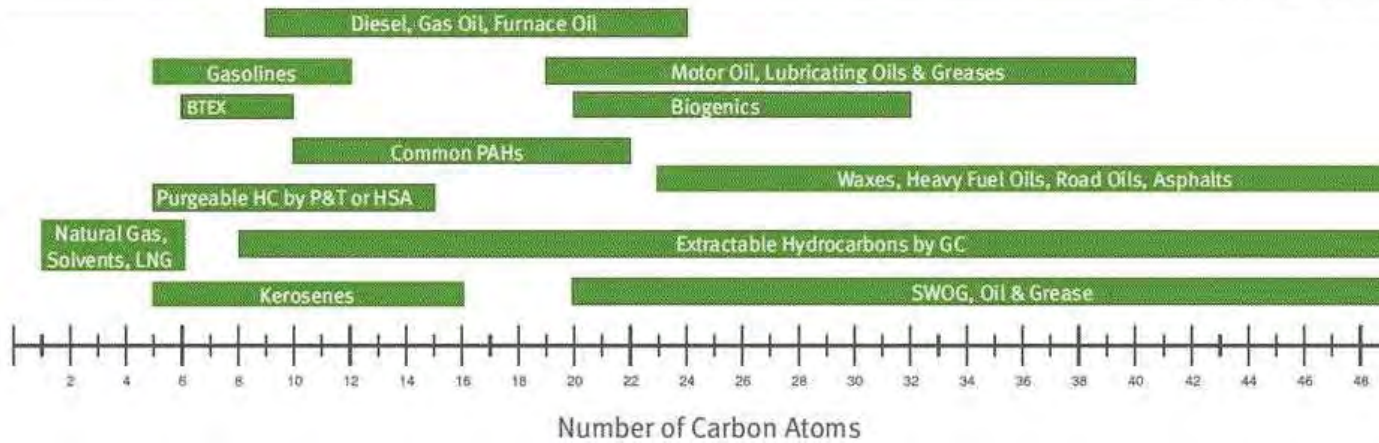
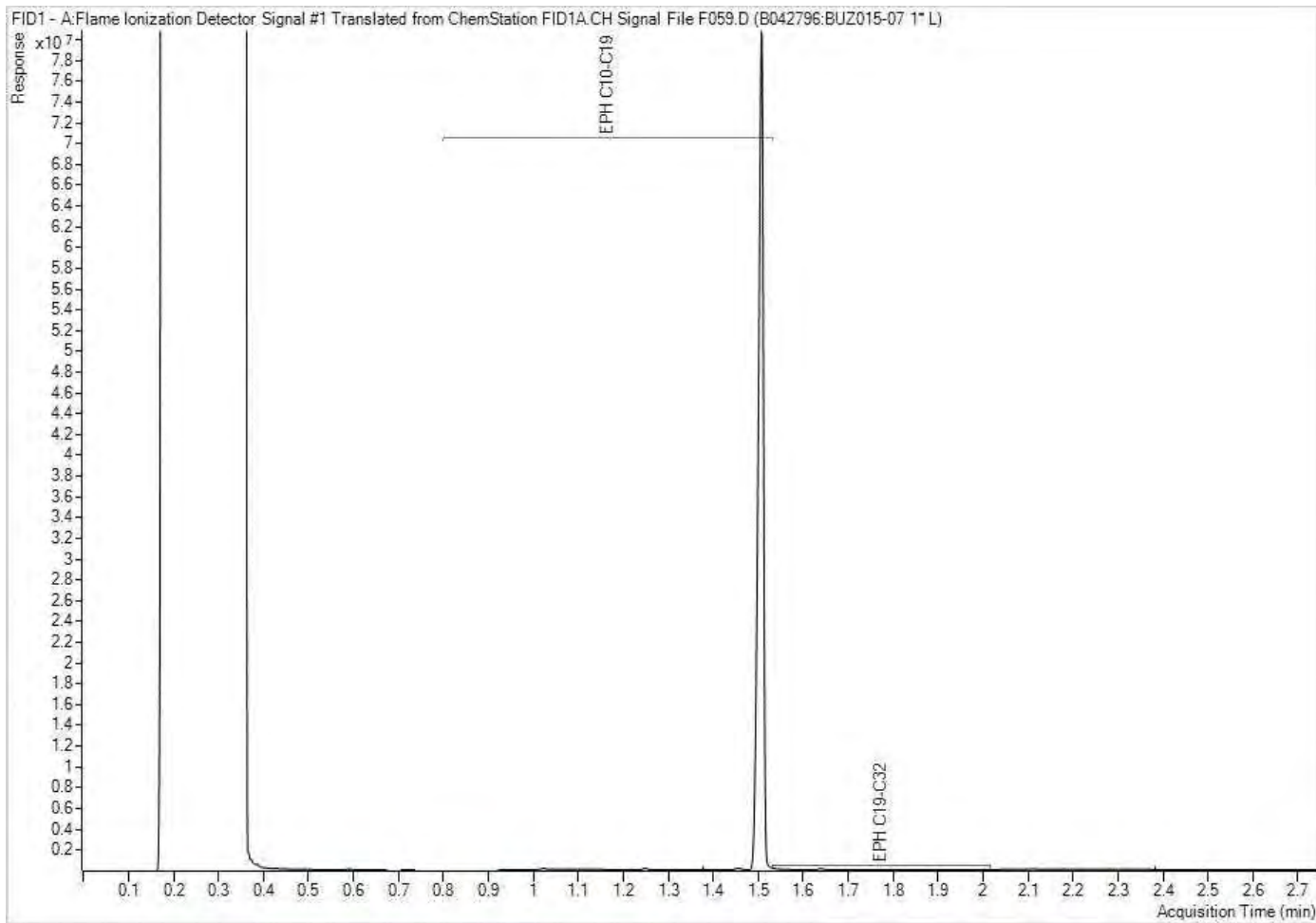
icc packs: yes

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

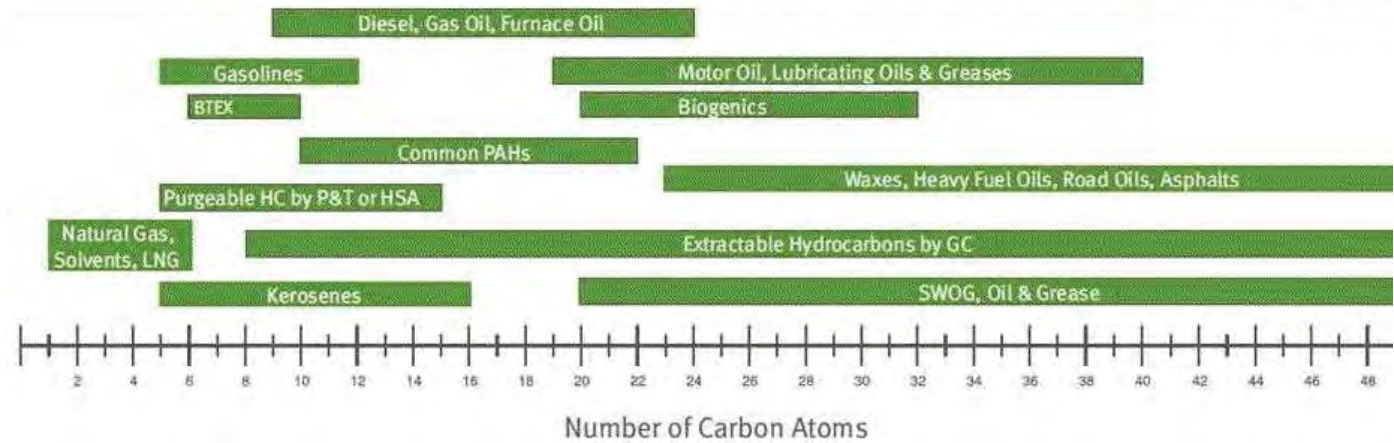
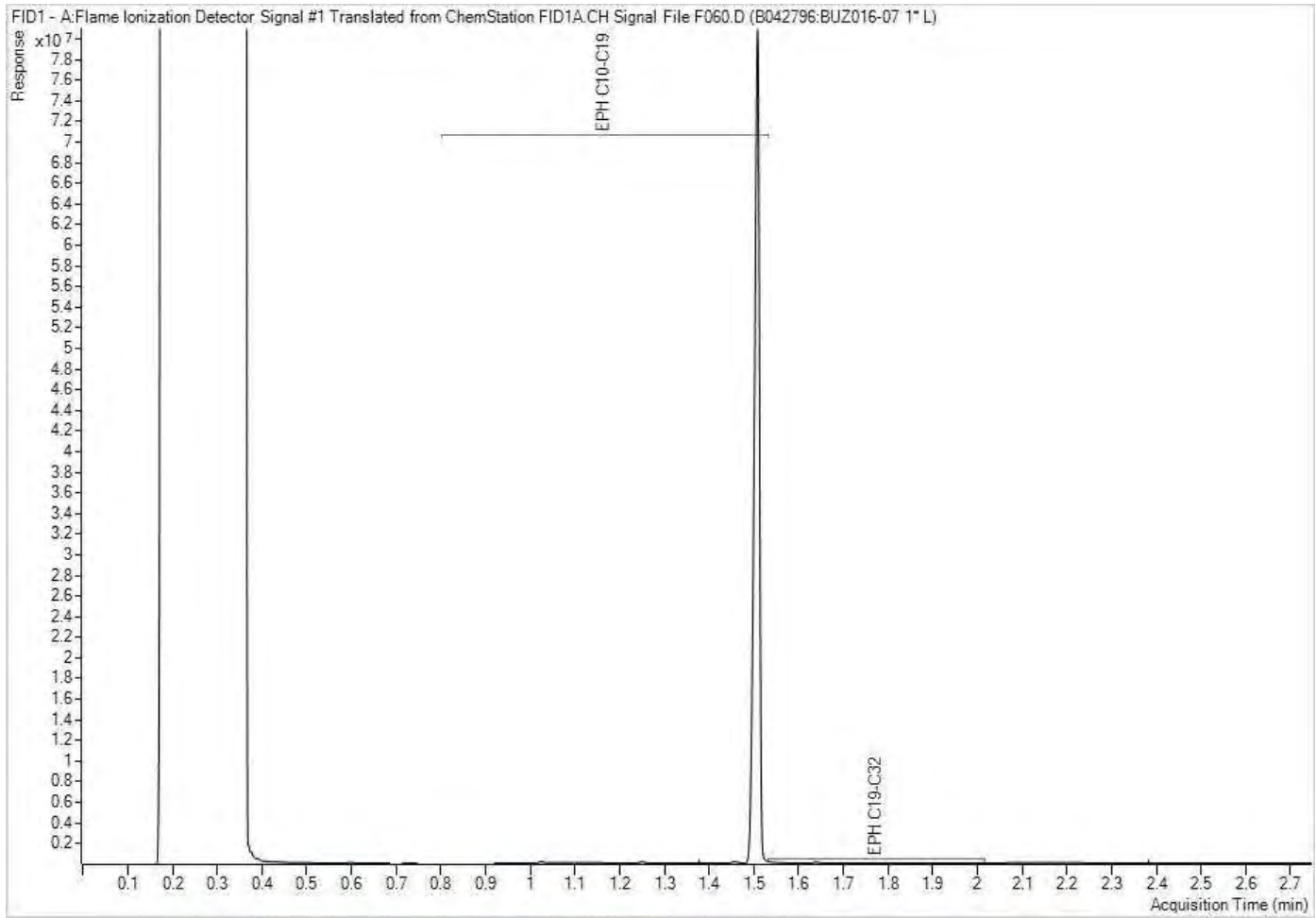
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

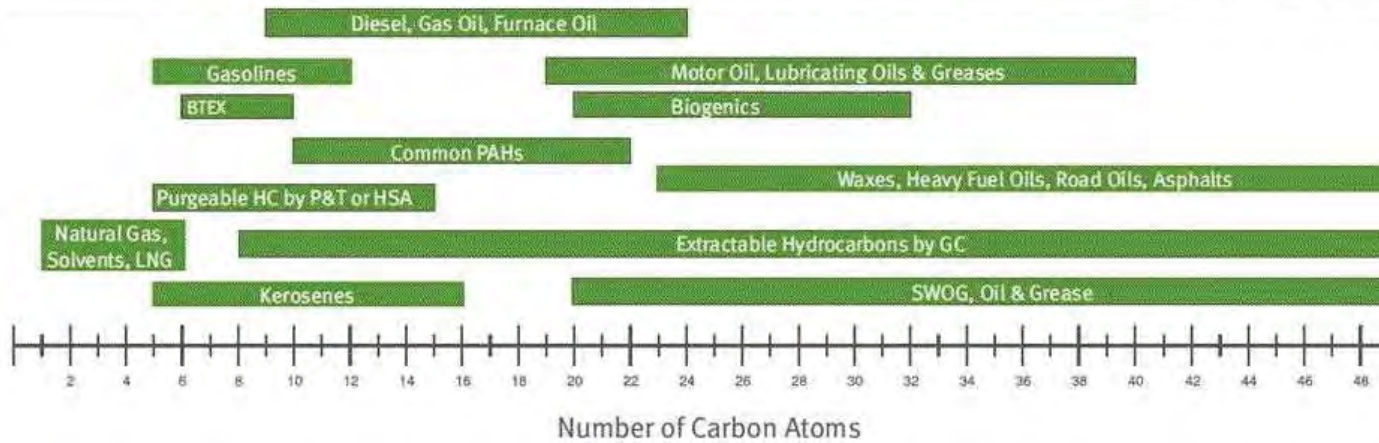
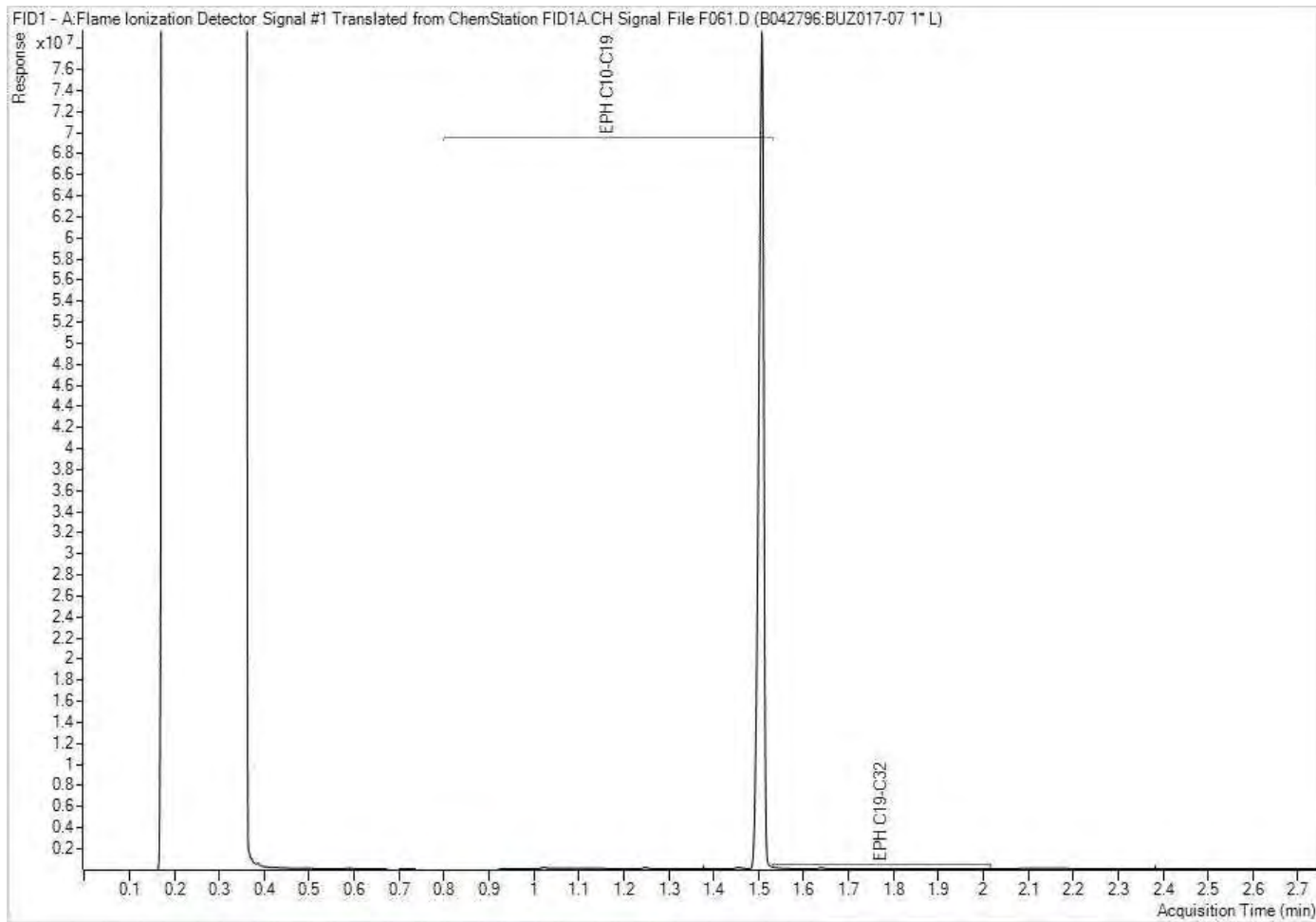


EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.





Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 694571-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/08/04**  
 Report #: R3376673  
 Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BUREAU VERITAS JOB #: C354963**

**Received: 2023/07/19, 11:02**

Sample Matrix: Water  
 # Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	2	N/A	2023/07/21	BBY6SOP-00026	SM 24 2320 B m
Biochemical Oxygen Demand	2	2023/07/20	2023/07/25	BBY6SOP-00045	SM 23 5210 B m
Chloride/Sulphate by Auto Colourimetry	2	N/A	2023/07/25	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
COD by Colorimeter	2	N/A	2023/07/21	BBY6SOP-00024	SM 23 5220 D m
Conductivity @25C	2	N/A	2023/07/21	BBY6SOP-00026	SM 24 2510 B m
Sulphide (as H2S) (1)	2	N/A	2023/07/24		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc (1)	2	N/A	2023/07/25		
Hardness Total (calculated as CaCO3) (2)	2	N/A	2023/07/24	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	2	N/A	2023/07/26	BBY WI-00033	Auto Calc
Mercury (Total) by CV	2	2023/07/24	2023/07/25	AB SOP-00084	BCMOE BCLM Oct2013 m
ICP-OES Dissolved Metals in Water (3)	2	N/A	2023/07/26	BBY7SOP-00018	EPA 6010d m
EPH in Water when PAH required	2	2023/07/21	2023/07/21	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2023/07/20	2023/07/24	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	2	2023/07/21	2023/07/24	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	2	N/A	2023/07/25	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	2	N/A	2023/07/21	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	2	N/A	2023/07/21	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N)	2	N/A	2023/07/22	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	2	2023/07/21	2023/07/21	BBY8SOP-00021	BCMOE BCLM Jul2017m
pH @25°C (4)	2	N/A	2023/07/21	BBY6SOP-00026	SM 24 4500-H+ B m
Orthophosphate by Konelab (5)	2	N/A	2023/07/21	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (1)	2	N/A	2023/07/24	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	2	2023/07/24	2023/07/25	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (6)	2	N/A	2023/07/24	BBY WI-00033	Auto Calc
Total Suspended Solids (NFR)	2	2023/07/21	2023/07/24	BBY6SOP-00034	SM 24 2540 D m
Field pH	2	N/A	2023/07/20		
Field Temperature	2	N/A	2023/07/20		

**Remarks:**

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau



Your P.O. #: 735-002640-3  
Your Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your C.O.C. #: 694571-01-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/08/04**  
Report #: R3376673  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BUREAU VERITAS JOB #: C354963**

**Received: 2023/07/19, 11:02**

Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

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

(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(3) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(4) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

(5) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

(6) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)

HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)



Your P.O. #: 735-002640-3  
Your Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your C.O.C. #: 694571-01-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/08/04**  
Report #: R3376673  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BUREAU VERITAS JOB #: C354963**

**Received: 2023/07/19, 11:02**

Encryption Key

Brody Andersen  
Program Specialist-Emergency Spill  
Response  
04 Aug 2023 16:33:57

Please direct all questions regarding this Certificate of Analysis to:  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response  
Email: Brody.Andersen@bureauveritas.com  
Phone# (780)577-7120

=====

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



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BUZ206	BUZ206		BUZ207		
<b>Sampling Date</b>		2023/07/18 16:50	2023/07/18 16:50		2023/07/18 17:00		
<b>COC Number</b>		694571-01-01	694571-01-01		694571-01-01		
	<b>UNITS</b>	<b>WL-11222680-180723-KH-01</b>	<b>WL-11222680-180723-KH-01 Lab-Dup</b>	<b>QC Batch</b>	<b>WL-11222680-180723-KH-02</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	<0.0050	B043059	<0.0050	0.0050	B043059
<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	1530	N/A	B040635	1560	0.50	B040635
Nitrate (N)	mg/L	<0.020	N/A	B040742	<0.020	0.020	B040742
Sulphide (as H2S)	mg/L	0.37	N/A	B040445	0.34	0.0040	B041248
<b>Demand Parameters</b>							
Biochemical Oxygen Demand	mg/L	8.4	N/A	B040505	8.3	2.0	B040505
Chemical Oxygen Demand	mg/L	208	N/A	B040515	210	10	B040515
<b>Field Parameters</b>							
Field pH	pH	6.32	N/A	ONSITE	6.32	N/A	ONSITE
Field Temperature	°C	24.04	N/A	ONSITE	24.04	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	4400	N/A	B042663	4400	2.0	B042663
pH	pH	5.82	N/A	B042658	5.96	N/A	B042658
Total Dissolved Solids	mg/L	3700 (1)	N/A	B045215	3600 (1)	13	B045215
Total Suspended Solids	mg/L	140 (1)	N/A	B040632	180 (1)	5.0	B040632
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	B042664	<1.0	1.0	B042664
Alkalinity (Total as CaCO3)	mg/L	26	N/A	B042664	30	1.0	B042664
Bicarbonate (HCO3)	mg/L	31	N/A	B042664	36	1.0	B042664
Carbonate (CO3)	mg/L	<1.0	N/A	B042664	<1.0	1.0	B042664
Hydroxide (OH)	mg/L	<1.0	N/A	B042664	<1.0	1.0	B042664
Total Sulphide	mg/L	0.35 (2)	N/A	B043887	0.32 (2)	0.0036	B043887
Chloride (Cl)	mg/L	310	320	B046927	310	5.0	B046927
Sulphate (SO4)	mg/L	2000	2000	B046927	2000	25	B046927
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	55	N/A	B046614	55	0.75	B046614

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable  
 (1) RDL raised due to high concentration of solids in the sample.  
 (2) Sample pH <9, preservation incomplete. Due to volatility of analyte, a low bias in the results is likely.



Bureau Veritas Job #: C354963  
 Report Date: 2023/08/04

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BUZ206	BUZ206		BUZ207		
Sampling Date		2023/07/18 16:50	2023/07/18 16:50		2023/07/18 17:00		
COC Number		694571-01-01	694571-01-01		694571-01-01		
	UNITS	WL-11222680-180723- KH-01	WL-11222680-180723- KH-01 Lab-Dup	QC Batch	WL-11222680-180723- KH-02	RDL	QC Batch
Orthophosphate (P)	mg/L	<0.0030	N/A	B042667	<0.0030	0.0030	B042667
Nitrate plus Nitrite (N)	mg/L	<0.020	<0.020	B043056	<0.020	0.020	B043056
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		BUZ206	BUZ207		
Sampling Date		2023/07/18 16:50	2023/07/18 17:00		
COC Number		694571-01-01	694571-01-01		
	UNITS	WL-11222680-180723-KH-01	WL-11222680-180723-KH-02	RDL	QC Batch
<b>Polycyclic Aromatics</b>					
Naphthalene	ug/L	0.78	0.82	0.10	B042271
Acenaphthene	ug/L	0.094	0.094	0.050	B042271
Fluorene	ug/L	<0.050	<0.050	0.050	B042271
Phenanthrene	ug/L	<0.050	<0.050	0.050	B042271
Anthracene	ug/L	0.018	0.019	0.010	B042271
Acridine	ug/L	<0.050	<0.050	0.050	B042271
Fluoranthene	ug/L	0.021	<0.020	0.020	B042271
Pyrene	ug/L	<0.020	<0.020	0.020	B042271
Benzo(a)anthracene	ug/L	<0.010	<0.010	0.010	B042271
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	0.0050	B042271
<b>Surrogate Recovery (%)</b>					
D10-ANTHRACENE (sur.)	%	85	86	N/A	B042271
D8-ACENAPHTHYLENE (sur.)	%	90	92	N/A	B042271
D8-NAPHTHALENE (sur.)	%	82	84	N/A	B042271
TERPHENYL-D14 (sur.)	%	83	83	N/A	B042271
RDL = Reportable Detection Limit N/A = Not Applicable					



Bureau Veritas Job #: C354963  
 Report Date: 2023/08/04

GHD Limited  
 Client Project #: 11222680-15.1  
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 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Bureau Veritas ID</b>		BUZ206	BUZ206	BUZ207		
<b>Sampling Date</b>		2023/07/18 16:50	2023/07/18 16:50	2023/07/18 17:00		
<b>COC Number</b>		694571-01-01	694571-01-01	694571-01-01		
	<b>UNITS</b>	<b>WL-11222680-180723- KH-01</b>	<b>WL-11222680-180723- KH-01 Lab-Dup</b>	<b>WL-11222680-180723- KH-02</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Dissolved Metals by ICP</b>						
Dissolved Calcium (Ca)	mg/L	486	475	500	0.50	B048276
Dissolved Magnesium (Mg)	mg/L	76.7	77.3	76.9	0.050	B048276
RDL = Reportable Detection Limit						
Lab-Dup = Laboratory Initiated Duplicate						





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**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Bureau Veritas ID		BUZ206	BUZ207		
Sampling Date		2023/07/18 16:50	2023/07/18 17:00		
COC Number		694571-01-01	694571-01-01		
	UNITS	WL-11222680-180723-KH-01	WL-11222680-180723-KH-02	RDL	QC Batch
<b>Calculated Parameters</b>					
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	0.20	B041128
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	0.20	B041128
<b>Ext. Pet. Hydrocarbon</b>					
EPH (C10-C19)	mg/L	<0.20	<0.20	0.20	B042275
EPH (C19-C32)	mg/L	<0.20	<0.20	0.20	B042275
<b>Surrogate Recovery (%)</b>					
O-TERPHENYL (sur.)	%	86	84	N/A	B042275
RDL = Reportable Detection Limit N/A = Not Applicable					



Bureau Veritas Job #: C354963  
 Report Date: 2023/08/04

GHD Limited  
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 Sampler Initials: KH

**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BUZ206	BUZ207		
<b>Sampling Date</b>		2023/07/18 16:50	2023/07/18 17:00		
<b>COC Number</b>		694571-01-01	694571-01-01		
	<b>UNITS</b>	<b>WL-11222680-180723- KH-01</b>	<b>WL-11222680-180723- KH-02</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>					
Total Un-ionized Hydrogen Sulfide as S	mg/L	0.28	0.25	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	0.29	0.26	0.0050	B041137
RDL = Reportable Detection Limit					



**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BUZ206	BUZ207		
Sampling Date		2023/07/18 16:50	2023/07/18 17:00		
COC Number		694571-01-01	694571-01-01		
	UNITS	WL-11222680-180723-KH-01	WL-11222680-180723-KH-02	RDL	QC Batch
<b>Calculated Parameters</b>					
Total Hardness (CaCO3)	mg/L	1290	1350	0.50	B040739
<b>Elements</b>					
Total Mercury (Hg)	ug/L	0.0041	0.0041	0.0019	B045377
<b>Total Metals by ICPMS</b>					
Total Aluminum (Al)	ug/L	1250	1170	15	B042401
Total Antimony (Sb)	ug/L	<2.5	<2.5	2.5	B042401
Total Arsenic (As)	ug/L	3.06	3.18	0.50	B042401
Total Barium (Ba)	ug/L	59.8	62.0	5.0	B042401
Total Beryllium (Be)	ug/L	<0.50	<0.50	0.50	B042401
Total Bismuth (Bi)	ug/L	<5.0	<5.0	5.0	B042401
Total Boron (B)	ug/L	1240	1280	100	B042401
Total Cadmium (Cd)	ug/L	0.282	0.297	0.050	B042401
Total Chromium (Cr)	ug/L	10.4	10.2	5.0	B042401
Total Cobalt (Co)	ug/L	13.9	14.5	1.0	B042401
Total Copper (Cu)	ug/L	32.0	31.7	2.5	B042401
Total Iron (Fe)	ug/L	26300	26500	50	B042401
Total Lead (Pb)	ug/L	<1.0	<1.0	1.0	B042401
Total Lithium (Li)	ug/L	11	12	10	B042401
Total Manganese (Mn)	ug/L	4600	4790	5.0	B042401
Total Molybdenum (Mo)	ug/L	<5.0	<5.0	5.0	B042401
Total Nickel (Ni)	ug/L	20.3	18.8	5.0	B042401
Total Phosphorus (P)	ug/L	123	106	50	B042401
Total Selenium (Se)	ug/L	<0.50	<0.50	0.50	B042401
Total Silicon (Si)	ug/L	18400	19100	500	B042401
Total Silver (Ag)	ug/L	<0.10	<0.10	0.10	B042401
Total Strontium (Sr)	ug/L	2720	2890	5.0	B042401
Total Thallium (Tl)	ug/L	<0.050	<0.050	0.050	B042401
Total Tin (Sn)	ug/L	<25	<25	25	B042401
Total Titanium (Ti)	ug/L	34	26	25	B042401
Total Uranium (U)	ug/L	<0.50	<0.50	0.50	B042401
Total Vanadium (V)	ug/L	<25	<25	25	B042401
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C354963  
 Report Date: 2023/08/04

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		BUZ206	BUZ207		
Sampling Date		2023/07/18 16:50	2023/07/18 17:00		
COC Number		694571-01-01	694571-01-01		
	UNITS	WL-11222680-180723-KH-01	WL-11222680-180723-KH-02	RDL	QC Batch
Total Zinc (Zn)	ug/L	131	132	25	B042401
Total Zirconium (Zr)	ug/L	0.56	0.55	0.50	B042401
Total Calcium (Ca)	mg/L	409	426	0.25	B040818
Total Magnesium (Mg)	mg/L	66.6	69.4	0.25	B040818
Total Potassium (K)	mg/L	48.2	51.0	0.25	B040818
Total Sodium (Na)	mg/L	304	319	0.25	B040818
Total Sulphur (S)	mg/L	593	648	15	B040818
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C354963  
Report Date: 2023/08/04

GHD Limited  
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Your P.O. #: 735-002640-3  
Sampler Initials: KH

### GENERAL COMMENTS

Version 2: Report reissued to remove Fluoride in Water from all samples as per original chain of custody form.

**Results relate only to the items tested.**



### QUALITY ASSURANCE REPORT

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042271	D10-ANTHRACENE (sur.)	2023/07/21	89	50 - 140	84	50 - 140	89	%		
B042271	D8-ACENAPHTHYLENE (sur.)	2023/07/21	88	50 - 140	84	50 - 140	86	%		
B042271	D8-NAPHTHALENE (sur.)	2023/07/21	84	50 - 140	77	50 - 140	76	%		
B042271	TERPHENYL-D14 (sur.)	2023/07/21	95	50 - 140	89	50 - 140	95	%		
B042275	O-TERPHENYL (sur.)	2023/07/21			93	60 - 140	98	%		
B040505	Biochemical Oxygen Demand	2023/07/25			92	85 - 115	<2.0	mg/L	6.3 (1)	20
B040515	Chemical Oxygen Demand	2023/07/21	102	N/A	100	80 - 120	<10	mg/L	3.3 (1)	20
B040632	Total Suspended Solids	2023/07/24	103	80 - 120	99	80 - 120	<1.0	mg/L	NC (1)	20
B042271	Acenaphthene	2023/07/21	85	50 - 140	78	50 - 140	<0.050	ug/L	12 (1)	40
B042271	Acridine	2023/07/21	102	50 - 140	99	50 - 140	<0.050	ug/L	0.13 (1)	40
B042271	Anthracene	2023/07/21	94	50 - 140	87	50 - 140	<0.010	ug/L	17 (1)	40
B042271	Benzo(a)anthracene	2023/07/21	89	50 - 140	78	50 - 140	<0.010	ug/L	2.7 (1)	40
B042271	Benzo(a)pyrene	2023/07/21	81	50 - 140	75	50 - 140	<0.0050	ug/L	8.8 (1)	40
B042271	Fluoranthene	2023/07/21	94	50 - 140	86	50 - 140	<0.020	ug/L	11 (1)	40
B042271	Fluorene	2023/07/21	87	50 - 140	80	50 - 140	<0.050	ug/L	20 (1)	40
B042271	Naphthalene	2023/07/21	79	50 - 140	73	50 - 140	<0.10	ug/L	11 (1)	40
B042271	Phenanthrene	2023/07/21	84	50 - 140	77	50 - 140	<0.050	ug/L	12 (1)	40
B042271	Pyrene	2023/07/21	96	50 - 140	88	50 - 140	<0.020	ug/L	12 (1)	40
B042275	EPH (C10-C19)	2023/07/21			102	70 - 130	<0.20	mg/L	NC (1)	30
B042275	EPH (C19-C32)	2023/07/21			105	70 - 130	<0.20	mg/L	NC (1)	30
B042401	Total Aluminum (Al)	2023/07/21	102	80 - 120	105	80 - 120	<3.0	ug/L	2.5 (1)	20
B042401	Total Antimony (Sb)	2023/07/21	102	80 - 120	104	80 - 120	<0.50	ug/L		
B042401	Total Arsenic (As)	2023/07/21	102	80 - 120	101	80 - 120	<0.10	ug/L	3.2 (1)	20
B042401	Total Barium (Ba)	2023/07/21	98	80 - 120	99	80 - 120	<1.0	ug/L		
B042401	Total Beryllium (Be)	2023/07/21	99	80 - 120	101	80 - 120	<0.10	ug/L		
B042401	Total Bismuth (Bi)	2023/07/21	94	80 - 120	100	80 - 120	<1.0	ug/L		
B042401	Total Boron (B)	2023/07/21	99	80 - 120	102	80 - 120	<50	ug/L	NC (1)	20
B042401	Total Cadmium (Cd)	2023/07/21	99	80 - 120	100	80 - 120	<0.010	ug/L	NC (1)	20
B042401	Total Chromium (Cr)	2023/07/21	97	80 - 120	102	80 - 120	<1.0	ug/L	2.8 (1)	20
B042401	Total Cobalt (Co)	2023/07/21	94	80 - 120	98	80 - 120	<0.20	ug/L	NC (1)	20
B042401	Total Copper (Cu)	2023/07/21	91	80 - 120	97	80 - 120	<0.50	ug/L	2.8 (1)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042401	Total Iron (Fe)	2023/07/21	100	80 - 120	100	80 - 120	<10	ug/L	0.0095 (1)	20
B042401	Total Lead (Pb)	2023/07/21	95	80 - 120	98	80 - 120	<0.20	ug/L	NC (1)	20
B042401	Total Lithium (Li)	2023/07/21	93	80 - 120	95	80 - 120	<2.0	ug/L		
B042401	Total Manganese (Mn)	2023/07/21	97	80 - 120	100	80 - 120	<1.0	ug/L	2.4 (1)	20
B042401	Total Molybdenum (Mo)	2023/07/21	NC	80 - 120	101	80 - 120	<1.0	ug/L	0.84 (1)	20
B042401	Total Nickel (Ni)	2023/07/21	94	80 - 120	99	80 - 120	<1.0	ug/L	3.7 (1)	20
B042401	Total Phosphorus (P)	2023/07/21	104	80 - 120	103	80 - 120	<10	ug/L		
B042401	Total Selenium (Se)	2023/07/21	98	80 - 120	101	80 - 120	<0.10	ug/L	1.9 (1)	20
B042401	Total Silicon (Si)	2023/07/21	NC	80 - 120	113	80 - 120	<100	ug/L		
B042401	Total Silver (Ag)	2023/07/21	99	80 - 120	100	80 - 120	<0.020	ug/L	NC (1)	20
B042401	Total Strontium (Sr)	2023/07/21	NC	80 - 120	99	80 - 120	<1.0	ug/L		
B042401	Total Thallium (Tl)	2023/07/21	97	80 - 120	101	80 - 120	<0.010	ug/L		
B042401	Total Tin (Sn)	2023/07/21	99	80 - 120	101	80 - 120	<5.0	ug/L		
B042401	Total Titanium (Ti)	2023/07/21	101	80 - 120	102	80 - 120	<5.0	ug/L		
B042401	Total Uranium (U)	2023/07/21	102	80 - 120	103	80 - 120	<0.10	ug/L		
B042401	Total Vanadium (V)	2023/07/21	98	80 - 120	100	80 - 120	<5.0	ug/L		
B042401	Total Zinc (Zn)	2023/07/21	97	80 - 120	101	80 - 120	<5.0	ug/L	NC (1)	20
B042401	Total Zirconium (Zr)	2023/07/21	101	80 - 120	98	80 - 120	<0.10	ug/L		
B042658	pH	2023/07/21			100	97 - 103			0.096 (1)	N/A
B042663	Conductivity	2023/07/21			100	90 - 110	<2.0	uS/cm	0.27 (1)	10
B042664	Alkalinity (PP as CaCO3)	2023/07/21					<1.0	mg/L	NC (1)	20
B042664	Alkalinity (Total as CaCO3)	2023/07/21			98	80 - 120	<1.0	mg/L	0.36 (1)	20
B042664	Bicarbonate (HCO3)	2023/07/21					<1.0	mg/L	0.36 (1)	20
B042664	Carbonate (CO3)	2023/07/21					<1.0	mg/L	NC (1)	20
B042664	Hydroxide (OH)	2023/07/21					<1.0	mg/L	NC (1)	20
B042667	Orthophosphate (P)	2023/07/21	111	80 - 120	107	80 - 120	<0.0030	mg/L	NC (1)	20
B043056	Nitrate plus Nitrite (N)	2023/07/21	98 (2)	80 - 120	107	80 - 120	<0.020	mg/L	NC (3)	25
B043059	Nitrite (N)	2023/07/21	96 (2)	80 - 120	103	80 - 120	<0.0050	mg/L	NC (3)	20
B043887	Total Sulphide	2023/07/24	NC	80 - 120	100	80 - 120	<0.0018	mg/L		
B045215	Total Dissolved Solids	2023/07/25	101	80 - 120	108	80 - 120	<10	mg/L	3.3 (1)	20
B045377	Total Mercury (Hg)	2023/07/25	86	80 - 120	104	80 - 120	<0.0019	ug/L	NC (1)	20





**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B046614	Total Ammonia (N)	2023/07/25	124 (4)	80 - 120	109	80 - 120	<0.015	mg/L	NC (1)	20
B046927	Chloride (Cl)	2023/07/25	NC (2)	80 - 120	101	80 - 120	<1.0	mg/L	0.82 (3)	20
B046927	Sulphate (SO4)	2023/07/25	NC (2)	80 - 120	105	80 - 120	<1.0	mg/L	0.13 (3)	20
B048276	Dissolved Calcium (Ca)	2023/07/26	NC (5)	80 - 120	100	80 - 120	<0.050	mg/L	2.3 (6)	20
B048276	Dissolved Magnesium (Mg)	2023/07/26	NC (5)	80 - 120	108	80 - 120	<0.050	mg/L	0.81 (6)	20

N/A = Not Applicable

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [BUZ206-03]

(3) Duplicate Parent ID [BUZ206-03]

(4) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(5) Matrix Spike Parent ID [BUZ206-07]

(6) Duplicate Parent ID [BUZ206-07]



Bureau Veritas Job #: C354963  
Report Date: 2023/08/04

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

---

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.





<b>INVOICE TO:</b>		<b>Report Information</b>		<b>Project Information</b>		<b>Laboratory Use Only</b>	
Company Name	#163 GHD Limited	Company Name	GHD Limited	Question #	C30090	Bureau Veritas Job #	Sample Order #
Contact Name	AP Invoices - 735	Contact Name	Stephanie Berton	P.O. #	735-002640-3		
Address	455 PHILLIP STREET WATERLOO ON N2L 3X2	Address		Project #	11222680-15.1		094571
Phone	(519) 884-0510 Fax (519) 725-1394	Phone		Project Name	upland	Chain Of Custody Record	Project Manager
Email	APInvoices-735@ghd.com	Email	NationalEDDSupport@maxam.ca stephanie.berton@ghd.com	Site #	Leachate Water		Wendy Anderson
				Sample By	K. HOSNER	0964271-01-01	

<b>Regulatory Criteria</b> <input checked="" type="checkbox"/> CCR <input type="checkbox"/> CCME <input type="checkbox"/> RC Water Quality <input type="checkbox"/> Other: _____	<b>Special Instructions</b> Bottles need filtered and preserved as indicated on bottle.	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b> Metals Filtered (P/N) Conductivity, Cl, SO4, NO2, NO3, N-N, PO4, TD5, TSS, Sp. Alb Total Sulphide, Total H2S, Un-ionized (as H2S) - based on total Ammonia-N (Total) Total Metals with Cu, Hg, Ni, Pb, Zn Biochemical Oxygen Demand (5 DAY BOD5) COD + CO3 + HCO3 + OH + ALKALINITY @ 25C (PPM)	<b>Turnaround Time (TAT) Requested</b> Please provide advance notice for rush projects <b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not applied) Standard TAT = 5-7 Working days for most water Please Note: Standard TAT for certain tests such as BOD and Dissolved Oxygen are 7-8 days - contact your Project Manager for details. <b>Job Specific Rush TAT (if applies to entire submission)</b> 1 Day <input checked="" type="checkbox"/> 2 Day <input checked="" type="checkbox"/> 3 Day <input type="checkbox"/> Other Requested _____ Rush Confirmation Number: perpo (not set for 0)
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**SAMPLES MUST BE KEPT COOL (+/- 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS**

Sample Barcode Label	Sample Location Identification	Date Sampled	Time Sampled	Matrix	Metals Filtered (P/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4, TD5, TSS, Sp. Alb	Total Sulphide, Total H2S, Un-ionized (as H2S) - based on total	Ammonia-N (Total)	Total Metals with Cu, Hg, Ni, Pb, Zn	Biochemical Oxygen Demand (5 DAY BOD5)	COD + CO3 + HCO3 + OH + ALKALINITY @ 25C (PPM)	Dissolved Hardness	LEPNHEPH with subtracted P&Hs	Field pH	Field Temperature
1	WL-11222680-180723	1810123	1650	W	X	X	X	X	X	X	X	X	X	6.32	24.04
2	WL-11222680-180723-KH-02	1810123	1700	W	X	X	X	X	X	X	X	X	X	6.32	24.04
3															
4															
5															
6															
7															
8															
9															
10															



RELINQUISHED BY: (Signature/Print)	Date: (YYMMDD)	Time	RECEIVED BY: (Signature/Print)	Date: (YYMMDD)	Time	# Jars used and not submitted	Lab Use Only
Kathleen Klossner	14/07/23	1800	EVELANIE COOKE	23/07/19	11:01		Test Results: <input type="checkbox"/> Temperature (°C) at Receipt: 3, 5, 2 Cooled (See Note on Label): <input type="checkbox"/> Yes <input type="checkbox"/> No

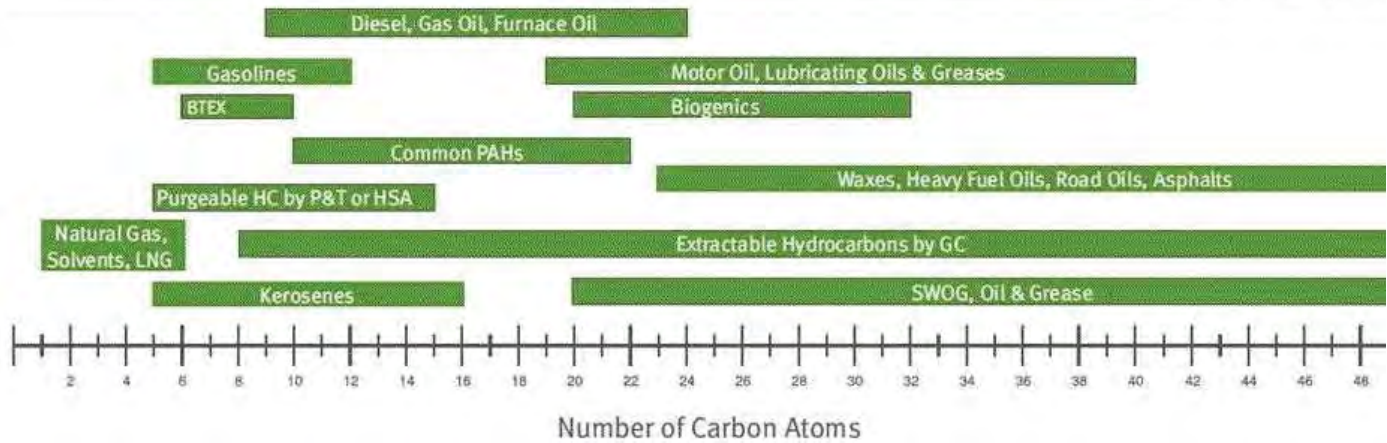
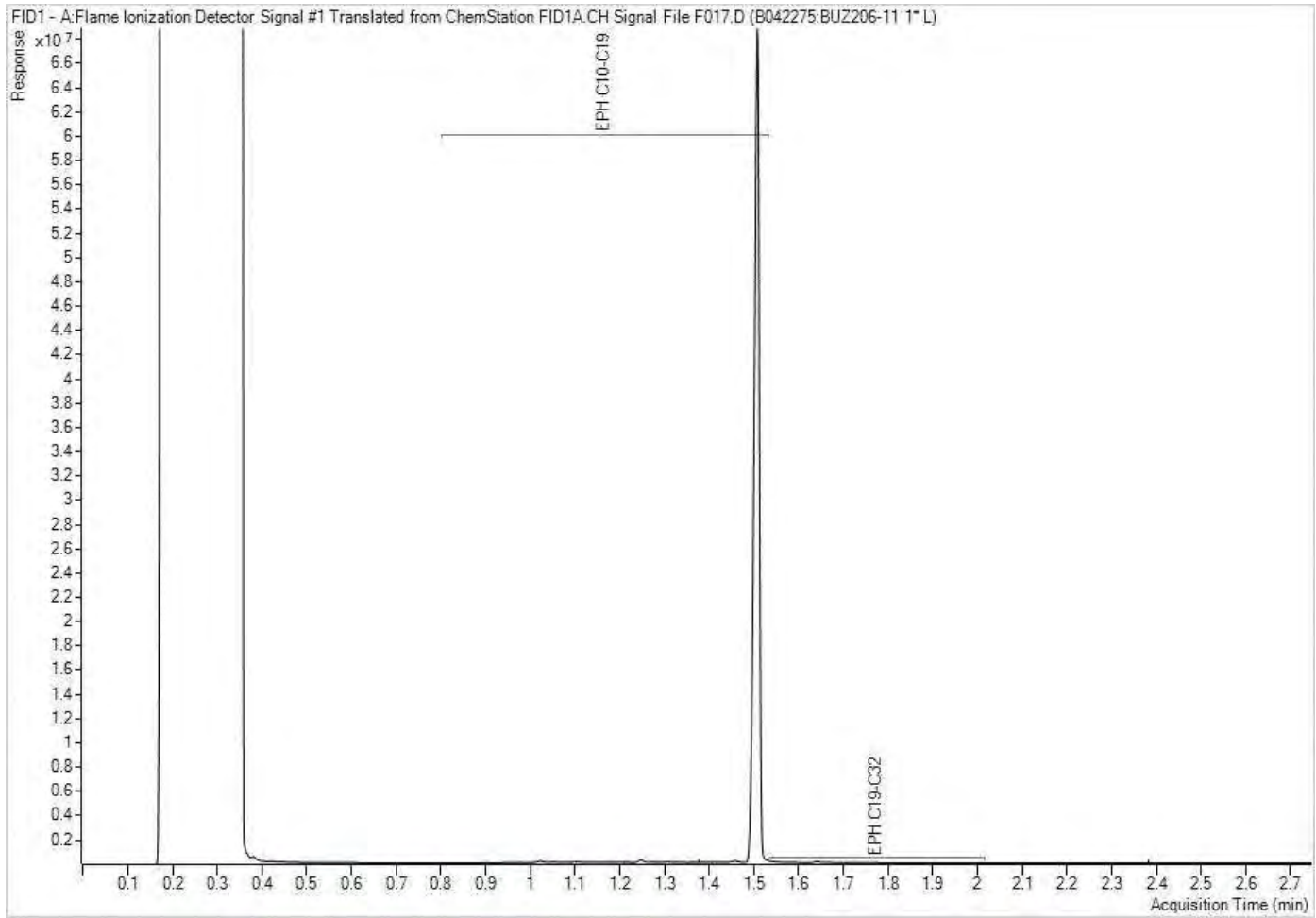
\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT [WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS](http://WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS)

\*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

7, 2, 5  
Ice-jars  
see Actil for EBY temps

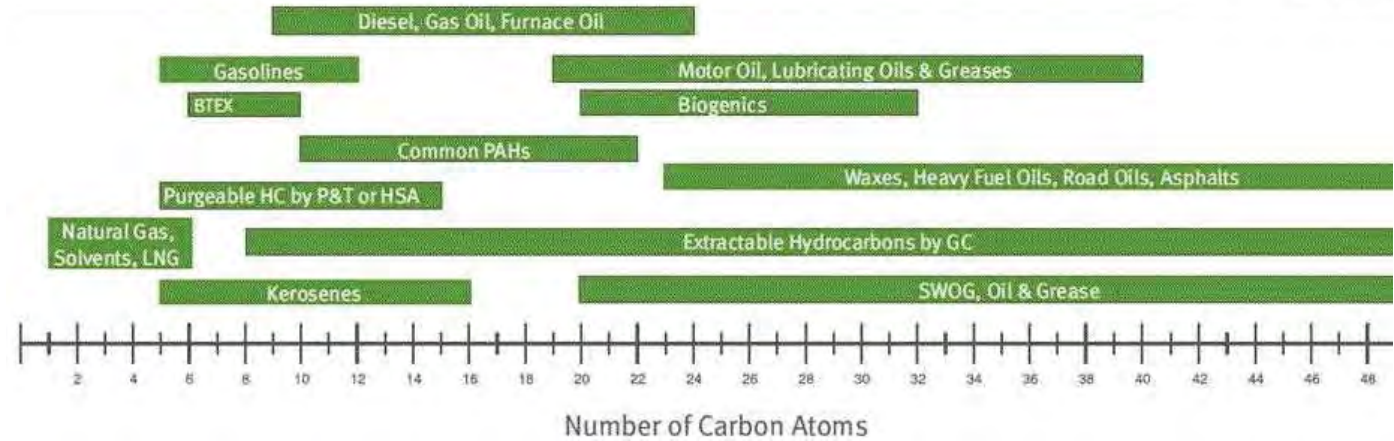
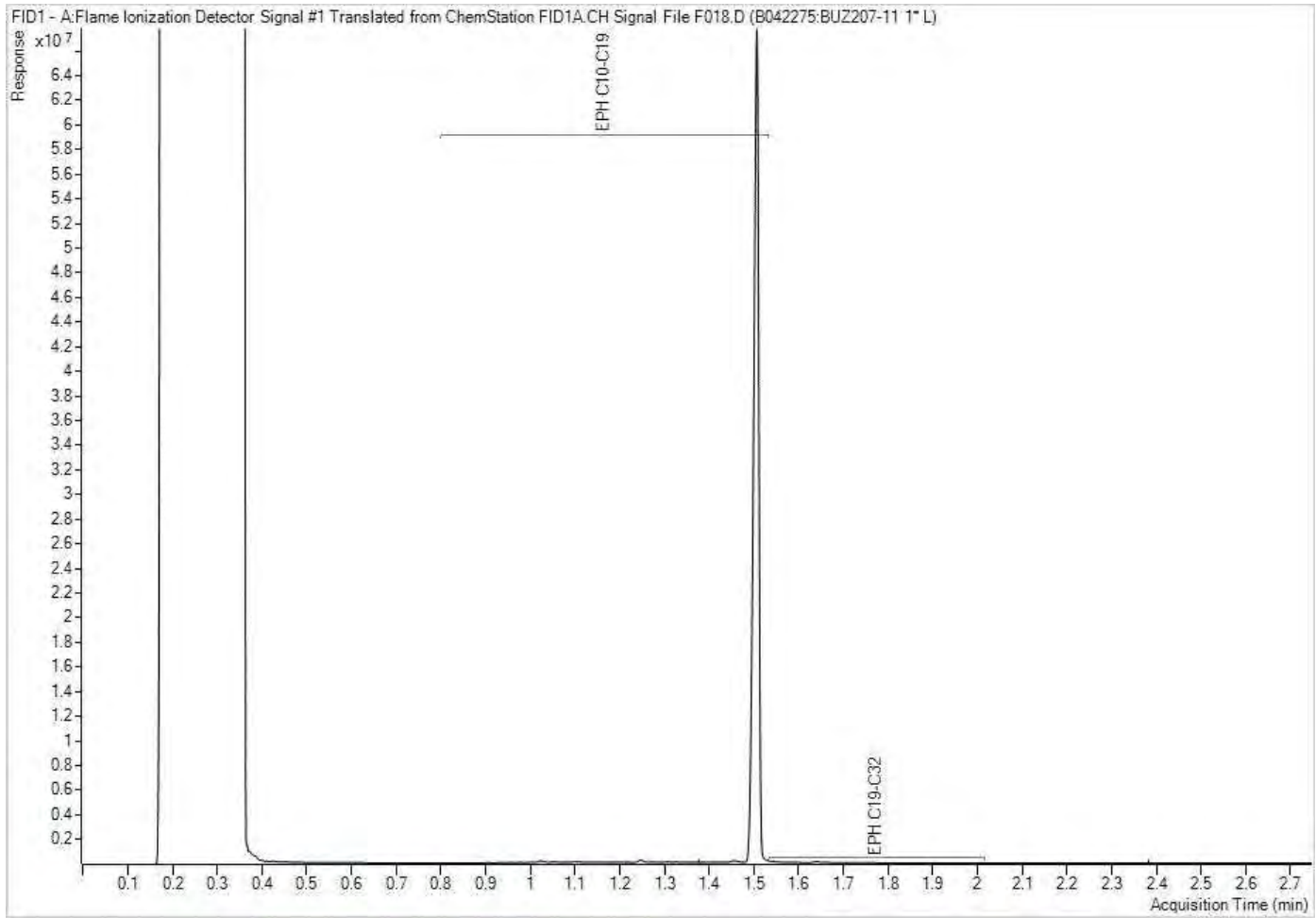


EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 694569-02-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/07/28**  
 Report #: R3373120  
 Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C354973**

**Received: 2023/07/19, 11:02**

Sample Matrix: Water  
 # Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2023/07/20	BBY6SOP-00026	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2023/07/28	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry	2	N/A	2023/07/24	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Chloride/Sulphate by Auto Colourimetry	4	N/A	2023/07/25	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Chloride/Sulphate by Auto Colourimetry	1	N/A	2023/07/27	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Conductivity @25C	6	N/A	2023/07/20	BBY6SOP-00026	SM 24 2510 B m
Conductivity @25C	1	N/A	2023/07/28	BBY6SOP-00026	SM 24 2510 B m
Sulphide (as H2S) (1)	7	N/A	2023/07/25		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc (1)	7	N/A	2023/07/25		
Hardness (calculated as CaCO3)	6	N/A	2023/07/24	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	1	N/A	2023/07/27	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (2)	7	2023/07/27	2023/07/28	AB SOP-00084	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	2	2023/07/21	2023/07/21	BBY8SOP-00029	BCMOE BCLM Sep2017 m
EPH in Water when PAH required	5	2023/07/24	2023/07/24	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2023/07/24	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2023/07/27	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (2)	6	N/A	2023/07/22	BBY7SOP-00002	EPA 6020b R2 m
Elements by CRC ICPMS (dissolved) (2)	1	N/A	2023/07/26	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	7	N/A	2023/07/25	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	6	N/A	2023/07/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrate + Nitrite (N)	1	N/A	2023/07/27	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	6	N/A	2023/07/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) by CFA	1	N/A	2023/07/27	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N)	6	N/A	2023/07/21	BBY WI-00033	Auto Calc
Nitrogen - Nitrate (as N)	1	N/A	2023/07/27	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	2	2023/07/21	2023/07/22	BBY8SOP-00021	BCMOE BCLM Jul2017m
PAH in Water by GC/MS (SIM)	5	2023/07/24	2023/07/24	BBY8SOP-00021	BCMOE BCLM Jul2017m
pH @25°C (3)	5	N/A	2023/07/20	BBY6SOP-00026	SM 24 4500-H+ B m
pH @25°C (3)	1	N/A	2023/07/21	BBY6SOP-00026	SM 24 4500-H+ B m





Your P.O. #: 735-002640-3  
 Your Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 694569-02-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/07/28**  
 Report #: R3373120  
 Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C354973**

**Received: 2023/07/19, 11:02**

Sample Matrix: Water  
 # Samples Received: 7

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
pH @25°C (3)	1	N/A	2023/07/28	BBY6SOP-00026	SM 24 4500-H+ B m
Orthophosphate by Konelab (4)	6	N/A	2023/07/20	BBY6SOP-00013	SM 24 4500-P E m
Orthophosphate by Konelab (4)	1	N/A	2023/07/27	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (1)	7	N/A	2023/07/25	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	3	2023/07/21	2023/07/24	BBY6SOP-00033	SM 24 2540 C m
Total Dissolved Solids (Filt. Residue)	4	2023/07/24	2023/07/25	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (5)	2	N/A	2023/07/24	BBY WI-00033	Auto Calc
EPH less PAH in Water by GC/FID (5)	3	N/A	2023/07/25	BBY WI-00033	Auto Calc
EPH less PAH in Water by GC/FID (5)	2	N/A	2023/07/26	BBY WI-00033	Auto Calc
Field pH	7	N/A	2023/07/20		
Field Temperature	7	N/A	2023/07/20		

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

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

(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8



Your P.O. #: 735-002640-3  
Your Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your C.O.C. #: 694569-02-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/07/28**  
Report #: R3373120  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C354973**

**Received: 2023/07/19, 11:02**

- (2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
- (4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (5) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)  
HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)

Encryption Key



Bureau Veritas  
28 Jul 2023 19:11:23

Please direct all questions regarding this Certificate of Analysis to:  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response  
Email: Brody.Andersen@bureauveritas.com  
Phone# (780)577-7120

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



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BUZ261	BUZ261		BUZ262		
<b>Sampling Date</b>		2023/07/18 10:40	2023/07/18 10:40		2023/07/18 12:10		
<b>COC Number</b>		694569-02-01	694569-02-01		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-05</b>	<b>WG-11222680-180723 -KH-05 Lab-Dup</b>	<b>QC Batch</b>	<b>WG-11222680-180723 -KH-06</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	N/A	B041712	0.0055	0.0050	B050812
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	0.365	N/A	B040742	0.190	0.020	B049848
Sulphide (as H2S)	mg/L	<0.0020	N/A	B040445	<0.0020	0.0020	B040445
<b>Field Parameters</b>							
Field pH	pH	7.70	N/A	ONSITE	7.65	N/A	ONSITE
Field Temperature	°C	16.92	N/A	ONSITE	16.90	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	220	N/A	B041769	130	2.0	B050736
pH	pH	7.76	N/A	B041758	7.15	N/A	B050725
Total Dissolved Solids	mg/L	130	N/A	B042634	54	10	B042634
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	B041770	<1.0	1.0	B050737
Alkalinity (Total as CaCO3)	mg/L	74	N/A	B041770	41	1.0	B050737
Bicarbonate (HCO3)	mg/L	90	N/A	B041770	50	1.0	B050737
Carbonate (CO3)	mg/L	<1.0	N/A	B041770	<1.0	1.0	B050737
Hydroxide (OH)	mg/L	<1.0	N/A	B041770	<1.0	1.0	B050737
Total Sulphide	mg/L	<0.0018	<0.0018	B046711	<0.0018 (1)	0.0018	B046711
Chloride (Cl)	mg/L	16	N/A	B045835	12	1.0	B050697
Sulphate (SO4)	mg/L	6.6	N/A	B045835	3.1	1.0	B050697
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	N/A	B046614	<0.015	0.015	B046614
Orthophosphate (P)	mg/L	0.0099	N/A	B041593	0.0040	0.0030	B050548
Nitrate plus Nitrite (N)	mg/L	0.365	N/A	B041707	0.195	0.020	B050809

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable  
 (1) Matrix spike exceeds acceptance limits due to matrix interference.



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BUZ262		BUZ263		BUZ264		
<b>Sampling Date</b>		2023/07/18 12:10		2023/07/18 13:45		2023/07/18 14:00		
<b>COC Number</b>		694569-02-01		694569-02-01		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723</b> -KH-06 Lab-Dup	<b>QC Batch</b>	<b>WG-11222680-180723</b> -KH-07	<b>QC Batch</b>	<b>WG-11222680-180723</b> -KH-08	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>								
Nitrite (N)	mg/L	N/A	B050812	<0.0050	B041712	<0.0050	0.0050	B041712
<b>Calculated Parameters</b>								
Nitrate (N)	mg/L	N/A	B049848	0.720	B040742	0.082	0.020	B040742
Sulphide (as H2S)	mg/L	N/A	B040445	<0.0020	B040445	<0.0020	0.0020	B040445
<b>Field Parameters</b>								
Field pH	pH	N/A	ONSITE	6.99	ONSITE	8.59	N/A	ONSITE
Field Temperature	°C	N/A	ONSITE	14.96	ONSITE	15.95	N/A	ONSITE
<b>Misc. Inorganics</b>								
Conductivity	uS/cm	N/A	B050736	200	B041769	73	2.0	B041769
pH	pH	N/A	B050725	7.54	B041758	7.61	N/A	B041758
Total Dissolved Solids	mg/L	N/A	B042634	120	B042634	56	10	B045215
<b>Anions</b>								
Alkalinity (PP as CaCO3)	mg/L	N/A	B050737	<1.0	B041770	<1.0	1.0	B041770
Alkalinity (Total as CaCO3)	mg/L	N/A	B050737	77	B041770	32	1.0	B041770
Bicarbonate (HCO3)	mg/L	N/A	B050737	94	B041770	40	1.0	B041770
Carbonate (CO3)	mg/L	N/A	B050737	<1.0	B041770	<1.0	1.0	B041770
Hydroxide (OH)	mg/L	N/A	B050737	<1.0	B041770	<1.0	1.0	B041770
Total Sulphide	mg/L	N/A	B046711	<0.0018	B046711	<0.0018	0.0018	B046711
Chloride (Cl)	mg/L	12	B050697	6.3	B045835	<1.0	1.0	B045835
Sulphate (SO4)	mg/L	3.0	B050697	8.4	B045835	2.7	1.0	B045835
<b>Nutrients</b>								
Total Ammonia (N)	mg/L	N/A	B046614	<0.015	B046614	<0.015	0.015	B046614
Orthophosphate (P)	mg/L	N/A	B050548	0.0035	B041593	0.026	0.0030	B041593
Nitrate plus Nitrite (N)	mg/L	N/A	B050809	0.720	B041707	0.082	0.020	B041707

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BUZ264			BUZ265		BUZ266		
<b>Sampling Date</b>		2023/07/18 14:00			2023/07/18 15:30		2023/07/19 08:30		
<b>COC Number</b>		694569-02-01			694569-02-01		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723</b> <b>-KH-08</b> <b>Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>WG-11222680-180723</b> <b>-KH-09</b>	<b>RDL</b>	<b>WG-11222680-180723</b> <b>-KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>									
Nitrite (N)	mg/L	N/A	0.0050	B041712	<0.0050	0.0050	<0.0050	0.0050	B041712
<b>Calculated Parameters</b>									
Nitrate (N)	mg/L	N/A	0.020	B040742	2.66	0.10	0.901	0.020	B040742
Sulphide (as H2S)	mg/L	N/A	0.0020	B040445	<0.0020	0.0020	<0.0020	0.0020	B040445
<b>Field Parameters</b>									
Field pH	pH	N/A	N/A	ONSITE	7.37	N/A	6.99	N/A	ONSITE
Field Temperature	°C	N/A	N/A	ONSITE	15.26	N/A	14.59	N/A	ONSITE
<b>Misc. Inorganics</b>									
Conductivity	uS/cm	N/A	2.0	B041769	130	2.0	500	2.0	B041769
pH	pH	N/A	N/A	B041758	7.14	N/A	7.49	N/A	B041758
Total Dissolved Solids	mg/L	N/A	10	B045215	100	10	370	10	B045215
<b>Anions</b>									
Alkalinity (PP as CaCO3)	mg/L	N/A	1.0	B041770	<1.0	1.0	<1.0	1.0	B041770
Alkalinity (Total as CaCO3)	mg/L	N/A	1.0	B041770	44	1.0	94	1.0	B041770
Bicarbonate (HCO3)	mg/L	N/A	1.0	B041770	54	1.0	110	1.0	B041770
Carbonate (CO3)	mg/L	N/A	1.0	B041770	<1.0	1.0	<1.0	1.0	B041770
Hydroxide (OH)	mg/L	N/A	1.0	B041770	<1.0	1.0	<1.0	1.0	B041770
Total Sulphide	mg/L	N/A	0.0018	B046711	<0.0018	0.0018	<0.0018	0.0018	B046711
Chloride (Cl)	mg/L	<1.0	1.0	B045835	1.9	1.0	86	1.0	B045835
Sulphate (SO4)	mg/L	2.6	1.0	B045835	8.6	1.0	6.4	1.0	B045835
<b>Nutrients</b>									
Total Ammonia (N)	mg/L	N/A	0.015	B046614	<0.015	0.015	<0.015	0.015	B046614
Orthophosphate (P)	mg/L	0.027	0.0030	B041593	0.0047	0.0030	0.0075	0.0030	B041593
Nitrate plus Nitrite (N)	mg/L	N/A	0.020	B041707	2.66	0.10	0.901	0.020	B041707

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BUZ267	BUZ267		
Sampling Date		2023/07/19 09:30	2023/07/19 09:30		
COC Number		694569-02-01	694569-02-01		
	UNITS	WG-11222680-180723 -KH-11	WG-11222680-180723 -KH-11 Lab-Dup	RDL	QC Batch
<b>ANIONS</b>					
Nitrite (N)	mg/L	<0.0050	N/A	0.0050	B041712
<b>Calculated Parameters</b>					
Nitrate (N)	mg/L	<0.020	N/A	0.020	B040742
Sulphide (as H <sub>2</sub> S)	mg/L	0.0028	N/A	0.0020	B040445
<b>Field Parameters</b>					
Field pH	pH	0	N/A	N/A	ONSITE
Field Temperature	°C	0	N/A	N/A	ONSITE
<b>Misc. Inorganics</b>					
Conductivity	uS/cm	<2.0	<2.0	2.0	B041769
pH	pH	5.48	5.47	N/A	B042566
Total Dissolved Solids	mg/L	<10	N/A	10	B045215
<b>Anions</b>					
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041770
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041770
Bicarbonate (HCO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041770
Carbonate (CO <sub>3</sub> )	mg/L	<1.0	<1.0	1.0	B041770
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	B041770
Total Sulphide	mg/L	0.0027	N/A	0.0018	B046711
Chloride (Cl)	mg/L	<1.0	N/A	1.0	B045835
Sulphate (SO <sub>4</sub> )	mg/L	<1.0	N/A	1.0	B045835
<b>Nutrients</b>					
Total Ammonia (N)	mg/L	<0.015	N/A	0.015	B046617
Orthophosphate (P)	mg/L	<0.0030	N/A	0.0030	B041593
Nitrate plus Nitrite (N)	mg/L	<0.020	N/A	0.020	B041707
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		BUZ261	BUZ262		BUZ263		
Sampling Date		2023/07/18 10:40	2023/07/18 12:10		2023/07/18 13:45		
COC Number		694569-02-01	694569-02-01		694569-02-01		
	UNITS	WG-11222680-180723 -KH-05	WG-11222680-180723 -KH-06	QC Batch	WG-11222680-180723 -KH-07	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Naphthalene	ug/L	<0.10	<0.10	B042787	<0.10	0.10	B044779
Acenaphthene	ug/L	<0.050	<0.050	B042787	<0.050	0.050	B044779
Fluorene	ug/L	<0.050	<0.050	B042787	<0.050	0.050	B044779
Phenanthrene	ug/L	<0.050	<0.050	B042787	<0.050	0.050	B044779
Anthracene	ug/L	<0.010	<0.010	B042787	<0.010	0.010	B044779
Acridine	ug/L	<0.050	<0.050	B042787	<0.050	0.050	B044779
Fluoranthene	ug/L	<0.020	<0.020	B042787	<0.020	0.020	B044779
Pyrene	ug/L	<0.020	<0.020	B042787	<0.020	0.020	B044779
Benzo(a)anthracene	ug/L	<0.010	<0.010	B042787	<0.010	0.010	B044779
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	B042787	<0.0050	0.0050	B044779
<b>Surrogate Recovery (%)</b>							
D10-ANTHRACENE (sur.)	%	83	85	B042787	91	N/A	B044779
D8-ACENAPHTHYLENE (sur.)	%	83	84	B042787	90	N/A	B044779
D8-NAPHTHALENE (sur.)	%	74	76	B042787	84	N/A	B044779
TERPHENYL-D14 (sur.)	%	78	78	B042787	79	N/A	B044779
RDL = Reportable Detection Limit N/A = Not Applicable							





**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		BUZ264		BUZ265	BUZ266		
Sampling Date		2023/07/18 14:00		2023/07/18 15:30	2023/07/19 08:30		
COC Number		694569-02-01		694569-02-01	694569-02-01		
	UNITS	WG-11222680-180723 -KH-08	QC Batch	WG-11222680-180723 -KH-09	WG-11222680-180723 -KH-10	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Naphthalene	ug/L	<0.10	B044779	<0.10	<0.10	0.10	B045204
Acenaphthene	ug/L	<0.050	B044779	<0.050	<0.050	0.050	B045204
Fluorene	ug/L	<0.050	B044779	<0.050	<0.050	0.050	B045204
Phenanthrene	ug/L	<0.050	B044779	<0.050	<0.050	0.050	B045204
Anthracene	ug/L	<0.010	B044779	<0.010	<0.010	0.010	B045204
Acridine	ug/L	<0.050	B044779	<0.050	<0.050	0.050	B045204
Fluoranthene	ug/L	<0.020	B044779	<0.020	<0.020	0.020	B045204
Pyrene	ug/L	<0.020	B044779	<0.020	0.030	0.020	B045204
Benzo(a)anthracene	ug/L	<0.010	B044779	<0.010	<0.010	0.010	B045204
Benzo(a)pyrene	ug/L	<0.0050	B044779	<0.0050	0.013 (1)	0.0050	B045204
<b>Surrogate Recovery (%)</b>							
D10-ANTHRACENE (sur.)	%	91	B044779	94	90	N/A	B045204
D8-ACENAPHTHYLENE (sur.)	%	89	B044779	91	91	N/A	B045204
D8-NAPHTHALENE (sur.)	%	82	B044779	76	72	N/A	B045204
TERPHENYL-D14 (sur.)	%	79	B044779	103	96	N/A	B045204
RDL = Reportable Detection Limit N/A = Not Applicable (1) Tentatively identified result and may be potentially biased high due to matrix interference.							



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

<b>Bureau Veritas ID</b>		BUZ267		
<b>Sampling Date</b>		2023/07/19 09:30		
<b>COC Number</b>		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-11</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Polycyclic Aromatics</b>				
Naphthalene	ug/L	<0.10	0.10	B045204
Acenaphthene	ug/L	<0.050	0.050	B045204
Fluorene	ug/L	<0.050	0.050	B045204
Phenanthrene	ug/L	<0.050	0.050	B045204
Anthracene	ug/L	<0.010	0.010	B045204
Acridine	ug/L	<0.050	0.050	B045204
Fluoranthene	ug/L	<0.020	0.020	B045204
Pyrene	ug/L	<0.020	0.020	B045204
Benzo(a)anthracene	ug/L	<0.010	0.010	B045204
Benzo(a)pyrene	ug/L	<0.0050	0.0050	B045204
<b>Surrogate Recovery (%)</b>				
D10-ANTHRACENE (sur.)	%	92	N/A	B045204
D8-ACENAPHTHYLENE (sur.)	%	88	N/A	B045204
D8-NAPHTHALENE (sur.)	%	67	N/A	B045204
TERPHENYL-D14 (sur.)	%	100	N/A	B045204
RDL = Reportable Detection Limit N/A = Not Applicable				



**TOTAL PETROLEUM HYDROCARBONS (WATER)**

<b>Bureau Veritas ID</b>		BUZ261	BUZ262		BUZ263		
<b>Sampling Date</b>		2023/07/18 10:40	2023/07/18 12:10		2023/07/18 13:45		
<b>COC Number</b>		694569-02-01	694569-02-01		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-05</b>	<b>WG-11222680-180723 -KH-06</b>	<b>QC Batch</b>	<b>WG-11222680-180723 -KH-07</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	B041128	<0.20	0.20	B041128
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	B041128	<0.20	0.20	B041128
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	B042796	<0.20	0.20	B044780
EPH (C19-C32)	mg/L	<0.20	<0.20	B042796	<0.20	0.20	B044780
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	98	96	B042796	97	N/A	B044780
RDL = Reportable Detection Limit N/A = Not Applicable							

<b>Bureau Veritas ID</b>		BUZ264		BUZ265	BUZ266		
<b>Sampling Date</b>		2023/07/18 14:00		2023/07/18 15:30	2023/07/19 08:30		
<b>COC Number</b>		694569-02-01		694569-02-01	694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-08</b>	<b>QC Batch</b>	<b>WG-11222680-180723 -KH-09</b>	<b>WG-11222680-180723 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	B041128	<0.20	<0.20	0.20	B041128
HEPH (C19-C32 less PAH)	mg/L	<0.20	B041128	<0.20	0.29	0.20	B041128
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	B044780	<0.20	<0.20	0.20	B045218
EPH (C19-C32)	mg/L	<0.20	B044780	<0.20	0.29	0.20	B045218
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	95	B044780	94	86	N/A	B045218
RDL = Reportable Detection Limit N/A = Not Applicable							



Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**TOTAL PETROLEUM HYDROCARBONS (WATER)**

<b>Bureau Veritas ID</b>		BUZ267		
<b>Sampling Date</b>		2023/07/19 09:30		
<b>COC Number</b>		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-11</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
LEPH (C10-C19 less PAH)	mg/L	<0.20	0.20	B041128
HEPH (C19-C32 less PAH)	mg/L	<0.20	0.20	B041128
<b>Ext. Pet. Hydrocarbon</b>				
EPH (C10-C19)	mg/L	<0.20	0.20	B045218
EPH (C19-C32)	mg/L	<0.20	0.20	B045218
<b>Surrogate Recovery (%)</b>				
O-TERPHENYL (sur.)	%	95	N/A	B045218
RDL = Reportable Detection Limit N/A = Not Applicable				



**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BUZ261	BUZ262	BUZ263		
<b>Sampling Date</b>		2023/07/18 10:40	2023/07/18 12:10	2023/07/18 13:45		
<b>COC Number</b>		694569-02-01	694569-02-01	694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-05</b>	<b>WG-11222680-180723 -KH-06</b>	<b>WG-11222680-180723 -KH-07</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BUZ264	BUZ265	BUZ266		
<b>Sampling Date</b>		2023/07/18 14:00	2023/07/18 15:30	2023/07/19 08:30		
<b>COC Number</b>		694569-02-01	694569-02-01	694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-08</b>	<b>WG-11222680-180723 -KH-09</b>	<b>WG-11222680-180723 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B041137
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BUZ267		
<b>Sampling Date</b>		2023/07/19 09:30		
<b>COC Number</b>		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-11</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>				
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	0.0050	B041137
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	0.0050	B041137
RDL = Reportable Detection Limit				



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ261	BUZ261		BUZ262		
<b>Sampling Date</b>		2023/07/18 10:40	2023/07/18 10:40		2023/07/18 12:10		
<b>COC Number</b>		694569-02-01	694569-02-01		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-05</b>	<b>WG-11222680-180723 -KH-05 Lab-Dup</b>	<b>QC Batch</b>	<b>WG-11222680-180723 -KH-06</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	87.7	N/A	B040635	30.7	0.50	B047969
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	B050172	<0.0019	0.0019	B050172
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	N/A	B042783	3.6	3.0	B049143
Dissolved Antimony (Sb)	ug/L	<0.50	N/A	B042783	<0.50	0.50	B049143
Dissolved Arsenic (As)	ug/L	0.23	N/A	B042783	<0.10	0.10	B049143
Dissolved Barium (Ba)	ug/L	5.3	N/A	B042783	<1.0	1.0	B049143
Dissolved Beryllium (Be)	ug/L	<0.10	N/A	B042783	<0.10	0.10	B049143
Dissolved Bismuth (Bi)	ug/L	<1.0	N/A	B042783	<1.0	1.0	B049143
Dissolved Boron (B)	ug/L	<50	N/A	B042783	<50	50	B049143
Dissolved Cadmium (Cd)	ug/L	<0.010	N/A	B042783	<0.010	0.010	B049143
Dissolved Chromium (Cr)	ug/L	<1.0	N/A	B042783	<1.0	1.0	B049143
Dissolved Cobalt (Co)	ug/L	<0.20	N/A	B042783	<0.20	0.20	B049143
Dissolved Copper (Cu)	ug/L	<0.20	N/A	B042783	<0.20	0.20	B049143
Dissolved Iron (Fe)	ug/L	<5.0	N/A	B042783	<5.0	5.0	B049143
Dissolved Lead (Pb)	ug/L	<0.20	N/A	B042783	<0.20	0.20	B049143
Dissolved Lithium (Li)	ug/L	<2.0	N/A	B042783	<2.0	2.0	B049143
Dissolved Manganese (Mn)	ug/L	<1.0	N/A	B042783	<1.0	1.0	B049143
Dissolved Molybdenum (Mo)	ug/L	<1.0	N/A	B042783	<1.0	1.0	B049143
Dissolved Nickel (Ni)	ug/L	<1.0	N/A	B042783	<1.0	1.0	B049143
Dissolved Phosphorus (P)	ug/L	13	N/A	B042783	<10	10	B049143
Dissolved Selenium (Se)	ug/L	0.19	N/A	B042783	<0.10	0.10	B049143
Dissolved Silicon (Si)	ug/L	8440	N/A	B042783	3810	100	B049143
Dissolved Silver (Ag)	ug/L	<0.020	N/A	B042783	<0.020	0.020	B049143
Dissolved Strontium (Sr)	ug/L	42.3	N/A	B042783	16.1	1.0	B049143
Dissolved Thallium (Tl)	ug/L	<0.010	N/A	B042783	<0.010	0.010	B049143
Dissolved Tin (Sn)	ug/L	<5.0	N/A	B042783	<5.0	5.0	B049143
Dissolved Titanium (Ti)	ug/L	<5.0	N/A	B042783	<5.0	5.0	B049143

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BUZ261	BUZ261		BUZ262		
Sampling Date		2023/07/18 10:40	2023/07/18 10:40		2023/07/18 12:10		
COC Number		694569-02-01	694569-02-01		694569-02-01		
	UNITS	WG-11222680-180723 -KH-05	WG-11222680-180723 -KH-05 Lab-Dup	QC Batch	WG-11222680-180723 -KH-06	RDL	QC Batch
Dissolved Uranium (U)	ug/L	<0.10	N/A	B042783	<0.10	0.10	B049143
Dissolved Vanadium (V)	ug/L	<5.0	N/A	B042783	<5.0	5.0	B049143
Dissolved Zinc (Zn)	ug/L	<5.0	N/A	B042783	<5.0	5.0	B049143
Dissolved Zirconium (Zr)	ug/L	<0.10	N/A	B042783	<0.10	0.10	B049143
Dissolved Calcium (Ca)	mg/L	27.8	N/A	B040637	10.1	0.050	B048034
Dissolved Magnesium (Mg)	mg/L	4.45	N/A	B040637	1.35	0.050	B048034
Dissolved Potassium (K)	mg/L	0.405	N/A	B040637	0.139	0.050	B048034
Dissolved Sodium (Na)	mg/L	6.10	N/A	B040637	2.07	0.050	B048034
Dissolved Sulphur (S)	mg/L	<3.0	N/A	B040637	<3.0	3.0	B048034
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							





**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ263	BUZ264	BUZ265	BUZ266		
<b>Sampling Date</b>		2023/07/18 13:45	2023/07/18 14:00	2023/07/18 15:30	2023/07/19 08:30		
<b>COC Number</b>		694569-02-01	694569-02-01	694569-02-01	694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-07</b>	<b>WG-11222680-180723 -KH-08</b>	<b>WG-11222680-180723 -KH-09</b>	<b>WG-11222680-180723 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	85.9	32.5	49.2	155	0.50	B040635
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	B050172
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	41.3	4.1	<3.0	6.9	3.0	B042783
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B042783
Dissolved Arsenic (As)	ug/L	<0.10	0.83	<0.10	0.20	0.10	B042783
Dissolved Barium (Ba)	ug/L	2.4	1.8	1.1	18.0	1.0	B042783
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	B042783
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	0.015	0.010	B042783
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B042783
Dissolved Copper (Cu)	ug/L	0.37	<0.20	0.23	0.35	0.20	B042783
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	7.5	7.3	5.0	B042783
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B042783
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B042783
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	<1.0	19.0	1.0	B042783
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B042783
Dissolved Phosphorus (P)	ug/L	<10	29	<10	23	10	B042783
Dissolved Selenium (Se)	ug/L	0.14	<0.10	0.17	<0.10	0.10	B042783
Dissolved Silicon (Si)	ug/L	6480	3880	7370	12800	100	B042783
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B042783
Dissolved Strontium (Sr)	ug/L	44.5	13.2	29.0	102	1.0	B042783
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B042783
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B042783
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Vanadium (V)	ug/L	<5.0	6.8	<5.0	<5.0	5.0	B042783

RDL = Reportable Detection Limit



Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BUZ263	BUZ264	BUZ265	BUZ266		
Sampling Date		2023/07/18 13:45	2023/07/18 14:00	2023/07/18 15:30	2023/07/19 08:30		
COC Number		694569-02-01	694569-02-01	694569-02-01	694569-02-01		
	UNITS	WG-11222680-180723 -KH-07	WG-11222680-180723 -KH-08	WG-11222680-180723 -KH-09	WG-11222680-180723 -KH-10	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	8.0	5.0	B042783
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B042783
Dissolved Calcium (Ca)	mg/L	26.9	10.5	14.2	39.3	0.050	B040637
Dissolved Magnesium (Mg)	mg/L	4.54	1.55	3.37	13.9	0.050	B040637
Dissolved Potassium (K)	mg/L	0.271	0.174	0.223	1.19	0.050	B040637
Dissolved Sodium (Na)	mg/L	4.01	0.990	5.91	26.5	0.050	B040637
Dissolved Sulphur (S)	mg/L	3.0	<3.0	<3.0	<3.0	3.0	B040637
RDL = Reportable Detection Limit							



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ267		
<b>Sampling Date</b>		2023/07/19 09:30		
<b>COC Number</b>		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-11</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Dissolved Hardness (CaCO3)	mg/L	<0.50	0.50	B040635
<b>Elements</b>				
Dissolved Mercury (Hg)	ug/L	<0.0019	0.0019	B050172
<b>Dissolved Metals by ICPMS</b>				
Dissolved Aluminum (Al)	ug/L	<3.0	3.0	B042772
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	B042772
Dissolved Arsenic (As)	ug/L	<0.10	0.10	B042772
Dissolved Barium (Ba)	ug/L	<1.0	1.0	B042772
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	B042772
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	B042772
Dissolved Boron (B)	ug/L	<50	50	B042772
Dissolved Cadmium (Cd)	ug/L	<0.010	0.010	B042772
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	B042772
Dissolved Cobalt (Co)	ug/L	<0.20	0.20	B042772
Dissolved Copper (Cu)	ug/L	<0.20	0.20	B042772
Dissolved Iron (Fe)	ug/L	<5.0	5.0	B042772
Dissolved Lead (Pb)	ug/L	<0.20	0.20	B042772
Dissolved Lithium (Li)	ug/L	<2.0	2.0	B042772
Dissolved Manganese (Mn)	ug/L	<1.0	1.0	B042772
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	B042772
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	B042772
Dissolved Phosphorus (P)	ug/L	<10	10	B042772
Dissolved Selenium (Se)	ug/L	<0.10	0.10	B042772
Dissolved Silicon (Si)	ug/L	<100	100	B042772
Dissolved Silver (Ag)	ug/L	<0.020	0.020	B042772
Dissolved Strontium (Sr)	ug/L	<1.0	1.0	B042772
Dissolved Thallium (Tl)	ug/L	<0.010	0.010	B042772
Dissolved Tin (Sn)	ug/L	<5.0	5.0	B042772
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	B042772
Dissolved Uranium (U)	ug/L	<0.10	0.10	B042772
Dissolved Vanadium (V)	ug/L	<5.0	5.0	B042772
RDL = Reportable Detection Limit				



Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BUZ267		
<b>Sampling Date</b>		2023/07/19 09:30		
<b>COC Number</b>		694569-02-01		
	<b>UNITS</b>	<b>WG-11222680-180723 -KH-11</b>	<b>RDL</b>	<b>QC Batch</b>
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	B042772
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B042772
Dissolved Calcium (Ca)	mg/L	<0.050	0.050	B040637
Dissolved Magnesium (Mg)	mg/L	<0.050	0.050	B040637
Dissolved Potassium (K)	mg/L	<0.050	0.050	B040637
Dissolved Sodium (Na)	mg/L	<0.050	0.050	B040637
Dissolved Sulphur (S)	mg/L	<3.0	3.0	B040637
RDL = Reportable Detection Limit				



Bureau Veritas Job #: C354973  
Report Date: 2023/07/28

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### GENERAL COMMENTS

Sample BUZ262 [WG-11222680-180723-KH-06] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrate + Nitrite (N). Sample was analyzed past method specified hold time for Nitrite (N) by CFA.

**Results relate only to the items tested.**



### QUALITY ASSURANCE REPORT

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042787	D10-ANTHRACENE (sur.)	2023/07/21			90	50 - 140	89	%		
B042787	D8-ACENAPHTHYLENE (sur.)	2023/07/21			93	50 - 140	89	%		
B042787	D8-NAPHTHALENE (sur.)	2023/07/21			85	50 - 140	80	%		
B042787	TERPHENYL-D14 (sur.)	2023/07/21			86	50 - 140	82	%		
B042796	O-TERPHENYL (sur.)	2023/07/21			94	60 - 140	98	%		
B044779	D10-ANTHRACENE (sur.)	2023/07/24			92	50 - 140	92	%		
B044779	D8-ACENAPHTHYLENE (sur.)	2023/07/24			95	50 - 140	89	%		
B044779	D8-NAPHTHALENE (sur.)	2023/07/24			80	50 - 140	72	%		
B044779	TERPHENYL-D14 (sur.)	2023/07/24			82	50 - 140	84	%		
B044780	O-TERPHENYL (sur.)	2023/07/24			95	60 - 140	93	%		
B045204	D10-ANTHRACENE (sur.)	2023/07/24			101	50 - 140	98	%		
B045204	D8-ACENAPHTHYLENE (sur.)	2023/07/24			101	50 - 140	97	%		
B045204	D8-NAPHTHALENE (sur.)	2023/07/24			84	50 - 140	80	%		
B045204	TERPHENYL-D14 (sur.)	2023/07/24			107	50 - 140	109	%		
B045218	O-TERPHENYL (sur.)	2023/07/24			97	60 - 140	94	%		
B041593	Orthophosphate (P)	2023/07/20	102 (1)	80 - 120	109	80 - 120	<0.0030	mg/L	1.4 (2)	20
B041707	Nitrate plus Nitrite (N)	2023/07/20	102	80 - 120	107	80 - 120	<0.020	mg/L	0.47 (3)	25
B041712	Nitrite (N)	2023/07/20	100	80 - 120	103	80 - 120	<0.0050	mg/L	NC (3)	20
B041758	pH	2023/07/20			100	97 - 103				
B041769	Conductivity	2023/07/20			100	90 - 110	<2.0	uS/cm	NC (4)	10
B041770	Alkalinity (PP as CaCO3)	2023/07/20					<1.0	mg/L	NC (4)	20
B041770	Alkalinity (Total as CaCO3)	2023/07/20			97	80 - 120	<1.0	mg/L	NC (4)	20
B041770	Bicarbonate (HCO3)	2023/07/20					<1.0	mg/L	NC (4)	20
B041770	Carbonate (CO3)	2023/07/20					<1.0	mg/L	NC (4)	20
B041770	Hydroxide (OH)	2023/07/20					<1.0	mg/L	NC (4)	20
B042566	pH	2023/07/21			100	97 - 103			1.1 (3)	N/A
B042634	Total Dissolved Solids	2023/07/24	101	80 - 120	97	80 - 120	<10	mg/L	2.5 (3)	20
B042772	Dissolved Aluminum (Al)	2023/07/22	117	80 - 120	97	80 - 120	<3.0	ug/L	4.4 (3)	20
B042772	Dissolved Antimony (Sb)	2023/07/22	123 (5)	80 - 120	100	80 - 120	<0.50	ug/L	NC (3)	20
B042772	Dissolved Arsenic (As)	2023/07/22	123 (5)	80 - 120	100	80 - 120	<0.10	ug/L	0.18 (3)	20
B042772	Dissolved Barium (Ba)	2023/07/22	119	80 - 120	100	80 - 120	<1.0	ug/L	0.71 (3)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042772	Dissolved Beryllium (Be)	2023/07/22	116	80 - 120	95	80 - 120	<0.10	ug/L	NC (3)	20
B042772	Dissolved Bismuth (Bi)	2023/07/22	114	80 - 120	95	80 - 120	<1.0	ug/L	NC (3)	20
B042772	Dissolved Boron (B)	2023/07/22	118	80 - 120	99	80 - 120	<50	ug/L	NC (3)	20
B042772	Dissolved Cadmium (Cd)	2023/07/22	117	80 - 120	96	80 - 120	<0.010	ug/L	NC (3)	20
B042772	Dissolved Chromium (Cr)	2023/07/22	114	80 - 120	96	80 - 120	<1.0	ug/L	NC (3)	20
B042772	Dissolved Cobalt (Co)	2023/07/22	114	80 - 120	93	80 - 120	<0.20	ug/L	NC (3)	20
B042772	Dissolved Copper (Cu)	2023/07/22	107	80 - 120	91	80 - 120	<0.20	ug/L	0.93 (3)	20
B042772	Dissolved Iron (Fe)	2023/07/22	121 (5)	80 - 120	100	80 - 120	<5.0	ug/L	NC (3)	20
B042772	Dissolved Lead (Pb)	2023/07/22	115	80 - 120	94	80 - 120	<0.20	ug/L	NC (3)	20
B042772	Dissolved Lithium (Li)	2023/07/22	113	80 - 120	94	80 - 120	<2.0	ug/L	NC (3)	20
B042772	Dissolved Manganese (Mn)	2023/07/22	113	80 - 120	94	80 - 120	<1.0	ug/L	0.10 (3)	20
B042772	Dissolved Molybdenum (Mo)	2023/07/22	123 (5)	80 - 120	99	80 - 120	<1.0	ug/L	NC (3)	20
B042772	Dissolved Nickel (Ni)	2023/07/22	112	80 - 120	95	80 - 120	<1.0	ug/L	NC (3)	20
B042772	Dissolved Phosphorus (P)	2023/07/22	100	80 - 120	97	80 - 120	<10	ug/L	NC (3)	20
B042772	Dissolved Selenium (Se)	2023/07/22	120	80 - 120	100	80 - 120	<0.10	ug/L	0.35 (3)	20
B042772	Dissolved Silicon (Si)	2023/07/22	NC	80 - 120	107	80 - 120	<100	ug/L	0.32 (3)	20
B042772	Dissolved Silver (Ag)	2023/07/22	118	80 - 120	97	80 - 120	<0.020	ug/L	NC (3)	20
B042772	Dissolved Strontium (Sr)	2023/07/22	NC	80 - 120	96	80 - 120	<1.0	ug/L	0.98 (3)	20
B042772	Dissolved Thallium (Tl)	2023/07/22	117	80 - 120	94	80 - 120	<0.010	ug/L	NC (3)	20
B042772	Dissolved Tin (Sn)	2023/07/22	119	80 - 120	104	80 - 120	<5.0	ug/L	NC (3)	20
B042772	Dissolved Titanium (Ti)	2023/07/22	115	80 - 120	97	80 - 120	<5.0	ug/L	NC (3)	20
B042772	Dissolved Uranium (U)	2023/07/22	115	80 - 120	92	80 - 120	<0.10	ug/L	NC (3)	20
B042772	Dissolved Vanadium (V)	2023/07/22	119	80 - 120	96	80 - 120	<5.0	ug/L	NC (3)	20
B042772	Dissolved Zinc (Zn)	2023/07/22	114	80 - 120	96	80 - 120	<5.0	ug/L	NC (3)	20
B042772	Dissolved Zirconium (Zr)	2023/07/22	120	80 - 120	96	80 - 120	<0.10	ug/L	NC (3)	20
B042783	Dissolved Aluminum (Al)	2023/07/22	99	80 - 120	103	80 - 120	<3.0	ug/L	NC (3)	20
B042783	Dissolved Antimony (Sb)	2023/07/22	100	80 - 120	103	80 - 120	<0.50	ug/L	NC (3)	20
B042783	Dissolved Arsenic (As)	2023/07/22	101	80 - 120	103	80 - 120	<0.10	ug/L	NC (3)	20
B042783	Dissolved Barium (Ba)	2023/07/22	95	80 - 120	99	80 - 120	<1.0	ug/L	2.4 (3)	20
B042783	Dissolved Beryllium (Be)	2023/07/22	102	80 - 120	104	80 - 120	<0.10	ug/L	NC (3)	20
B042783	Dissolved Bismuth (Bi)	2023/07/22	98	80 - 120	98	80 - 120	<1.0	ug/L	NC (3)	20





Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042783	Dissolved Boron (B)	2023/07/22	102	80 - 120	107	80 - 120	<50	ug/L	NC (3)	20
B042783	Dissolved Cadmium (Cd)	2023/07/22	97	80 - 120	101	80 - 120	<0.010	ug/L	NC (3)	20
B042783	Dissolved Chromium (Cr)	2023/07/22	96	80 - 120	99	80 - 120	<1.0	ug/L	NC (3)	20
B042783	Dissolved Cobalt (Co)	2023/07/22	93	80 - 120	98	80 - 120	<0.20	ug/L	NC (3)	20
B042783	Dissolved Copper (Cu)	2023/07/22	93	80 - 120	98	80 - 120	<0.20	ug/L	NC (3)	20
B042783	Dissolved Iron (Fe)	2023/07/22	103	80 - 120	105	80 - 120	<5.0	ug/L	NC (3)	20
B042783	Dissolved Lead (Pb)	2023/07/22	104	80 - 120	101	80 - 120	<0.20	ug/L	NC (3)	20
B042783	Dissolved Lithium (Li)	2023/07/22	100	80 - 120	102	80 - 120	<2.0	ug/L	NC (3)	20
B042783	Dissolved Manganese (Mn)	2023/07/22	96	80 - 120	100	80 - 120	<1.0	ug/L	0.52 (3)	20
B042783	Dissolved Molybdenum (Mo)	2023/07/22	101	80 - 120	104	80 - 120	<1.0	ug/L	NC (3)	20
B042783	Dissolved Nickel (Ni)	2023/07/22	94	80 - 120	99	80 - 120	<1.0	ug/L	NC (3)	20
B042783	Dissolved Phosphorus (P)	2023/07/22	100	80 - 120	103	80 - 120	<10	ug/L	NC (3)	20
B042783	Dissolved Selenium (Se)	2023/07/22	100	80 - 120	102	80 - 120	<0.10	ug/L	0.55 (3)	20
B042783	Dissolved Silicon (Si)	2023/07/22	NC	80 - 120	111	80 - 120	<100	ug/L	1.2 (3)	20
B042783	Dissolved Silver (Ag)	2023/07/22	97	80 - 120	100	80 - 120	<0.020	ug/L	NC (3)	20
B042783	Dissolved Strontium (Sr)	2023/07/22	99	80 - 120	101	80 - 120	<1.0	ug/L	0.26 (3)	20
B042783	Dissolved Thallium (Tl)	2023/07/22	99	80 - 120	99	80 - 120	<0.010	ug/L	NC (3)	20
B042783	Dissolved Tin (Sn)	2023/07/22	97	80 - 120	105	80 - 120	<5.0	ug/L	NC (3)	20
B042783	Dissolved Titanium (Ti)	2023/07/22	97	80 - 120	101	80 - 120	<5.0	ug/L	NC (3)	20
B042783	Dissolved Uranium (U)	2023/07/22	103	80 - 120	100	80 - 120	<0.10	ug/L	NC (3)	20
B042783	Dissolved Vanadium (V)	2023/07/22	97	80 - 120	101	80 - 120	<5.0	ug/L	NC (3)	20
B042783	Dissolved Zinc (Zn)	2023/07/22	98	80 - 120	102	80 - 120	<5.0	ug/L	NC (3)	20
B042783	Dissolved Zirconium (Zr)	2023/07/22	100	80 - 120	101	80 - 120	<0.10	ug/L	NC (3)	20
B042787	Acenaphthene	2023/07/21			82	50 - 140	<0.050	ug/L		
B042787	Acridine	2023/07/21			89	50 - 140	<0.050	ug/L		
B042787	Anthracene	2023/07/21			84	50 - 140	<0.010	ug/L		
B042787	Benzo(a)anthracene	2023/07/21			81	50 - 140	<0.010	ug/L		
B042787	Benzo(a)pyrene	2023/07/21			83	50 - 140	<0.0050	ug/L		
B042787	Fluoranthene	2023/07/21			77	50 - 140	<0.020	ug/L		
B042787	Fluorene	2023/07/21			81	50 - 140	<0.050	ug/L		
B042787	Naphthalene	2023/07/21			81	50 - 140	<0.10	ug/L		



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B042787	Phenanthrene	2023/07/21			80	50 - 140	<0.050	ug/L		
B042787	Pyrene	2023/07/21			77	50 - 140	<0.020	ug/L		
B042796	EPH (C10-C19)	2023/07/21			103	70 - 130	<0.20	mg/L		
B042796	EPH (C19-C32)	2023/07/21			108	70 - 130	<0.20	mg/L		
B044779	Acenaphthene	2023/07/24			80	50 - 140	<0.050	ug/L		
B044779	Acridine	2023/07/24			83	50 - 140	<0.050	ug/L		
B044779	Anthracene	2023/07/24			80	50 - 140	<0.010	ug/L		
B044779	Benzo(a)anthracene	2023/07/24			79	50 - 140	<0.010	ug/L		
B044779	Benzo(a)pyrene	2023/07/24			84	50 - 140	<0.0050	ug/L		
B044779	Fluoranthene	2023/07/24			68	50 - 140	<0.020	ug/L		
B044779	Fluorene	2023/07/24			78	50 - 140	<0.050	ug/L		
B044779	Naphthalene	2023/07/24			75	50 - 140	<0.10	ug/L		
B044779	Phenanthrene	2023/07/24			78	50 - 140	<0.050	ug/L		
B044779	Pyrene	2023/07/24			67	50 - 140	<0.020	ug/L		
B044780	EPH (C10-C19)	2023/07/24			102	70 - 130	<0.20	mg/L		
B044780	EPH (C19-C32)	2023/07/24			102	70 - 130	<0.20	mg/L		
B045204	Acenaphthene	2023/07/24			95	50 - 140	<0.050	ug/L	NC (3)	40
B045204	Acridine	2023/07/24			99	50 - 140	<0.050	ug/L	NC (3)	40
B045204	Anthracene	2023/07/24			106	50 - 140	<0.010	ug/L	NC (3)	40
B045204	Benzo(a)anthracene	2023/07/24			95	50 - 140	<0.010	ug/L	NC (3)	40
B045204	Benzo(a)pyrene	2023/07/24			102	50 - 140	<0.0050	ug/L	NC (3)	40
B045204	Fluoranthene	2023/07/24			102	50 - 140	<0.020	ug/L	NC (3)	40
B045204	Fluorene	2023/07/24			100	50 - 140	<0.050	ug/L	NC (3)	40
B045204	Naphthalene	2023/07/24			88	50 - 140	<0.10	ug/L	NC (3)	40
B045204	Phenanthrene	2023/07/24			92	50 - 140	<0.050	ug/L	NC (3)	40
B045204	Pyrene	2023/07/24			104	50 - 140	<0.020	ug/L	NC (3)	40
B045215	Total Dissolved Solids	2023/07/25	101	80 - 120	108	80 - 120	<10	mg/L	3.3 (3)	20
B045218	EPH (C10-C19)	2023/07/24			101	70 - 130	<0.20	mg/L	0.85 (3)	30
B045218	EPH (C19-C32)	2023/07/24			104	70 - 130	<0.20	mg/L	29 (3)	30
B045835	Chloride (Cl)	2023/07/25	106 (1)	80 - 120	101	80 - 120	<1.0	mg/L	NC (2)	20
B045835	Sulphate (SO4)	2023/07/25	120 (1)	80 - 120	98	80 - 120	<1.0	mg/L	3.7 (2)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B046614	Total Ammonia (N)	2023/07/25	124 (5)	80 - 120	109	80 - 120	<0.015	mg/L	NC (3)	20
B046617	Total Ammonia (N)	2023/07/25	NC	80 - 120	109	80 - 120	<0.015	mg/L	0.22 (3)	20
B046711	Total Sulphide	2023/07/25	61 (5,6)	80 - 120	105	80 - 120	<0.0018	mg/L	NC (7)	20
B049143	Dissolved Aluminum (Al)	2023/07/26			105	80 - 120	<3.0	ug/L		
B049143	Dissolved Antimony (Sb)	2023/07/26			108	80 - 120	<0.50	ug/L		
B049143	Dissolved Arsenic (As)	2023/07/26			106	80 - 120	<0.10	ug/L		
B049143	Dissolved Barium (Ba)	2023/07/26			102	80 - 120	<1.0	ug/L		
B049143	Dissolved Beryllium (Be)	2023/07/26			103	80 - 120	<0.10	ug/L		
B049143	Dissolved Bismuth (Bi)	2023/07/26			103	80 - 120	<1.0	ug/L		
B049143	Dissolved Boron (B)	2023/07/26			94	80 - 120	<50	ug/L		
B049143	Dissolved Cadmium (Cd)	2023/07/26			105	80 - 120	<0.010	ug/L		
B049143	Dissolved Chromium (Cr)	2023/07/26			105	80 - 120	<1.0	ug/L		
B049143	Dissolved Cobalt (Co)	2023/07/26			102	80 - 120	<0.20	ug/L		
B049143	Dissolved Copper (Cu)	2023/07/26			102	80 - 120	<0.20	ug/L		
B049143	Dissolved Iron (Fe)	2023/07/26			105	80 - 120	<5.0	ug/L		
B049143	Dissolved Lead (Pb)	2023/07/26			101	80 - 120	<0.20	ug/L		
B049143	Dissolved Lithium (Li)	2023/07/26			92	80 - 120	<2.0	ug/L		
B049143	Dissolved Manganese (Mn)	2023/07/26			104	80 - 120	<1.0	ug/L		
B049143	Dissolved Molybdenum (Mo)	2023/07/26			107	80 - 120	<1.0	ug/L		
B049143	Dissolved Nickel (Ni)	2023/07/26			103	80 - 120	<1.0	ug/L		
B049143	Dissolved Phosphorus (P)	2023/07/26			100	80 - 120	<10	ug/L		
B049143	Dissolved Selenium (Se)	2023/07/26			107	80 - 120	<0.10	ug/L		
B049143	Dissolved Silicon (Si)	2023/07/26			108	80 - 120	<100	ug/L		
B049143	Dissolved Silver (Ag)	2023/07/26			104	80 - 120	<0.020	ug/L		
B049143	Dissolved Strontium (Sr)	2023/07/26			102	80 - 120	<1.0	ug/L		
B049143	Dissolved Thallium (Tl)	2023/07/26			105	80 - 120	<0.010	ug/L		
B049143	Dissolved Tin (Sn)	2023/07/26			109	80 - 120	<5.0	ug/L		
B049143	Dissolved Titanium (Ti)	2023/07/26			104	80 - 120	<5.0	ug/L		
B049143	Dissolved Uranium (U)	2023/07/26			103	80 - 120	<0.10	ug/L		
B049143	Dissolved Vanadium (V)	2023/07/26			105	80 - 120	<5.0	ug/L		
B049143	Dissolved Zinc (Zn)	2023/07/26			107	80 - 120	<5.0	ug/L		



Bureau Veritas Job #: C354973  
 Report Date: 2023/07/28

**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B049143	Dissolved Zirconium (Zr)	2023/07/26			105	80 - 120	<0.10	ug/L		
B050172	Dissolved Mercury (Hg)	2023/07/28	92 (8)	80 - 120	98	80 - 120	<0.0019	ug/L	NC (9)	20
B050548	Orthophosphate (P)	2023/07/27			100	80 - 120	<0.0030	mg/L		
B050697	Chloride (Cl)	2023/07/27	102 (10)	80 - 120	102	80 - 120	<1.0	mg/L	1.3 (11)	20
B050697	Sulphate (SO4)	2023/07/27	99 (10)	80 - 120	107	80 - 120	<1.0	mg/L	3.2 (11)	20
B050725	pH	2023/07/28			100	97 - 103			0.15 (3)	N/A
B050736	Conductivity	2023/07/28			99	90 - 110	<2.0	uS/cm		
B050737	Alkalinity (PP as CaCO3)	2023/07/28					<1.0	mg/L	NC (3)	20
B050737	Alkalinity (Total as CaCO3)	2023/07/28			100	80 - 120	<1.0	mg/L	2.5 (3)	20
B050737	Bicarbonate (HCO3)	2023/07/28					<1.0	mg/L	2.5 (3)	20
B050737	Carbonate (CO3)	2023/07/28					<1.0	mg/L	NC (3)	20
B050737	Hydroxide (OH)	2023/07/28					<1.0	mg/L	NC (3)	20
B050809	Nitrate plus Nitrite (N)	2023/07/27	103	80 - 120	110	80 - 120	<0.020	mg/L	NC (3)	25



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-3  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B050812	Nitrite (N)	2023/07/27	98	80 - 120	107	80 - 120	<0.0050	mg/L	NC (3)	20

N/A = Not Applicable

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Matrix Spike Parent ID [BUZ264-01]

(2) Duplicate Parent ID [BUZ264-01]

(3) Duplicate Parent ID

(4) Duplicate Parent ID [BUZ267-01]

(5) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(6) Matrix Spike Parent ID [BUZ262-05]

(7) Duplicate Parent ID [BUZ261-05]

(8) Matrix Spike Parent ID [BUZ262-04]

(9) Duplicate Parent ID [BUZ261-04]

(10) Matrix Spike Parent ID [BUZ262-01]

(11) Duplicate Parent ID [BUZ262-01]



Bureau Veritas Job #: C354973  
Report Date: 2023/07/28

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-3  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

\_\_\_\_\_  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response

\_\_\_\_\_  
David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

\_\_\_\_\_  
Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.



C354973\_ACTR



### ADDITIONAL COOLER TEMPERATURE RECORD CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #		COOLER OBSERVATIONS:				MAXXAM JOB#:			
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TEMP	PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8 9 4	INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TEMP	PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9 4 6	INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	
Page ___ of ___		CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID
Page ___ of ___		PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	TEMP
Page ___ of ___		INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		INTACT	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3
Page ___ of ___		ICE PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		ICE PRESENT	<input type="checkbox"/>	<input type="checkbox"/>	

RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME (HH:MM)
	2023/07/20	08:30





<b>INVOICE TO:</b> Company Name: #163 GHD Limited Contact Name: AP Invoices - 735 Address: 455 PHILLIP STREET WATERLOO ON N2L 3X2 Phone: (519) 884-0510 Fax: (519) 725-1394 Email: APInvoices-735@ghd.com		<b>Report Information:</b> Company Name: GHD Limited Contact Name: Stephanie Berton Address: _____ Phone: _____ Fax: _____ Email: NationalEODSupport@maxxam.ca stephanie.berton@ghd.com		<b>Project Information:</b> Custodian #: G30090 P.O. #: 735-002640-3 Project #: 11222680-15.1 Project Name: Groundwater Site #: _____ Sampled By: Katherine Hosler		<b>Laboratory Use Only:</b> Bureau Veritas Job #: _____ Sample Order #: _____ Chain Of Custody Record: _____ Project Manager: _____ Study Address: _____	
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<b>Regulatory Criteria:</b> <input checked="" type="checkbox"/> CSII <input type="checkbox"/> GCMI <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other: _____	<b>Special Instructions:</b> Bottles held chilled and preserved as indicated on bottle.	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC):</b> Matrix Field Filtered (MFL) Conductivity, Cl, SO4, NO2, NO3, NH, PO4 Specialized Alkalinity Sulphide + H2S Calc Sulphide, Un-ionized (all H2S) (Calc) Ammonia-N (Total) Dissolved Metals with CV Ng, Hardness Total Dissolved Solids (Fil. Residue) LEPTHEPH with subtracted PAHs Field pH Field Temperature	<b>Turnaround Time (TAT) Required:</b> Please provide advance notice for each project. Regular (Standard) TAT: will be applied if from TAT is not specified. Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as PCB and Dioxin/Furans are 4-8 days, contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Days Required: _____ Rush Confirmation Number: _____ (Call us at 877-877-8777)
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**SAMPLES MUST BE KEPT COOL (+/- 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS**

Sample Bureau Label	Sample (Locality) Identification	Date Sampled	Time Sampled	Matrix	MFL	Conductivity, Cl, SO4, NO2, NO3, NH, PO4	Specialized Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (all H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Ng, Hardness	Total Dissolved Solids (Fil. Residue)	LEPTHEPH with subtracted PAHs	Field pH	Field Temperature	# of Bottles	Comments
1	WG-11222680-180723-KH-05	18/07/23	10:40	W	X	X	X	X	X	X	X	X	X	7.70	16.92		
2	WG-11222680-180723-KH-06	18/07/23	12:10	W	X	X	X	X	X	X	X	X	X	7.65	16.90		
3	WG-11222680-180723-KH-07	18/07/23	13:45	W	X	X	X	X	X	X	X	X	X	6.99	14.90		
4	WG-11222680-180723-KH-08	18/07/23	14:00	W	X	X	X	X	X	X	X	X	X	8.59	15.95		
5	WG-11222680-180723-KH-09	18/07/23	15:30	W	X	X	X	X	X	X	X	X	X	7.57	15.20		
6	WG-11222680-190723-KH-10	19/07/23	8:30	W	X	X	X	X	X	X	X	X	X	6.99	14.54		
7	WG-11222680-190723-KH-11	19/07/23	9:30	W	X	X	X	X	X	X	X	X	X	0	0		
8																	
9																	
10																	

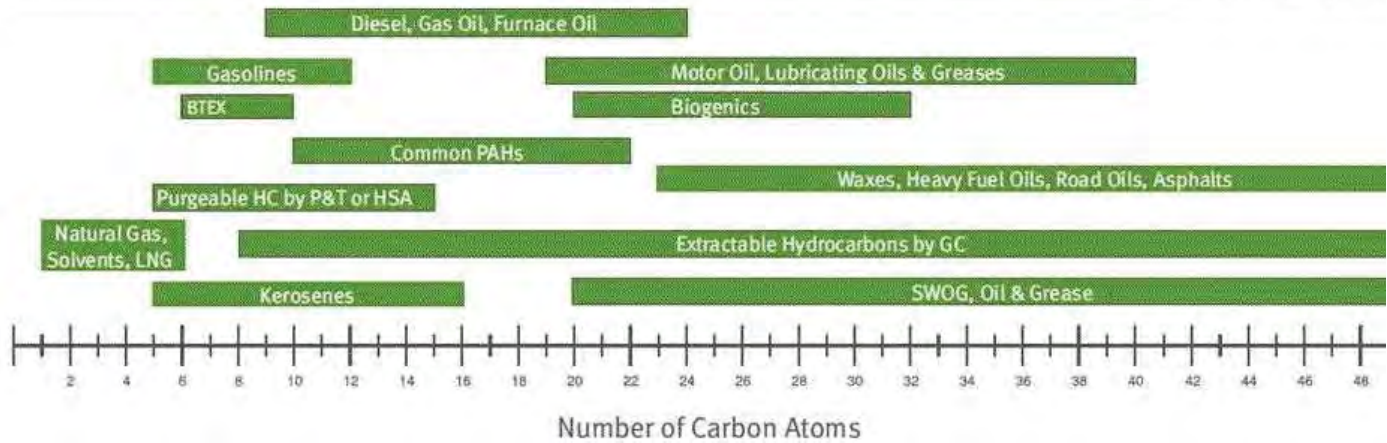
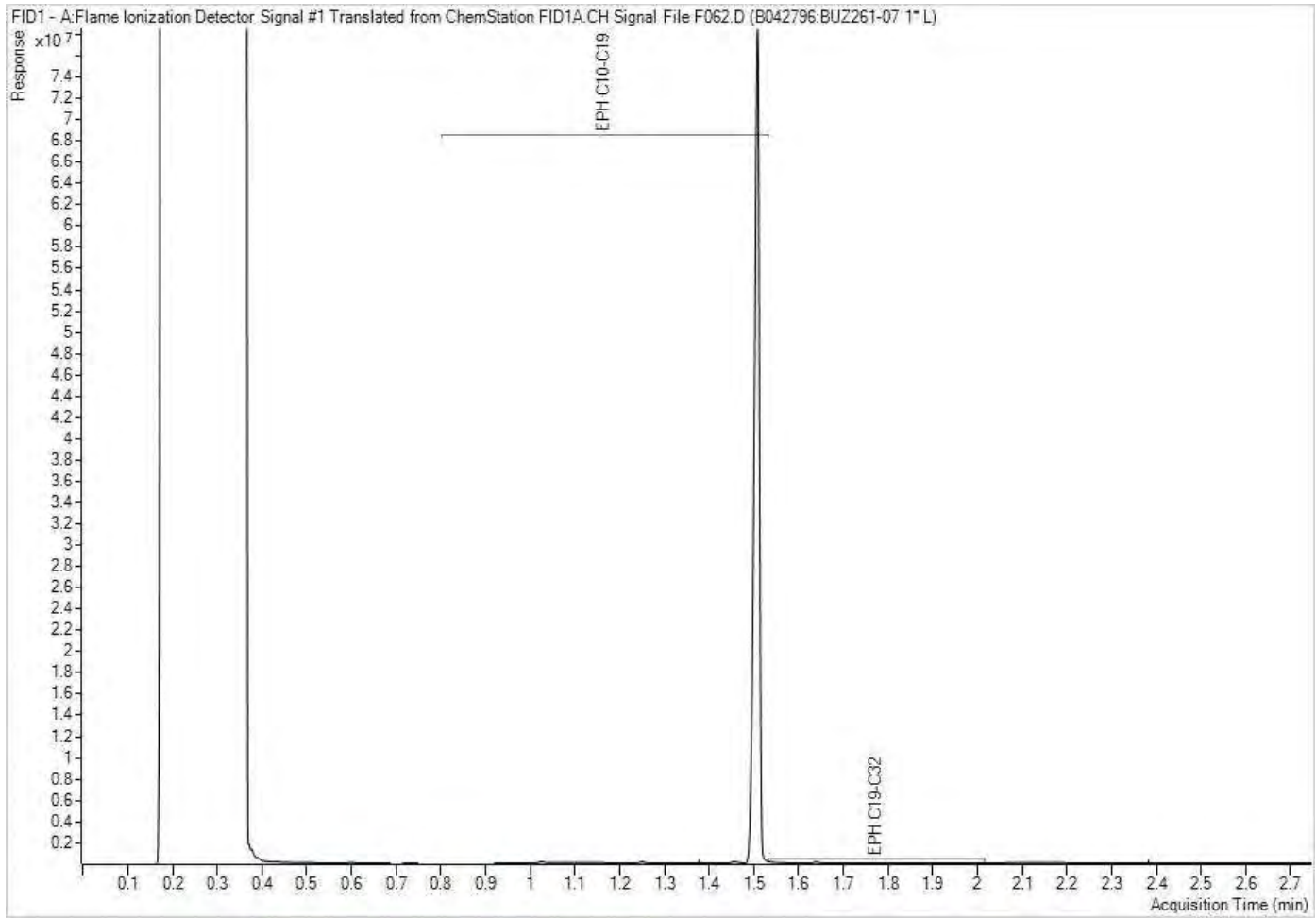


<b>RELINQUISHED BY: (Signature/Print)</b> Katherine Hosler	<b>Date: (YYMMDD)</b> 19/07/23	<b>Time</b> 8:15	<b>RECEIVED BY: (Signature/Print)</b> N. L. ...	<b>Date: (YYMMDD)</b> 23/07/23	<b>Time</b> 11:02	# jars used and not submitted: _____ Temp (Celsius) at Receipt: <input type="checkbox"/> _____ Temperature (C) at Receipt: 3, 5, 2 Contains the Product of Interest: <input type="checkbox"/> Yes <input type="checkbox"/> No
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\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BV.COM/ENVIRONMENTAL/LABORATORIES/RESOURCES/SCC/TERMS-AND-CONDITIONS.  
 \*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

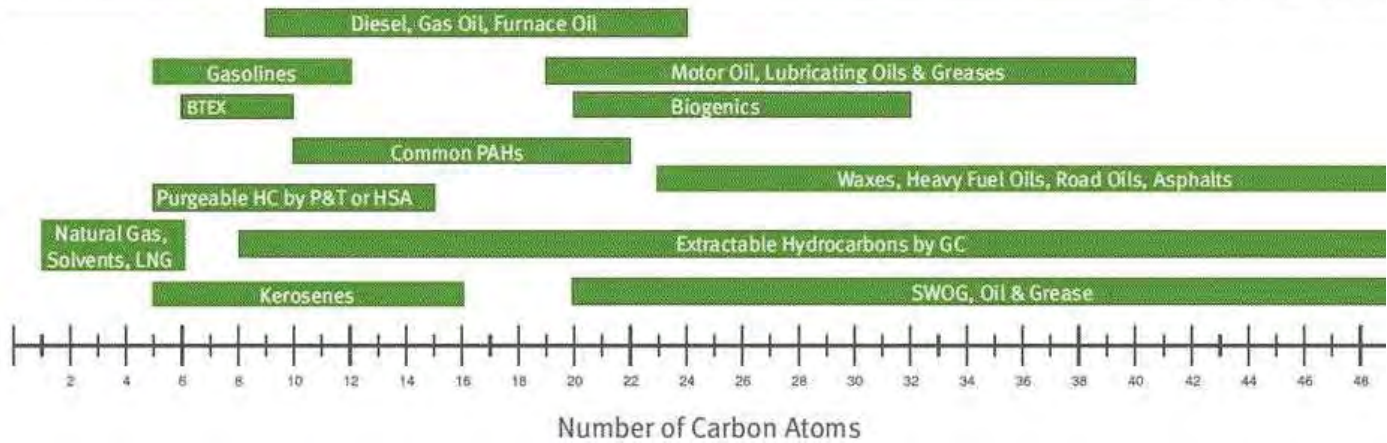
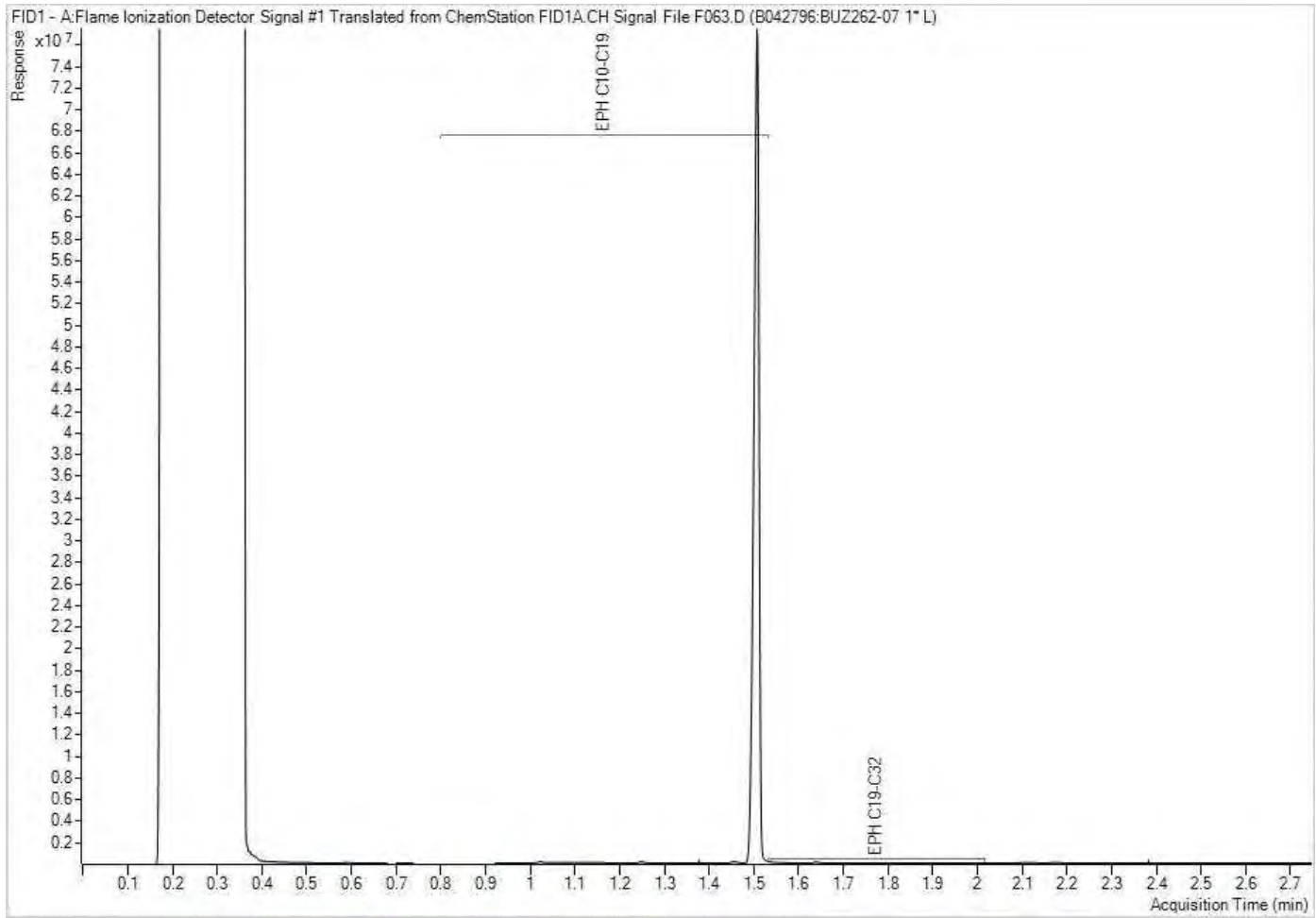
7, 2, 5  
Ice-yes see ACTR for RBY temps

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

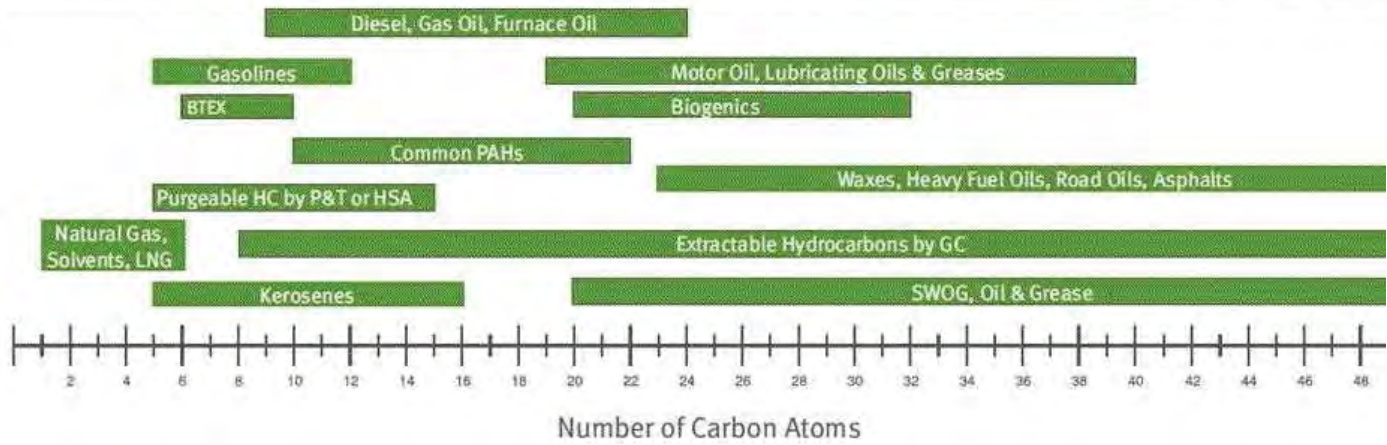
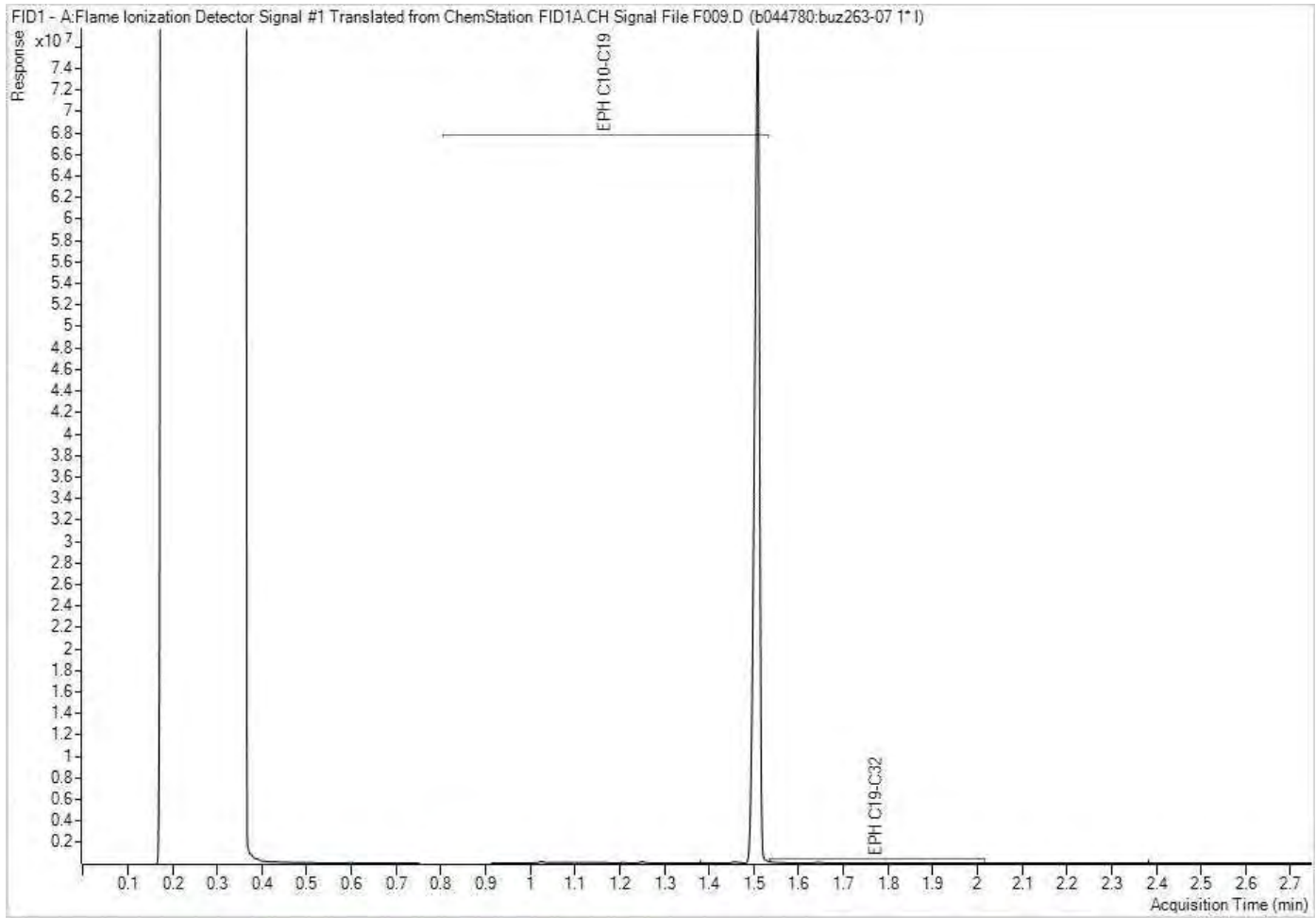
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

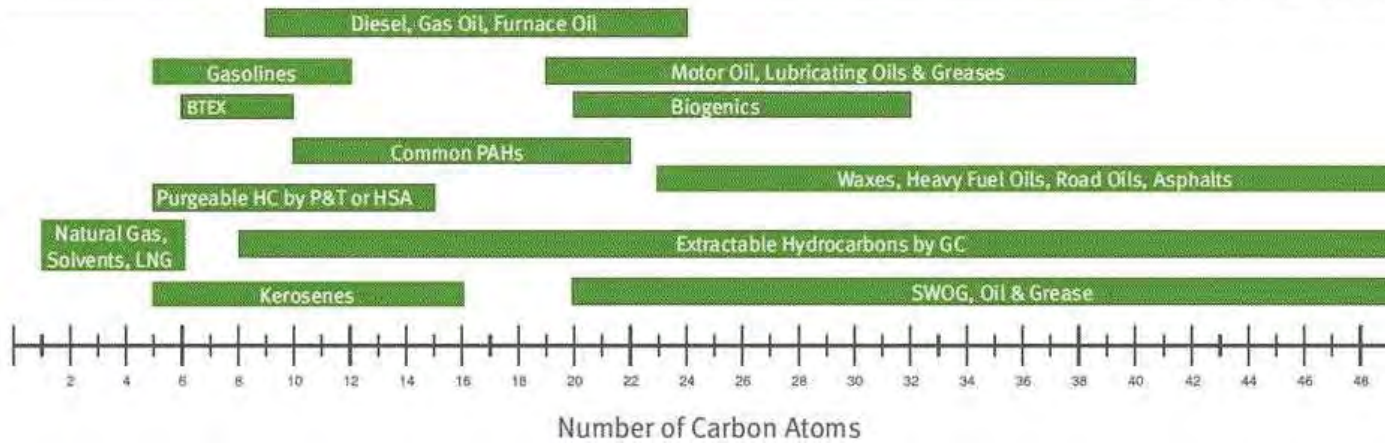
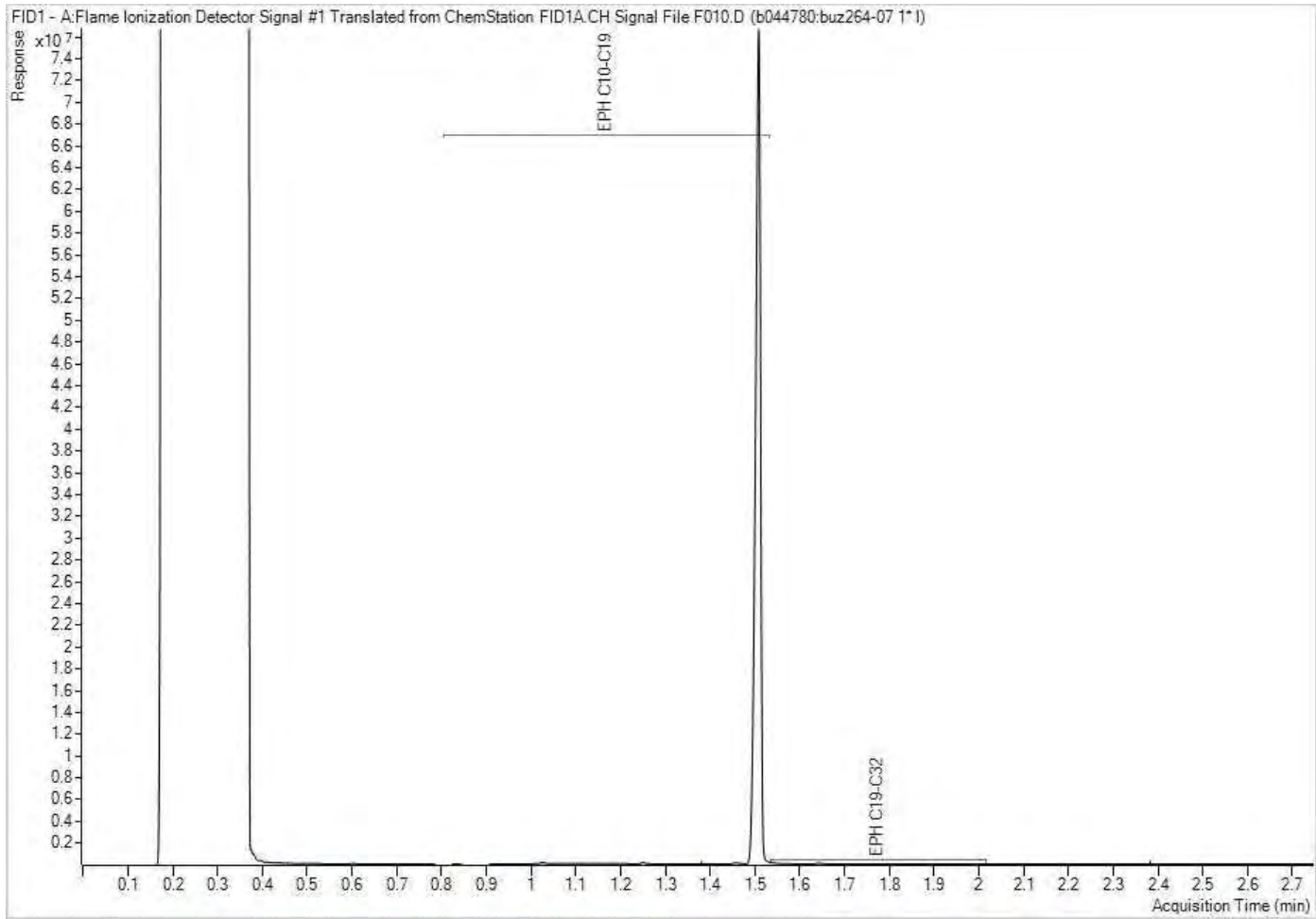


EPH in Water when PAH required Chromatogram



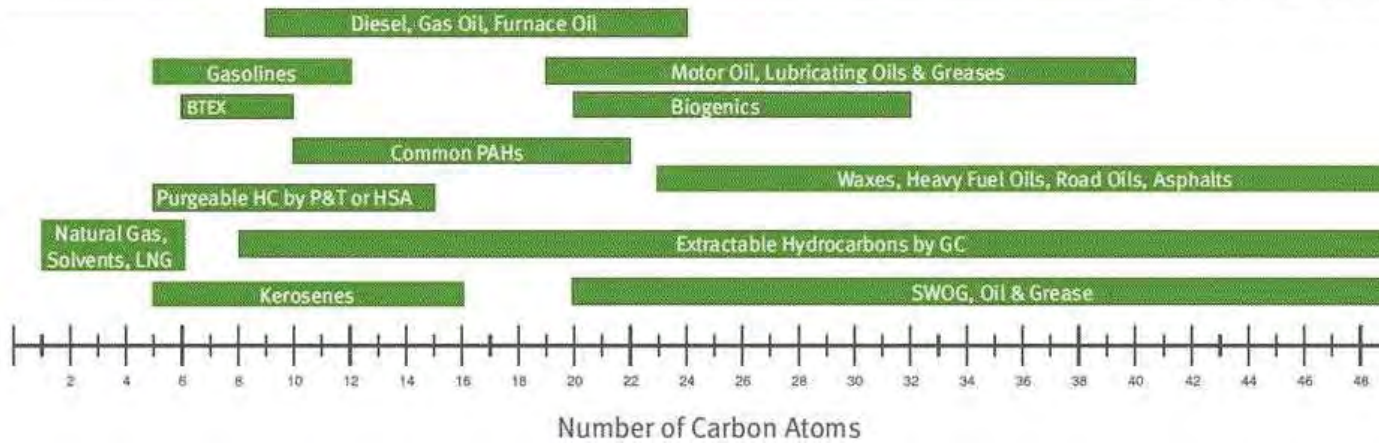
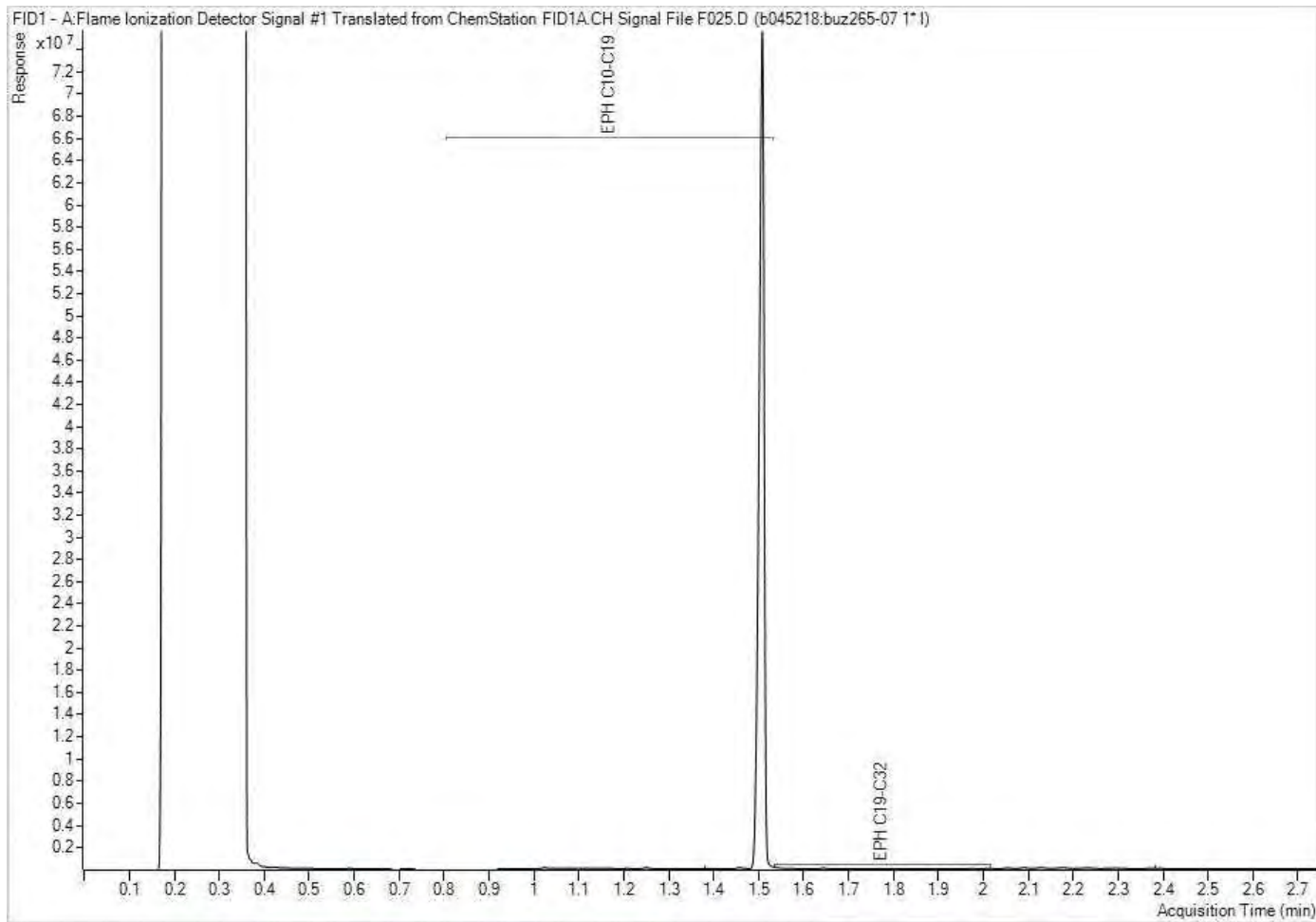
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



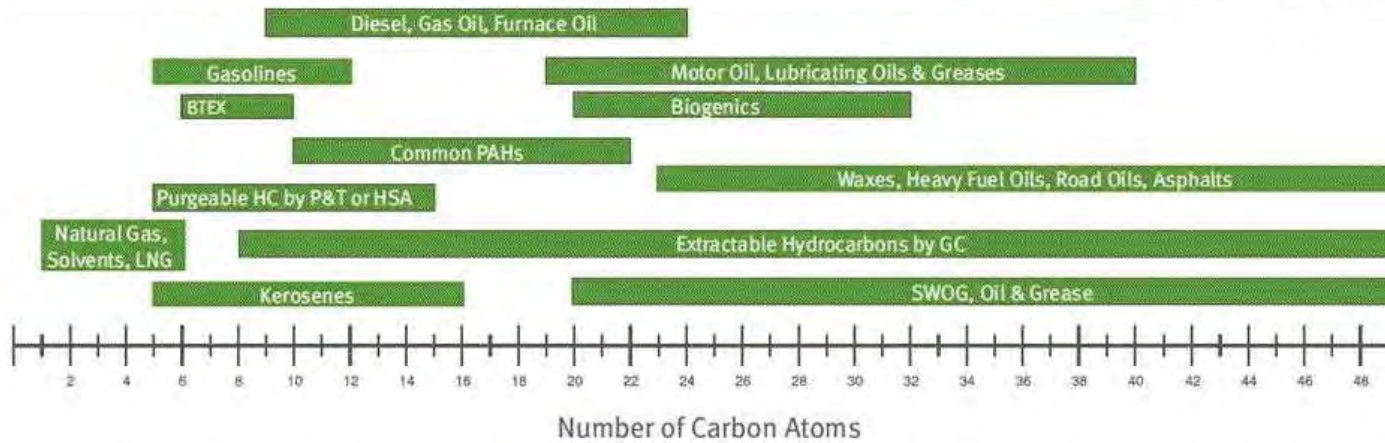
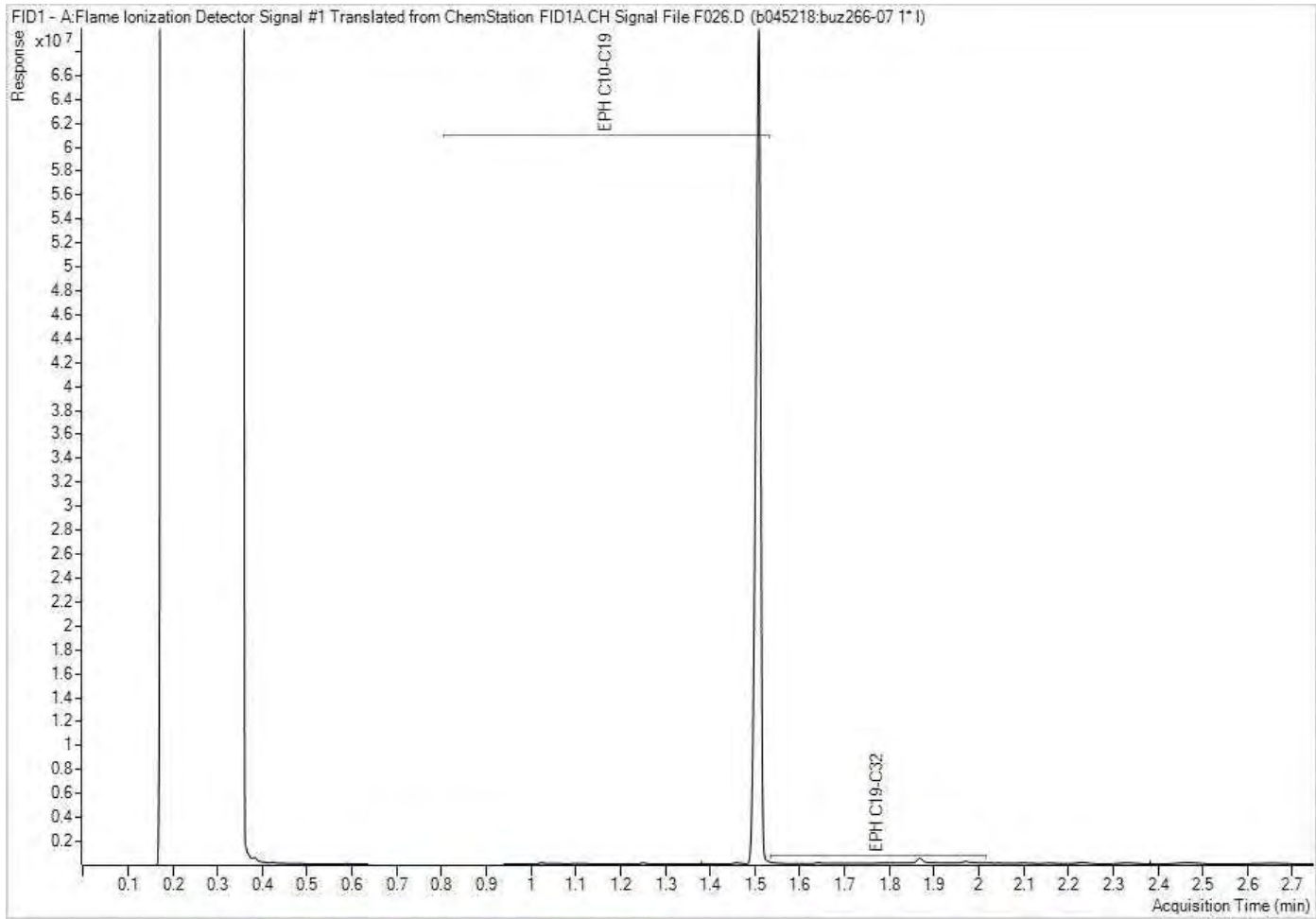
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

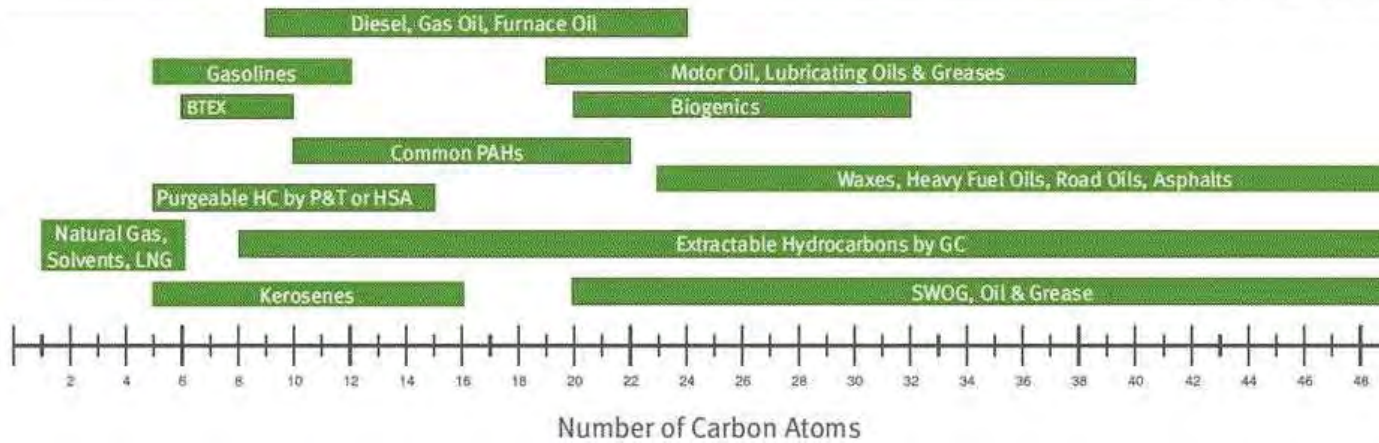
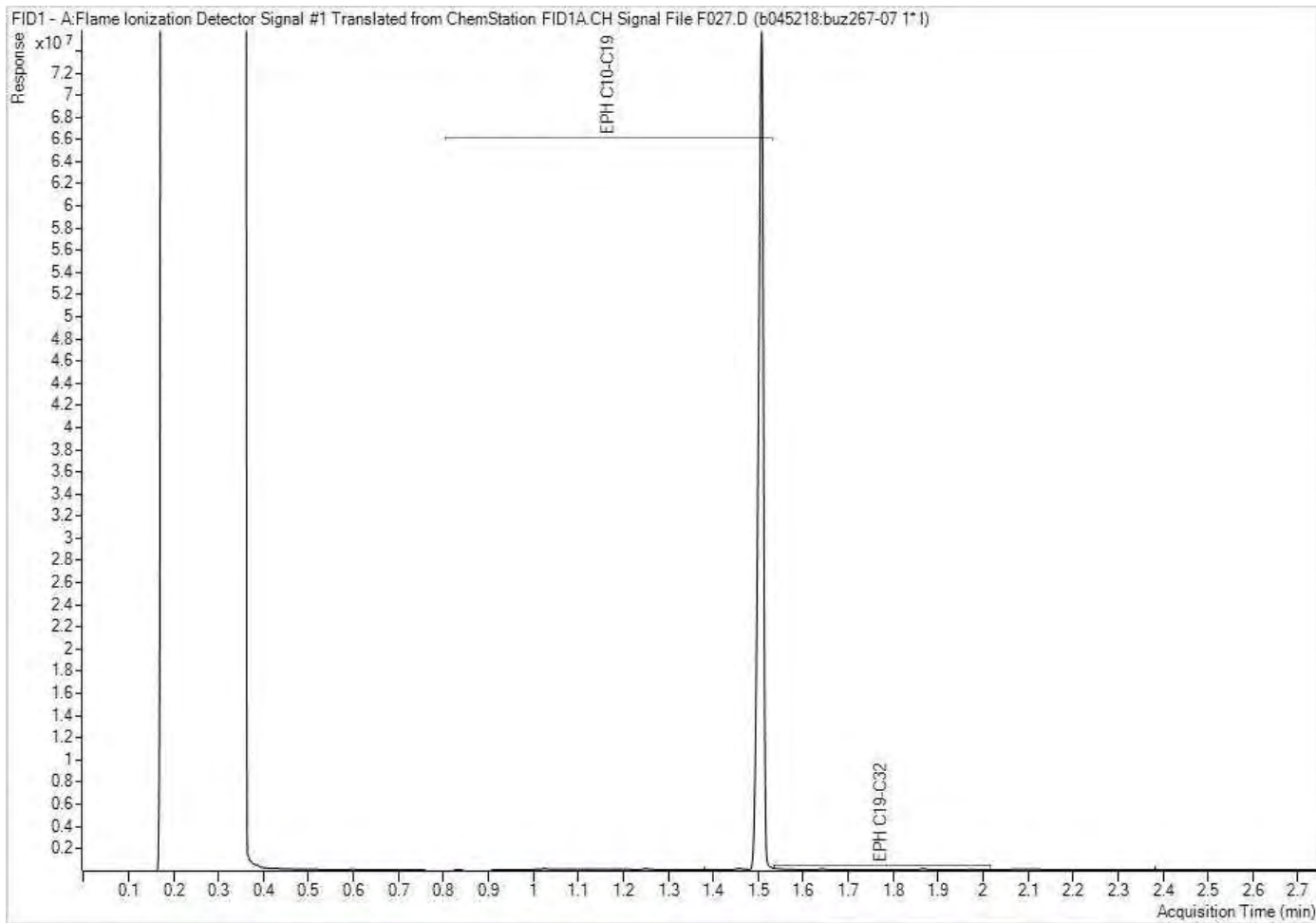
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your P.O. #: 735-002640-4  
 Your Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your C.O.C. #: 700911-01-01, 700911-03-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/09/18**  
 Report #: R3396694  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C371107**

**Received: 2023/09/08, 16:36**

Sample Matrix: Water  
 # Samples Received: 11

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	9	N/A	2023/09/11	BBY6SOP-00026	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	2	N/A	2023/09/12	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry	5	N/A	2023/09/11	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Chloride/Sulphate by Auto Colourimetry	6	N/A	2023/09/12	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Conductivity @25C	9	N/A	2023/09/11	BBY6SOP-00026	SM 24 2510 B m
Conductivity @25C	2	N/A	2023/09/12	BBY6SOP-00026	SM 24 2510 B m
Sulphide (as H2S) (1)	10	N/A	2023/09/12		Auto Calc
Sulphide (as H2S) (1)	1	N/A	2023/09/13		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc (1)	10	N/A	2023/09/12		
Hardness (calculated as CaCO3)	11	N/A	2023/09/14	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (2)	11	2023/09/13	2023/09/13	AB SOP-00084	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	11	2023/09/14	2023/09/14	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	11	N/A	2023/09/14	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (2)	11	N/A	2023/09/14	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	6	N/A	2023/09/11	AB SOP-00007	SM 24 4500 NH3 A G m
Ammonia-N (Total)	5	N/A	2023/09/13	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	11	N/A	2023/09/09	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water	11	N/A	2023/09/09	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N)	11	N/A	2023/09/12	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	11	2023/09/14	2023/09/14	BBY8SOP-00021	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (3)	11	N/A	2023/09/15	BBY WI-00033	Auto Calc
Orthophosphate by Automated Analyzer (4)	11	N/A	2023/09/09	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (1)	10	N/A	2023/09/12	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Sulphide (1)	1	N/A	2023/09/13	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	11	2023/09/11	2023/09/12	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (5)	11	N/A	2023/09/15	BBY WI-00033	Auto Calc
Field pH	10	N/A	2023/09/08		
Field Temperature	10	N/A	2023/09/08		

**Remarks:**



Your P.O. #: 735-002640-4  
Your Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your C.O.C. #: 700911-01-01, 700911-03-01

**Attention: Stephanie Berton**

GHD Limited  
455 PHILLIP STREET  
WATERLOO, ON  
CANADA N2L 3X2

**Report Date: 2023/09/18**

Report #: R3396694

Version: 1 - Final

## **CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C371107**

**Received: 2023/09/08, 16:36**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

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

(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8

(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) Total PAHs in Water include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.

(4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

(5) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)

HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)



Your P.O. #: 735-002640-4  
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Site Location: NEW LANDFILL  
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**Attention: Stephanie Berton**

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**Report Date: 2023/09/18**  
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**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C371107**

**Received: 2023/09/08, 16:36**

Encryption Key



Bureau Veritas  
18 Sep 2023 11:50:13

Please direct all questions regarding this Certificate of Analysis to:  
Brody Andersen, B.Sc., B.Sc., Program Specialist–Emergency Spill Response  
Email: Brody.Andersen@bureauveritas.com  
Phone# (780)577-7120

=====  
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For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BYQ312	BYQ313			BYQ314		
Sampling Date		2023/09/06 16:00	2023/09/06 16:55			2023/09/07 08:45		
COC Number		700911-01-01	700911-01-01			700911-01-01		
	UNITS	WG-11222680-060923 -CXW-01	WG-11222680-060923 -CXW-02	RDL	QC Batch	WG-11222680-070923 -CXW-03	RDL	QC Batch
<b>ANIONS</b>								
Nitrite (N)	mg/L	<0.0050	<0.0050	0.0050	B101391	<0.0050	0.0050	B101391
<b>Calculated Parameters</b>								
Nitrate (N)	mg/L	0.637	1.06	0.020	B099920	2.33	0.040	B099920
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	0.0020	B100168	<0.0020	0.0020	B100168
<b>Field Parameters</b>								
Field pH	pH	7.89	7.37	N/A	ONSITE	6.61	N/A	ONSITE
Field Temperature	°C	12.57	10.61	N/A	ONSITE	11.02	N/A	ONSITE
<b>Misc. Inorganics</b>								
Conductivity	uS/cm	180	200	2.0	B102512	140	2.0	B102524
Total Dissolved Solids	mg/L	110	120	10	B102287	84	10	B102287
<b>Anions</b>								
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	1.0	B102506	<1.0	1.0	B102520
Alkalinity (Total as CaCO3)	mg/L	72	85	1.0	B102506	45	1.0	B102520
Bicarbonate (HCO3)	mg/L	87	100	1.0	B102506	55	1.0	B102520
Carbonate (CO3)	mg/L	<1.0	<1.0	1.0	B102506	<1.0	1.0	B102520
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	B102506	<1.0	1.0	B102520
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	B104312	<0.0018	0.0018	B104312
Chloride (Cl)	mg/L	4.2	1.9	1.0	B102798	2.2	1.0	B102798
Sulphate (SO4)	mg/L	9.4	9.2	1.0	B102798	8.4	1.0	B102798
<b>Nutrients</b>								
Total Ammonia (N)	mg/L	<0.015	<0.015	0.015	B103325	<0.015	0.015	B103325
Orthophosphate (P)	mg/L	0.012	0.0048	0.0030	B101105	0.0048	0.0030	B101105
Nitrate plus Nitrite (N)	mg/L	0.637	1.06	0.020	B101390	2.33	0.040	B101390
RDL = Reportable Detection Limit N/A = Not Applicable								



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BYQ314			BYQ315	BYQ315		
<b>Sampling Date</b>		2023/09/07 08:45			2023/09/07 09:55	2023/09/07 09:55		
<b>COC Number</b>		700911-01-01			700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-03 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>WG-11222680-070923 -CXW-04</b>	<b>WG-11222680-070923 -CXW-04 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>								
Nitrite (N)	mg/L	N/A	0.0050	B101391	<0.0050	N/A	0.0050	B101391
<b>Calculated Parameters</b>								
Nitrate (N)	mg/L	N/A	0.040	B099920	0.062	N/A	0.020	B099920
Sulphide (as H <sub>2</sub> S)	mg/L	N/A	0.0020	B100168	<0.0020	N/A	0.0020	B100168
<b>Field Parameters</b>								
Field pH	pH	N/A	N/A	ONSITE	8.20	N/A	N/A	ONSITE
Field Temperature	°C	N/A	N/A	ONSITE	10.56	N/A	N/A	ONSITE
<b>Misc. Inorganics</b>								
Conductivity	uS/cm	140	2.0	B102524	87	N/A	2.0	B102512
Total Dissolved Solids	mg/L	N/A	10	B102287	60	N/A	10	B102287
<b>Anions</b>								
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	<1.0	1.0	B102520	<1.0	N/A	1.0	B102506
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	43	1.0	B102520	39	N/A	1.0	B102506
Bicarbonate (HCO <sub>3</sub> )	mg/L	53	1.0	B102520	48	N/A	1.0	B102506
Carbonate (CO <sub>3</sub> )	mg/L	<1.0	1.0	B102520	<1.0	N/A	1.0	B102506
Hydroxide (OH)	mg/L	<1.0	1.0	B102520	<1.0	N/A	1.0	B102506
Total Sulphide	mg/L	N/A	0.0018	B104312	<0.0018	N/A	0.0018	B104312
Chloride (Cl)	mg/L	N/A	1.0	B102798	<1.0	<1.0	1.0	B103224
Sulphate (SO <sub>4</sub> )	mg/L	N/A	1.0	B102798	2.8	2.7	1.0	B103224
<b>Nutrients</b>								
Total Ammonia (N)	mg/L	N/A	0.015	B103325	<0.015	N/A	0.015	B103325
Orthophosphate (P)	mg/L	N/A	0.0030	B101105	0.021	N/A	0.0030	B101105
Nitrate plus Nitrite (N)	mg/L	N/A	0.040	B101390	0.062	N/A	0.020	B101390
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable								



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		BYQ316	BYQ317		BYQ318		
Sampling Date		2023/09/07 10:05	2023/09/07 10:07		2023/09/07 11:20		
COC Number		700911-01-01	700911-01-01		700911-01-01		
	UNITS	WG-11222680-070923 -CXW-05	WG-11222680-070923 -CXW-06	QC Batch	WG-11222680-070923 -CXW-07	RDL	QC Batch
<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	<0.0050	B101391	<0.0050	0.0050	B101391
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	0.325	0.326	B099920	0.127	0.020	B099920
Sulphide (as H <sub>2</sub> S)	mg/L	<0.0020	<0.0020	B100168	<0.0020	0.0020	B100168
<b>Field Parameters</b>							
Field pH	pH	6.74	6.74	ONSITE	7.32	N/A	ONSITE
Field Temperature	°C	11.84	11.84	ONSITE	12.36	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	170	170	B102512	88	2.0	B102512
Total Dissolved Solids	mg/L	96	100	B102287	54	10	B102287
<b>Anions</b>							
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0	B102506	<1.0	1.0	B102506
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	67	67	B102506	35	1.0	B102506
Bicarbonate (HCO <sub>3</sub> )	mg/L	81	82	B102506	43	1.0	B102506
Carbonate (CO <sub>3</sub> )	mg/L	<1.0	<1.0	B102506	<1.0	1.0	B102506
Hydroxide (OH)	mg/L	<1.0	<1.0	B102506	<1.0	1.0	B102506
Total Sulphide	mg/L	<0.0018	<0.0018	B104312	<0.0018	0.0018	B104312
Chloride (Cl)	mg/L	4.5	4.7	B102798	3.3	1.0	B103224
Sulphate (SO <sub>4</sub> )	mg/L	7.3	7.4	B102798	3.0	1.0	B103224
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	<0.015	B103325	<0.015	0.015	B106275
Orthophosphate (P)	mg/L	0.0033	<0.0030	B101105	0.0047	0.0030	B101105
Nitrate plus Nitrite (N)	mg/L	0.325	0.326	B101390	0.127	0.020	B101390
RDL = Reportable Detection Limit N/A = Not Applicable							





**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BYQ319	BYQ319	BYQ320	BYQ321		
<b>Sampling Date</b>		2023/09/07 12:15	2023/09/07 12:15	2023/09/07 12:40	2023/09/07 15:15		
<b>COC Number</b>		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-08</b>	<b>WG-11222680-070923 -CXW-08 Lab-Dup</b>	<b>WG-11222680-070923 -CXW-09</b>	<b>WG-11222680-070923 -CXW-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	N/A	<0.0050	<0.0050	0.0050	B101391
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	0.740	N/A	0.521	0.079	0.020	B099920
Sulphide (as H2S)	mg/L	<0.0020	N/A	<0.0020	<0.0020	0.0020	B100168
<b>Field Parameters</b>							
Field pH	pH	6.74	N/A	6.74	7.73	N/A	ONSITE
Field Temperature	°C	18.24	N/A	18.72	12.35	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	450	460	250	76	2.0	B102512
Total Dissolved Solids	mg/L	300	N/A	140	36	10	B102287
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	B102506
Alkalinity (Total as CaCO3)	mg/L	78	78	100	34	1.0	B102506
Bicarbonate (HCO3)	mg/L	95	96	130	42	1.0	B102506
Carbonate (CO3)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	B102506
Hydroxide (OH)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	B102506
Total Sulphide	mg/L	<0.0018	N/A	<0.0018	<0.0018	0.0018	B104312
Chloride (Cl)	mg/L	85	N/A	8.6	<1.0	1.0	B103224
Sulphate (SO4)	mg/L	5.8	N/A	7.3	2.9	1.0	B103224
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	N/A	<0.015	<0.015	0.015	B106275
Orthophosphate (P)	mg/L	0.0045	N/A	0.025	0.0055	0.0030	B101105
Nitrate plus Nitrite (N)	mg/L	0.740	N/A	0.521	0.079	0.020	B101390
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		BYQ322		
<b>Sampling Date</b>		2023/09/08 08:25		
<b>COC Number</b>		700911-03-01		
	<b>UNITS</b>	<b>WG-11222680-080923 -CXW-11</b>	<b>RDL</b>	<b>QC Batch</b>
<b>ANIONS</b>				
Nitrite (N)	mg/L	<0.0050	0.0050	B101391
<b>Calculated Parameters</b>				
Nitrate (N)	mg/L	<0.020	0.020	B099920
Sulphide (as H <sub>2</sub> S)	mg/L	<0.0020	0.0020	B100168
<b>Misc. Inorganics</b>				
Conductivity	uS/cm	<2.0	2.0	B102512
Total Dissolved Solids	mg/L	<10	10	B102287
<b>Anions</b>				
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	<1.0	1.0	B102506
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	<1.0	1.0	B102506
Bicarbonate (HCO <sub>3</sub> )	mg/L	<1.0	1.0	B102506
Carbonate (CO <sub>3</sub> )	mg/L	<1.0	1.0	B102506
Hydroxide (OH)	mg/L	<1.0	1.0	B102506
Total Sulphide	mg/L	<0.0018	0.0018	B105624
Chloride (Cl)	mg/L	<1.0	1.0	B103224
Sulphate (SO <sub>4</sub> )	mg/L	<1.0	1.0	B103224
<b>Nutrients</b>				
Total Ammonia (N)	mg/L	0.025	0.015	B106275
Orthophosphate (P)	mg/L	<0.0030	0.0030	B101105
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	B101390
RDL = Reportable Detection Limit				



**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		BYQ312		BYQ313		
<b>Sampling Date</b>		2023/09/06 16:00		2023/09/06 16:55		
<b>COC Number</b>		700911-01-01		700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-060923 -CXW-01</b>	<b>QC Batch</b>	<b>WG-11222680-060923 -CXW-02</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	B100835	<0.0050	0.0050	B100837
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	B100835	<0.0050	0.0050	B100837
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BYQ314		BYQ315	BYQ316		
<b>Sampling Date</b>		2023/09/07 08:45		2023/09/07 09:55	2023/09/07 10:05		
<b>COC Number</b>		700911-01-01		700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-03</b>	<b>QC Batch</b>	<b>WG-11222680-070923 -CXW-04</b>	<b>WG-11222680-070923 -CXW-05</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	B100835	<0.0050	<0.0050	0.0050	B100837
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	B100835	<0.0050	<0.0050	0.0050	B100837
RDL = Reportable Detection Limit							

<b>Bureau Veritas ID</b>		BYQ317	BYQ318	BYQ319		
<b>Sampling Date</b>		2023/09/07 10:07	2023/09/07 11:20	2023/09/07 12:15		
<b>COC Number</b>		700911-01-01	700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-06</b>	<b>WG-11222680-070923 -CXW-07</b>	<b>WG-11222680-070923 -CXW-08</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B100837
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B100837
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		BYQ320	BYQ321		
<b>Sampling Date</b>		2023/09/07 12:40	2023/09/07 15:15		
<b>COC Number</b>		700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-09</b>	<b>WG-11222680-070923 -CXW-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>					
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	0.0050	B100837
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	0.0050	B100837
RDL = Reportable Detection Limit					



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ312	BYQ313	BYQ314	BYQ315		
Sampling Date		2023/09/06 16:00	2023/09/06 16:55	2023/09/07 08:45	2023/09/07 09:55		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	UNITS	WG-11222680-060923 -CXW-01	WG-11222680-060923 -CXW-02	WG-11222680-070923 -CXW-03	WG-11222680-070923 -CXW-04	RDL	QC Batch

Calculated Parameters							
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B099705
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B099705
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B099705

Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107283
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B107283
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B107283
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B107283
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107283
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107283
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B107283
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107283
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	B107283
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B107283
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	B107283
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107283

Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B099707
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B099707

Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B107289
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B107289

RDL = Reportable Detection Limit



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ312	BYQ313	BYQ314	BYQ315		
Sampling Date		2023/09/06 16:00	2023/09/06 16:55	2023/09/07 08:45	2023/09/07 09:55		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	UNITS	WG-11222680-060923 -CXW-01	WG-11222680-060923 -CXW-02	WG-11222680-070923 -CXW-03	WG-11222680-070923 -CXW-04	RDL	QC Batch
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	91	93	92	109	N/A	B107289
D10-ANTHRACENE (sur.)	%	85	88	88	89	N/A	B107283
D8-ACENAPHTHYLENE (sur.)	%	85	88	89	90	N/A	B107283
D8-NAPHTHALENE (sur.)	%	77	81	87	85	N/A	B107283
TERPHENYL-D14 (sur.)	%	78	80	78	81	N/A	B107283
RDL = Reportable Detection Limit N/A = Not Applicable							



**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ316		BYQ317	BYQ318		
Sampling Date		2023/09/07 10:05		2023/09/07 10:07	2023/09/07 11:20		
COC Number		700911-01-01		700911-01-01	700911-01-01		
	UNITS	WG-11222680-070923 -CXW-05	QC Batch	WG-11222680-070923 -CXW-06	WG-11222680-070923 -CXW-07	RDL	QC Batch
<b>Calculated Parameters</b>							
Low Molecular Weight PAH's	ug/L	<0.10	B099705	<0.10	<0.10	0.10	B099705
High Molecular Weight PAH's	ug/L	<0.050	B099705	<0.050	<0.050	0.050	B099705
Total PAH	ug/L	<0.10	B099705	<0.10	<0.10	0.10	B099705
<b>Polycyclic Aromatics</b>							
Quinoline	ug/L	<0.020	B107283	<0.020	<0.020	0.020	B107307
Naphthalene	ug/L	<0.10	B107283	<0.10	<0.10	0.10	B107307
1-Methylnaphthalene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
2-Methylnaphthalene	ug/L	<0.10	B107283	<0.10	<0.10	0.10	B107307
Acenaphthylene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Acenaphthene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Fluorene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Phenanthrene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Anthracene	ug/L	<0.010	B107283	<0.010	<0.010	0.010	B107307
Acridine	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Fluoranthene	ug/L	<0.020	B107283	<0.020	<0.020	0.020	B107307
Pyrene	ug/L	<0.020	B107283	<0.020	<0.020	0.020	B107307
Benzo(a)anthracene	ug/L	<0.010	B107283	<0.010	<0.010	0.010	B107307
Chrysene	ug/L	<0.020	B107283	<0.020	<0.020	0.020	B107307
Benzo(b&j)fluoranthene	ug/L	<0.030	B107283	<0.030	<0.030	0.030	B107307
Benzo(k)fluoranthene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Benzo(a)pyrene	ug/L	<0.0050	B107283	<0.0050	<0.0050	0.0050	B107307
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
Dibenz(a,h)anthracene	ug/L	<0.0030	B107283	<0.0030	<0.0030	0.0030	B107307
Benzo(g,h,i)perylene	ug/L	<0.050	B107283	<0.050	<0.050	0.050	B107307
<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	B099707	<0.20	<0.20	0.20	B099707
HEPH (C19-C32 less PAH)	mg/L	<0.20	B099707	<0.20	<0.20	0.20	B099707
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	B107289	<0.20	<0.20	0.20	B107314
EPH (C19-C32)	mg/L	<0.20	B107289	<0.20	<0.20	0.20	B107314
RDL = Reportable Detection Limit							



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ316		BYQ317	BYQ318		
Sampling Date		2023/09/07 10:05		2023/09/07 10:07	2023/09/07 11:20		
COC Number		700911-01-01		700911-01-01	700911-01-01		
	UNITS	WG-11222680-070923 -CXW-05	QC Batch	WG-11222680-070923 -CXW-06	WG-11222680-070923 -CXW-07	RDL	QC Batch
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	111	B107289	93	98	N/A	B107314
D10-ANTHRACENE (sur.)	%	87	B107283	98	97	N/A	B107307
D8-ACENAPHTHYLENE (sur.)	%	87	B107283	93	91	N/A	B107307
D8-NAPHTHALENE (sur.)	%	81	B107283	79	75	N/A	B107307
TERPHENYL-D14 (sur.)	%	78	B107283	77	73	N/A	B107307
RDL = Reportable Detection Limit N/A = Not Applicable							





**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ319	BYQ320	BYQ321	BYQ322		
Sampling Date		2023/09/07 12:15	2023/09/07 12:40	2023/09/07 15:15	2023/09/08 08:25		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-03-01		
	UNITS	WG-11222680-070923 -CXW-08	WG-11222680-070923 -CXW-09	WG-11222680-070923 -CXW-10	WG-11222680-080923 -CXW-11	RDL	QC Batch

Calculated Parameters							
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B099705
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B099705
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B099705

Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107307
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B107307
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B107307
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B107307
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107307
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107307
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B107307
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B107307
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	B107307
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B107307
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	B107307
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B107307

Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B099707
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B099707

Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B107314
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B107314

RDL = Reportable Detection Limit



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Bureau Veritas ID		BYQ319	BYQ320	BYQ321	BYQ322		
Sampling Date		2023/09/07 12:15	2023/09/07 12:40	2023/09/07 15:15	2023/09/08 08:25		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-03-01		
	UNITS	WG-11222680-070923 -CXW-08	WG-11222680-070923 -CXW-09	WG-11222680-070923 -CXW-10	WG-11222680-080923 -CXW-11	RDL	QC Batch

Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	92	93	93	92	N/A	B107314
D10-ANTHRACENE (sur.)	%	97	94	95	97	N/A	B107307
D8-ACENAPHTHYLENE (sur.)	%	92	90	92	92	N/A	B107307
D8-NAPHTHALENE (sur.)	%	76	75	94	78	N/A	B107307
TERPHENYL-D14 (sur.)	%	79	79	98	80	N/A	B107307

RDL = Reportable Detection Limit  
 N/A = Not Applicable



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BYQ312	BYQ312	BYQ313	BYQ314		
<b>Sampling Date</b>		2023/09/06 16:00	2023/09/06 16:00	2023/09/06 16:55	2023/09/07 08:45		
<b>COC Number</b>		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-060923 -CXW-01</b>	<b>WG-11222680-060923 -CXW-01 Lab-Dup</b>	<b>WG-11222680-060923 -CXW-02</b>	<b>WG-11222680-070923 -CXW-03</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	70.5	N/A	81.5	47.7	0.50	B099702
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	0.0019	<0.0019	<0.0019	<0.0019	0.0019	B105296
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	B105833
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B105833
Dissolved Arsenic (As)	ug/L	0.32	0.32	<0.10	<0.10	0.10	B105833
Dissolved Barium (Ba)	ug/L	3.3	3.2	3.1	1.1	1.0	B105833
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Boron (B)	ug/L	52	52	<50	<50	50	B105833
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Copper (Cu)	ug/L	0.79	0.83	<0.20	<0.20	0.20	B105833
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B105833
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	2.4	<1.0	1.0	B105833
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Phosphorus (P)	ug/L	14	15	<10	<10	10	B105833
Dissolved Selenium (Se)	ug/L	<0.10	<0.10	<0.10	0.23	0.10	B105833
Dissolved Silicon (Si)	ug/L	6490	6390	7250	6650	100	B105833
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B105833
Dissolved Strontium (Sr)	ug/L	33.5	33.0	38.7	29.5	1.0	B105833
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833

RDL = Reportable Detection Limit  
Lab-Dup = Laboratory Initiated Duplicate  
N/A = Not Applicable



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BYQ312	BYQ312	BYQ313	BYQ314		
Sampling Date		2023/09/06 16:00	2023/09/06 16:00	2023/09/06 16:55	2023/09/07 08:45		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	UNITS	WG-11222680-060923 -CXW-01	WG-11222680-060923 -CXW-01 Lab-Dup	WG-11222680-060923 -CXW-02	WG-11222680-070923 -CXW-03	RDL	QC Batch
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Calcium (Ca)	mg/L	22.8	N/A	24.8	13.8	0.050	B099703
Dissolved Magnesium (Mg)	mg/L	3.32	N/A	4.73	3.23	0.050	B099703
Dissolved Potassium (K)	mg/L	0.361	N/A	0.315	0.190	0.050	B099703
Dissolved Sodium (Na)	mg/L	6.89	N/A	5.94	6.27	0.050	B099703
Dissolved Sulphur (S)	mg/L	<3.0	N/A	<3.0	<3.0	3.0	B099703

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BYQ315	BYQ316	BYQ317	BYQ318		
<b>Sampling Date</b>		2023/09/07 09:55	2023/09/07 10:05	2023/09/07 10:07	2023/09/07 11:20		
<b>COC Number</b>		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-04</b>	<b>WG-11222680-070923 -CXW-05</b>	<b>WG-11222680-070923 -CXW-06</b>	<b>WG-11222680-070923 -CXW-07</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	36.2	69.2	68.8	33.2	0.50	B099702
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	B105296
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	B105833
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B105833
Dissolved Arsenic (As)	ug/L	0.72	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Barium (Ba)	ug/L	2.0	2.0	1.9	<1.0	1.0	B105833
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	B105833
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Copper (Cu)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B105833
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Phosphorus (P)	ug/L	25	<10	<10	<10	10	B105833
Dissolved Selenium (Se)	ug/L	<0.10	0.14	0.11	<0.10	0.10	B105833
Dissolved Silicon (Si)	ug/L	3380	5960	5750	3430	100	B105833
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B105833
Dissolved Strontium (Sr)	ug/L	15.5	36.9	37.3	16.1	1.0	B105833
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Vanadium (V)	ug/L	5.9	<5.0	<5.0	<5.0	5.0	B105833

RDL = Reportable Detection Limit



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BYQ315	BYQ316	BYQ317	BYQ318		
Sampling Date		2023/09/07 09:55	2023/09/07 10:05	2023/09/07 10:07	2023/09/07 11:20		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-01-01		
	UNITS	WG-11222680-070923 -CXW-04	WG-11222680-070923 -CXW-05	WG-11222680-070923 -CXW-06	WG-11222680-070923 -CXW-07	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Calcium (Ca)	mg/L	11.8	21.9	21.5	11.0	0.050	B099703
Dissolved Magnesium (Mg)	mg/L	1.65	3.54	3.65	1.36	0.050	B099703
Dissolved Potassium (K)	mg/L	0.165	0.225	0.238	0.124	0.050	B099703
Dissolved Sodium (Na)	mg/L	0.932	3.57	3.61	1.21	0.050	B099703
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	3.0	B099703
RDL = Reportable Detection Limit							



**CSR D. METALS W/CV HG-DISS (WATER)**

<b>Bureau Veritas ID</b>		BYQ319	BYQ320	BYQ321	BYQ322		
<b>Sampling Date</b>		2023/09/07 12:15	2023/09/07 12:40	2023/09/07 15:15	2023/09/08 08:25		
<b>COC Number</b>		700911-01-01	700911-01-01	700911-01-01	700911-03-01		
	<b>UNITS</b>	<b>WG-11222680-070923 -CXW-08</b>	<b>WG-11222680-070923 -CXW-09</b>	<b>WG-11222680-070923 -CXW-10</b>	<b>WG-11222680-080923 -CXW-11</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	134	103	32.0	<0.50	0.50	B099702
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	B105296
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	B105833
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B105833
Dissolved Arsenic (As)	ug/L	0.12	0.17	<0.10	<0.10	0.10	B105833
Dissolved Barium (Ba)	ug/L	11.4	7.0	<1.0	<1.0	1.0	B105833
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	B105833
Dissolved Cadmium (Cd)	ug/L	0.011	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Copper (Cu)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B105833
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B105833
Dissolved Manganese (Mn)	ug/L	13.8	2.8	<1.0	<1.0	1.0	B105833
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B105833
Dissolved Phosphorus (P)	ug/L	<10	26	<10	<10	10	B105833
Dissolved Selenium (Se)	ug/L	<0.10	0.16	<0.10	<0.10	0.10	B105833
Dissolved Silicon (Si)	ug/L	13300	9540	2930	<100	100	B105833
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B105833
Dissolved Strontium (Sr)	ug/L	96.6	53.2	14.8	<1.0	1.0	B105833
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B105833
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833

RDL = Reportable Detection Limit





Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		BYQ319	BYQ320	BYQ321	BYQ322		
Sampling Date		2023/09/07 12:15	2023/09/07 12:40	2023/09/07 15:15	2023/09/08 08:25		
COC Number		700911-01-01	700911-01-01	700911-01-01	700911-03-01		
	UNITS	WG-11222680-070923 -CXW-08	WG-11222680-070923 -CXW-09	WG-11222680-070923 -CXW-10	WG-11222680-080923 -CXW-11	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B105833
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B105833
Dissolved Calcium (Ca)	mg/L	33.8	32.6	10.8	<0.050	0.050	B099703
Dissolved Magnesium (Mg)	mg/L	12.2	5.13	1.24	<0.050	0.050	B099703
Dissolved Potassium (K)	mg/L	0.976	0.476	0.135	<0.050	0.050	B099703
Dissolved Sodium (Na)	mg/L	22.9	4.94	0.765	<0.050	0.050	B099703
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	3.0	B099703
RDL = Reportable Detection Limit							



Bureau Veritas Job #: C371107  
Report Date: 2023/09/18

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: CXW

### GENERAL COMMENTS

Results relate only to the items tested.



### QUALITY ASSURANCE REPORT

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B107283	D10-ANTHRACENE (sur.)	2023/09/14	87	50 - 140	88	50 - 140	92	%		
B107283	D8-ACENAPHTHYLENE (sur.)	2023/09/14	88	50 - 140	93	50 - 140	92	%		
B107283	D8-NAPHTHALENE (sur.)	2023/09/14	85	50 - 140	77	50 - 140	77	%		
B107283	TERPHENYL-D14 (sur.)	2023/09/14	80	50 - 140	87	50 - 140	87	%		
B107289	O-TERPHENYL (sur.)	2023/09/14	92	60 - 140	92	60 - 140	92	%		
B107307	D10-ANTHRACENE (sur.)	2023/09/14	75	50 - 140	95	50 - 140	94	%		
B107307	D8-ACENAPHTHYLENE (sur.)	2023/09/14	85	50 - 140	91	50 - 140	88	%		
B107307	D8-NAPHTHALENE (sur.)	2023/09/14	80	50 - 140	71	50 - 140	66	%		
B107307	TERPHENYL-D14 (sur.)	2023/09/14	46 (6)	50 - 140	86	50 - 140	85	%		
B107314	O-TERPHENYL (sur.)	2023/09/14			94	60 - 140	91	%		
B101105	Orthophosphate (P)	2023/09/09	110	80 - 120	100	80 - 120	<0.0030	mg/L	NC (1)	20
B101390	Nitrate plus Nitrite (N)	2023/09/09	NC	80 - 120	104	80 - 120	<0.020	mg/L	1.3 (1)	25
B101391	Nitrite (N)	2023/09/09	NC	N/A	102	80 - 120	<0.0050	mg/L	1.4 (1)	20
B102287	Total Dissolved Solids	2023/09/12	101	80 - 120	102	80 - 120	<10	mg/L	1.3 (1)	20
B102506	Alkalinity (PP as CaCO3)	2023/09/12					<1.0	mg/L	NC (2)	20
B102506	Alkalinity (Total as CaCO3)	2023/09/12			98	80 - 120	<1.0	mg/L	0.53 (2)	20
B102506	Bicarbonate (HCO3)	2023/09/12					<1.0	mg/L	0.53 (2)	20
B102506	Carbonate (CO3)	2023/09/12					<1.0	mg/L	NC (2)	20
B102506	Hydroxide (OH)	2023/09/12					<1.0	mg/L	NC (2)	20
B102512	Conductivity	2023/09/12			100	90 - 110	<2.0	uS/cm	1.1 (2)	10
B102520	Alkalinity (PP as CaCO3)	2023/09/12					<1.0	mg/L	NC (3)	20
B102520	Alkalinity (Total as CaCO3)	2023/09/12			101	80 - 120	<1.0	mg/L	4.7 (3)	20
B102520	Bicarbonate (HCO3)	2023/09/12					<1.0	mg/L	4.7 (3)	20
B102520	Carbonate (CO3)	2023/09/12					<1.0	mg/L	NC (3)	20
B102520	Hydroxide (OH)	2023/09/12					<1.0	mg/L	NC (3)	20
B102524	Conductivity	2023/09/12			100	90 - 110	<2.0	uS/cm	0.22 (3)	10
B102798	Chloride (Cl)	2023/09/11	NC	80 - 120	100	80 - 120	<1.0	mg/L	1.3 (1)	20
B102798	Sulphate (SO4)	2023/09/11	NC	80 - 120	97	80 - 120	<1.0	mg/L	0.0021 (1)	20
B103224	Chloride (Cl)	2023/09/12	109 (4)	80 - 120	97	80 - 120	<1.0	mg/L	NC (5)	20
B103224	Sulphate (SO4)	2023/09/12	107 (4)	80 - 120	97	80 - 120	<1.0	mg/L	2.3 (5)	20
B103325	Total Ammonia (N)	2023/09/11	NC	80 - 120	112	80 - 120	<0.015	mg/L	7.5 (1)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: CXW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B104312	Total Sulphide	2023/09/12	63 (6)	80 - 120	94	80 - 120	<0.0018	mg/L	13 (1)	20
B105296	Dissolved Mercury (Hg)	2023/09/13	88 (7)	80 - 120	99	80 - 120	<0.0019	ug/L	2.1 (8)	20
B105624	Total Sulphide	2023/09/13	89	80 - 120	107	80 - 120	<0.0018	mg/L	NC (1)	20
B105833	Dissolved Aluminum (Al)	2023/09/14	88 (9)	80 - 120	91	80 - 120	<3.0	ug/L	NC (10)	20
B105833	Dissolved Antimony (Sb)	2023/09/14	98 (9)	80 - 120	101	80 - 120	<0.50	ug/L	NC (10)	20
B105833	Dissolved Arsenic (As)	2023/09/14	98 (9)	80 - 120	99	80 - 120	<0.10	ug/L	1.3 (10)	20
B105833	Dissolved Barium (Ba)	2023/09/14	93 (9)	80 - 120	98	80 - 120	<1.0	ug/L	2.1 (10)	20
B105833	Dissolved Beryllium (Be)	2023/09/14	91 (9)	80 - 120	96	80 - 120	<0.10	ug/L	NC (10)	20
B105833	Dissolved Bismuth (Bi)	2023/09/14	91 (9)	80 - 120	99	80 - 120	<1.0	ug/L	NC (10)	20
B105833	Dissolved Boron (B)	2023/09/14	85 (9)	80 - 120	87	80 - 120	<50	ug/L	0.77 (10)	20
B105833	Dissolved Cadmium (Cd)	2023/09/14	97 (9)	80 - 120	99	80 - 120	<0.010	ug/L	NC (10)	20
B105833	Dissolved Chromium (Cr)	2023/09/14	96 (9)	80 - 120	99	80 - 120	<1.0	ug/L	NC (10)	20
B105833	Dissolved Cobalt (Co)	2023/09/14	93 (9)	80 - 120	97	80 - 120	<0.20	ug/L	NC (10)	20
B105833	Dissolved Copper (Cu)	2023/09/14	93 (9)	80 - 120	98	80 - 120	<0.20	ug/L	4.8 (10)	20
B105833	Dissolved Iron (Fe)	2023/09/14	97 (9)	80 - 120	99	80 - 120	<5.0	ug/L	NC (10)	20
B105833	Dissolved Lead (Pb)	2023/09/14	94 (9)	80 - 120	100	80 - 120	<0.20	ug/L	NC (10)	20
B105833	Dissolved Lithium (Li)	2023/09/14	85 (9)	80 - 120	93	80 - 120	<2.0	ug/L	NC (10)	20
B105833	Dissolved Manganese (Mn)	2023/09/14	97 (9)	80 - 120	100	80 - 120	<1.0	ug/L	NC (10)	20
B105833	Dissolved Molybdenum (Mo)	2023/09/14	99 (9)	80 - 120	101	80 - 120	<1.0	ug/L	NC (10)	20
B105833	Dissolved Nickel (Ni)	2023/09/14	96 (9)	80 - 120	102	80 - 120	<1.0	ug/L	NC (10)	20
B105833	Dissolved Phosphorus (P)	2023/09/14	93 (9)	80 - 120	94	80 - 120	<10	ug/L	6.2 (10)	20
B105833	Dissolved Selenium (Se)	2023/09/14	97 (9)	80 - 120	99	80 - 120	<0.10	ug/L	NC (10)	20
B105833	Dissolved Silicon (Si)	2023/09/14	NC (9)	80 - 120	102	80 - 120	<100	ug/L	1.6 (10)	20
B105833	Dissolved Silver (Ag)	2023/09/14	98 (9)	80 - 120	100	80 - 120	<0.020	ug/L	NC (10)	20
B105833	Dissolved Strontium (Sr)	2023/09/14	95 (9)	80 - 120	98	80 - 120	<1.0	ug/L	1.6 (10)	20
B105833	Dissolved Thallium (Tl)	2023/09/14	96 (9)	80 - 120	97	80 - 120	<0.010	ug/L	NC (10)	20
B105833	Dissolved Tin (Sn)	2023/09/14	99 (9)	80 - 120	101	80 - 120	<5.0	ug/L	NC (10)	20
B105833	Dissolved Titanium (Ti)	2023/09/14	98 (9)	80 - 120	100	80 - 120	<5.0	ug/L	NC (10)	20
B105833	Dissolved Uranium (U)	2023/09/14	101 (9)	80 - 120	103	80 - 120	<0.10	ug/L	NC (10)	20
B105833	Dissolved Vanadium (V)	2023/09/14	99 (9)	80 - 120	101	80 - 120	<5.0	ug/L	NC (10)	20
B105833	Dissolved Zinc (Zn)	2023/09/14	100 (9)	80 - 120	105	80 - 120	<5.0	ug/L	NC (10)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B105833	Dissolved Zirconium (Zr)	2023/09/14	97 (9)	80 - 120	96	80 - 120	<0.10	ug/L	NC (10)	20
B106275	Total Ammonia (N)	2023/09/13	111	80 - 120	106	80 - 120	<0.015	mg/L	NC (1)	20
B107283	1-Methylnaphthalene	2023/09/14	92	50 - 140	84	50 - 140	<0.050	ug/L	NC (1)	40
B107283	2-Methylnaphthalene	2023/09/14	90	50 - 140	83	50 - 140	<0.10	ug/L	NC (1)	40
B107283	Acenaphthene	2023/09/14	93	50 - 140	86	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Acenaphthylene	2023/09/14	94	50 - 140	91	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Acridine	2023/09/14	97	50 - 140	91	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Anthracene	2023/09/14	95	50 - 140	98	50 - 140	<0.010	ug/L	NC (1)	40
B107283	Benzo(a)anthracene	2023/09/14	88	50 - 140	97	50 - 140	<0.010	ug/L	NC (1)	40
B107283	Benzo(a)pyrene	2023/09/14	83	50 - 140	99	50 - 140	<0.0050	ug/L	NC (1)	40
B107283	Benzo(b&j)fluoranthene	2023/09/14	78	50 - 140	80	50 - 140	<0.030	ug/L	NC (1)	40
B107283	Benzo(g,h,i)perylene	2023/09/14	32 (6)	50 - 140	89	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Benzo(k)fluoranthene	2023/09/14	83	50 - 140	100	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Chrysene	2023/09/14	92	50 - 140	89	50 - 140	<0.020	ug/L	NC (1)	40
B107283	Dibenz(a,h)anthracene	2023/09/14	32 (6)	50 - 140	100	50 - 140	<0.0030	ug/L	NC (1)	40
B107283	Fluoranthene	2023/09/14	76	50 - 140	101	50 - 140	<0.020	ug/L	NC (1)	40
B107283	Fluorene	2023/09/14	93	50 - 140	91	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Indeno(1,2,3-cd)pyrene	2023/09/14	34 (6)	50 - 140	110	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Naphthalene	2023/09/14	95	50 - 140	86	50 - 140	<0.10	ug/L	NC (1)	40
B107283	Phenanthrene	2023/09/14	94	50 - 140	82	50 - 140	<0.050	ug/L	NC (1)	40
B107283	Pyrene	2023/09/14	76	50 - 140	101	50 - 140	<0.020	ug/L	NC (1)	40
B107283	Quinoline	2023/09/14	109	50 - 140	110	50 - 140	<0.020	ug/L	NC (1)	40
B107289	EPH (C10-C19)	2023/09/14	90	60 - 140	94	70 - 130	<0.20	mg/L	NC (1)	30
B107289	EPH (C19-C32)	2023/09/14	97	60 - 140	95	70 - 130	<0.20	mg/L	NC (1)	30
B107307	1-Methylnaphthalene	2023/09/15	76	50 - 140	82	50 - 140	<0.050	ug/L	NC (1)	40
B107307	2-Methylnaphthalene	2023/09/15	77	50 - 140	76	50 - 140	<0.10	ug/L	NC (1)	40
B107307	Acenaphthene	2023/09/15	78	50 - 140	82	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Acenaphthylene	2023/09/15	81	50 - 140	82	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Acridine	2023/09/15	88	50 - 140	85	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Anthracene	2023/09/15	72	50 - 140	85	50 - 140	<0.010	ug/L	NC (1)	40
B107307	Benzo(a)anthracene	2023/09/15	51	50 - 140	81	50 - 140	<0.010	ug/L	NC (1)	40



Bureau Veritas Job #: C371107  
 Report Date: 2023/09/18

**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: CXW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B107307	Benzo(a)pyrene	2023/09/15	33 (6)	50 - 140	86	50 - 140	<0.0050	ug/L	NC (1)	40
B107307	Benzo(b&j)fluoranthene	2023/09/15	33 (6)	50 - 140	82	50 - 140	<0.030	ug/L	NC (1)	40
B107307	Benzo(g,h,i)perylene	2023/09/15	24 (6)	50 - 140	83	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Benzo(k)fluoranthene	2023/09/15	30 (6)	50 - 140	83	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Chrysene	2023/09/15	52	50 - 140	83	50 - 140	<0.020	ug/L	NC (1)	40
B107307	Dibenz(a,h)anthracene	2023/09/15	26 (6)	50 - 140	84	50 - 140	<0.0030	ug/L	NC (1)	40
B107307	Fluoranthene	2023/09/15	65	50 - 140	66	50 - 140	<0.020	ug/L	NC (1)	40
B107307	Fluorene	2023/09/15	78	50 - 140	83	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Indeno(1,2,3-cd)pyrene	2023/09/15	26 (6)	50 - 140	85	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Naphthalene	2023/09/15	78	50 - 140	76	50 - 140	<0.10	ug/L	NC (1)	40
B107307	Phenanthrene	2023/09/15	71	50 - 140	86	50 - 140	<0.050	ug/L	NC (1)	40
B107307	Pyrene	2023/09/15	62	50 - 140	77	50 - 140	<0.020	ug/L	NC (1)	40
B107307	Quinoline	2023/09/15	95	50 - 140	94	50 - 140	<0.020	ug/L	NC (1)	40
B107314	EPH (C10-C19)	2023/09/14			93	70 - 130	<0.20	mg/L	NC (1)	30



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B107314	EPH (C19-C32)	2023/09/14			97	70 - 130	<0.20	mg/L	NC (1)	30

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Duplicate Parent ID [BYQ319-01]

(3) Duplicate Parent ID [BYQ314-01]

(4) Matrix Spike Parent ID [BYQ315-01]

(5) Duplicate Parent ID [BYQ315-01]

(6) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(7) Matrix Spike Parent ID [BYQ313-04]

(8) Duplicate Parent ID [BYQ312-04]

(9) Matrix Spike Parent ID [BYQ312-03]

(10) Duplicate Parent ID [BYQ312-03]





Bureau Veritas Job #: C371107  
Report Date: 2023/09/18

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: CXW

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

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Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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



Bureau Veritas  
4025 Canada Way, Toronto, ON M3J 3K9  
Tel: (904) 734-7278 Fax: (904) 734-7279  
Toll Free: 1-800-871-2239

Chain Of Custody Record

1/2

INVOICE TO:		Report Information:		Project Information:		Laboratory Use Only:	
Company Name: #163 GHD Limited	Company Name: GHD Ltd.	Customer #: C30050	Bureau Veritas Job #: 735-002640-3	Customer Name: AP Invoices - 735	Contact Name: Stephanie Burton	P.O. #: 11222660-15.1	Customer Job #: [Barcode]
Address: 455 PHILLIP STREET WATERLOO ON N2L 3X2	Address: 100 - 138 E 7th Avenue Vancouver BC V5T 1M6	Project Name: Upland Contaminants	Project Name: Upland Contaminants	Phone: (519) 884-0510	Phone: (519) 725-1394	Site #: Groundwater	Project Manager: [Barcode]
Email: AP/invoices-735@ghd.com	Email: NationalEODSupport@maxam.ca, stephanie.burton@ghd.com	Sampled by: CXW, DT	Sampled by: CXW, DT				Body Location: [Barcode]

Requester Criteria:  
 DSR  
 COME  
 RC Waste Quality  
 Other: \_\_\_\_\_

Special Instructions: \_\_\_\_\_

ANALYSIS REQUESTED (PLEASE BE SPECIFIC):

Make & Field Filtered 7(Y/N)	Conductivity, Cl, SO4, NO2, NO3, N/N, PO4	Speciated Ammonia	Sulphide + H2S Calc	Sulphide, Unfiltered (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg	Hardness	Total Dissolved Solids (TDS) (Residue)	LEAD/BERN with subtracted P/Pb	Field pH	Field Temperature
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Turnaround Time (TAT) Required:  
 Regular (Standard) TAT:  (will be split if Rush TAT is not available)  
 Second TAT - 5-7 Working days for most tests.  
 Please note: Standard TAT for certain tests such as SW7C and Drinking Water + 8 days - consult your Project Manager for details.  
 Job Specific Rush TAT (if applies to entire submission):  
 1 DAY  2 Day  3 Day  Other (Specify): \_\_\_\_\_  
 Rush Confirmation Number: \_\_\_\_\_

SAMPLES MUST BE KEPT COOL (< 19°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Sample Selection Label	Sample Location(s) Identification	Date/Event	Time Sampled	Matrix	Make & Field Filtered 7(Y/N)	Conductivity, Cl, SO4, NO2, NO3, N/N, PO4	Speciated Ammonia	Sulphide + H2S Calc	Sulphide, Unfiltered (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg	Hardness	Total Dissolved Solids (TDS) (Residue)	LEAD/BERN with subtracted P/Pb	Field pH	Field Temperature
WG-11222680-060973-CXW-01	Sept 6, 23	16:00	GW	Y	X	X	X	X	X	X	X	X	X	X	7.89	12.57
WG-11222680-060973-CXW-02	Sept 6, 23	16:55	GW												7.37	10.61
WG-11222680-070913-CXW-03	Sept 7, 23	0845	GW												6.61	11.02
	-	-04	0955	GW											8.20	10.56
	-	-05	1005	GW											6.74	11.84
	-	-06	1007	GW											6.74	11.84
	-	-07	1120	GW											7.32	12.36
	-	-08	1215	GW											6.74	18.24
	-	-09	1240	GW											6.74	18.77
	-	-10	1515	GW											7.73	12.35

Sampled, Sept 7, 23

Requested by: (Signature/Print) <i>Carmy Wong</i>	Date: (YYMMDD) 23/09/08	Time: 16:55	Requested by: (Signature/Print) <i>RUSSELL SUMARNO</i>	Date: (YYMMDD) 23/04/08	Time: 16:36	Field used and lab submitted	Lab Use Only
							Temperature (°C) or (°F) 7 8 11 Custody Log (Yes/No) <input type="checkbox"/> Yes <input type="checkbox"/> No N/A

UNLESS OTHERWISE AGREED TO BY WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. BUREAU VERITAS CHAIN OF CUSTODY DOCUMENT IS A COMMITMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BV.COM/ENVIRONMENTAL/LABORATORY/SOURCES/COC/TURMS-AND-CONDITIONS.  
 IT IS THE RESPONSIBILITY OF THE REQUESTER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.  
 Bureau Veritas Group (2018) Inc. ICE FROZEN



Bureau Veritas  
4000 Carleton Way, Burnaby, British Columbia Canada V5G 1K2 (Tel: (604) 734 3375) Tel: (800) 563-6268 Fax: (604) 734 2588 [www.bv.com](http://www.bv.com)

Chain Of Custody Record

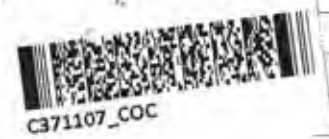
2/2

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name: #183 GHD Limited	Company Name: GHD Ltd	Quotation #: C30080	Bureau Veritas Job #	Contract Name: AP Invoices - 735	Contract Name: Stephanie Barton	735-002840-3	Boiler Order #
Contact Name: AP Invoices - 735	Contact Name: Stephanie Barton	P.O. #: 735-002840-3	Client Order #	Address: 455 PHILLIP STREET	Address: 100-138 E 7 <sup>th</sup> Avenue	1122280-15.1	Project Manager
Address: WATERLOO ON N2L 3X2	Address: Vancouver BC V5T 1M6	Project Name: Upland Contracting	Chain Of Custody Record	Phone: (519) 884-0510	Phone: +1 519 340-3926	Groundwater	Project Manager
Phone: (519) 884-0510	Fax: (519) 725-1394	Site #: Groundwater	Client Order #	Email: APInvoices-735@ghd.com	Email: NationalEDQSupport@maxxam.ca stephanie.barton@ghd.com	Sample By: CW, DT	Project Manager

<b>Regulatory Criteria</b> <input checked="" type="checkbox"/> CSR <input type="checkbox"/> CCME <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other: _____	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b> Conductivity, Cl, SO4, NO2, NO3, N+N, PO4 Speciated Alkalinity Sulphide + H2S Calc Sulphide, Un-ionized (as H2S) (Calc) Ammonia-N (Total) Dissolved Metals with CV Hg, Hardness Total Dissolved Solids (TDS Residue) LEPP/HEPH with subtracted PAHs Field pH Field Temperature	<b>Turnaround Time (TAT) Required</b> Please provide advance notice for rush projects Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests Please note: Standard TAT may contain tests such as RDO and Distillates/Residue and 5-8 days - contact your Project Manager for details. Rush TAT (if applicable to entire submission) 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: _____ Rush Confirmation Number: _____ (Call us today)
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**SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS**

Sample Barcode Label	Bottle (Lower) Identification	Date Sampled	Time Sampled	Matrix	Meq/L Total Filtered ? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, N+N, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness	Total Dissolved Solids (TDS Residue)	LEPP/HEPH with subtracted PAHs	Field pH	Field Temperature
W01-1122280-080923-CW-11		Sept 8, 2013	0825	W	Y	X	X	X	X	X	X	X	X	NA	N/A

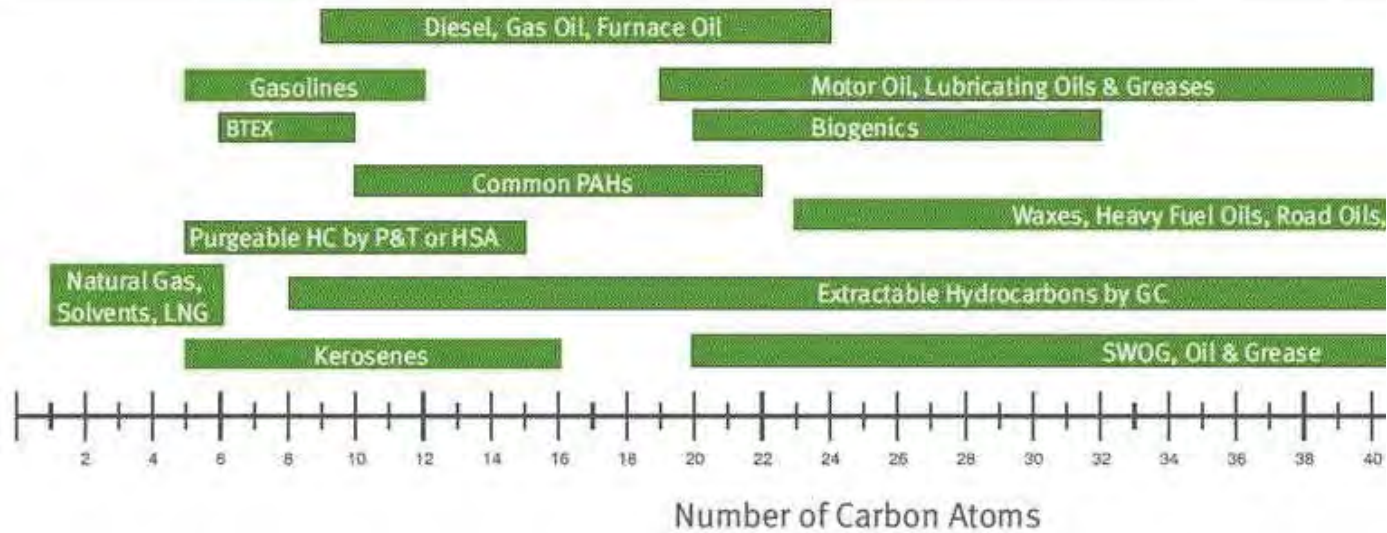
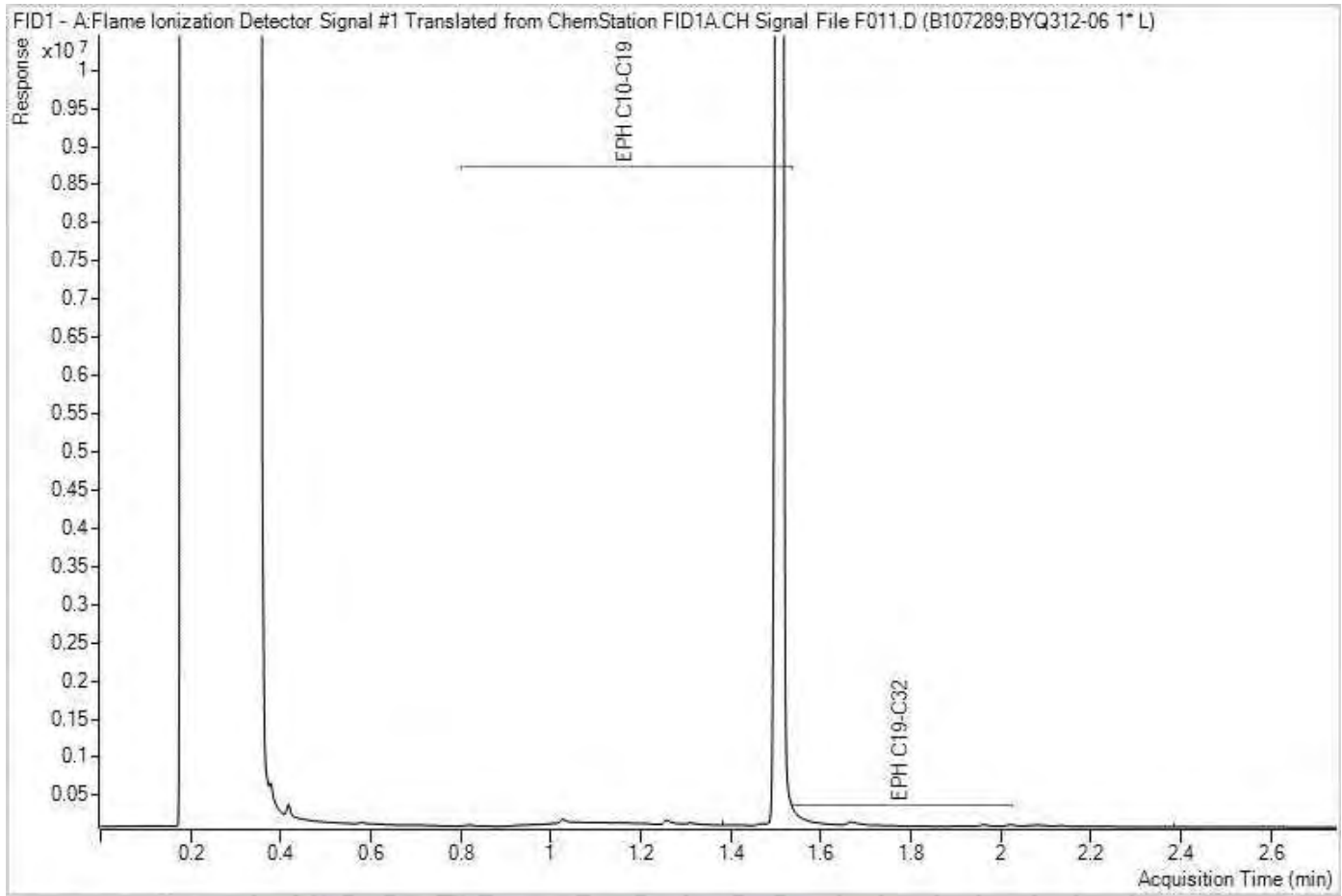


RECEIVED BY: (Signature/Print)  RUSSELL SUMARND	Date: (YYMMDD) 23/09/08	Time: 16:35	RECEIVED BY: (Signature/Print)  CAROLY WONG	Date: (YYMMDD) 23/09/08	Time: 16:36	If film used and not submitted <input type="checkbox"/>	Lab/Order No: 7811	Cleanly Seal Break in Chain? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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UNLESS OTHERWISE AGREEED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS A KNOWLEDGED AND ACCEPTANCE OF DATA TERMS WHICH ARE AVAILABLE FOR VIEWING AT [WWW.BVNA.COM/ENVIRONMENTAL/LABORATORY/RESOURCES/COC\\_FILING\\_AND\\_CONDITIONS](http://WWW.BVNA.COM/ENVIRONMENTAL/LABORATORY/RESOURCES/COC_FILING_AND_CONDITIONS). IT IS THE RESPONSIBILITY OF THE CLIENT/OWNER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL DATA DELAYS.

ICE FROZEN

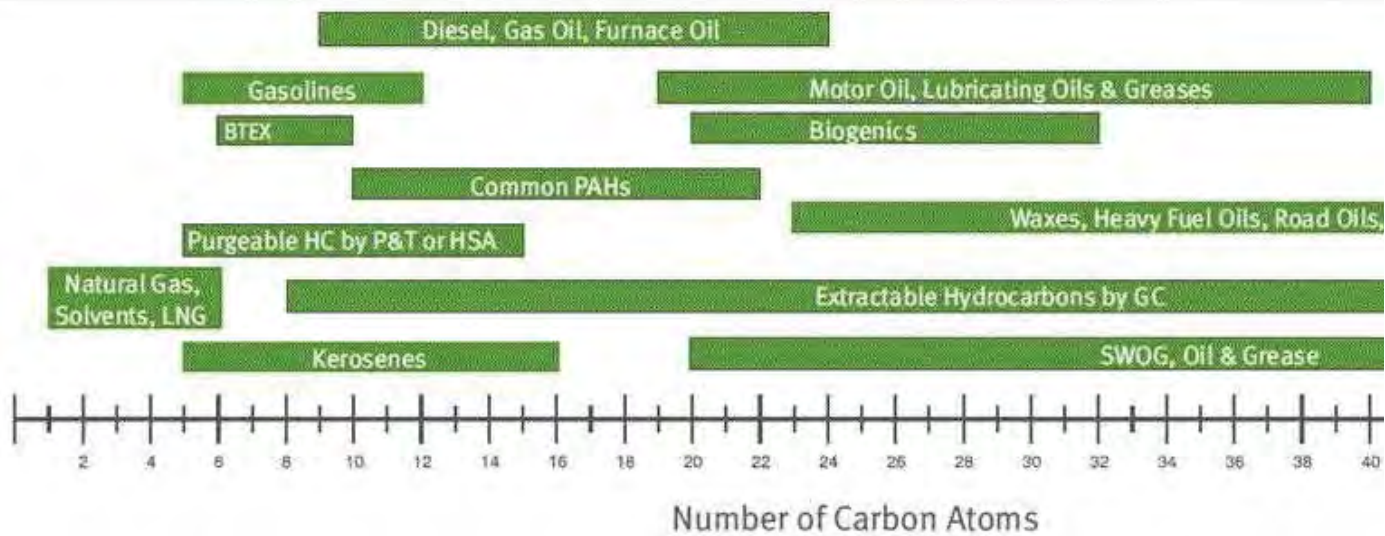
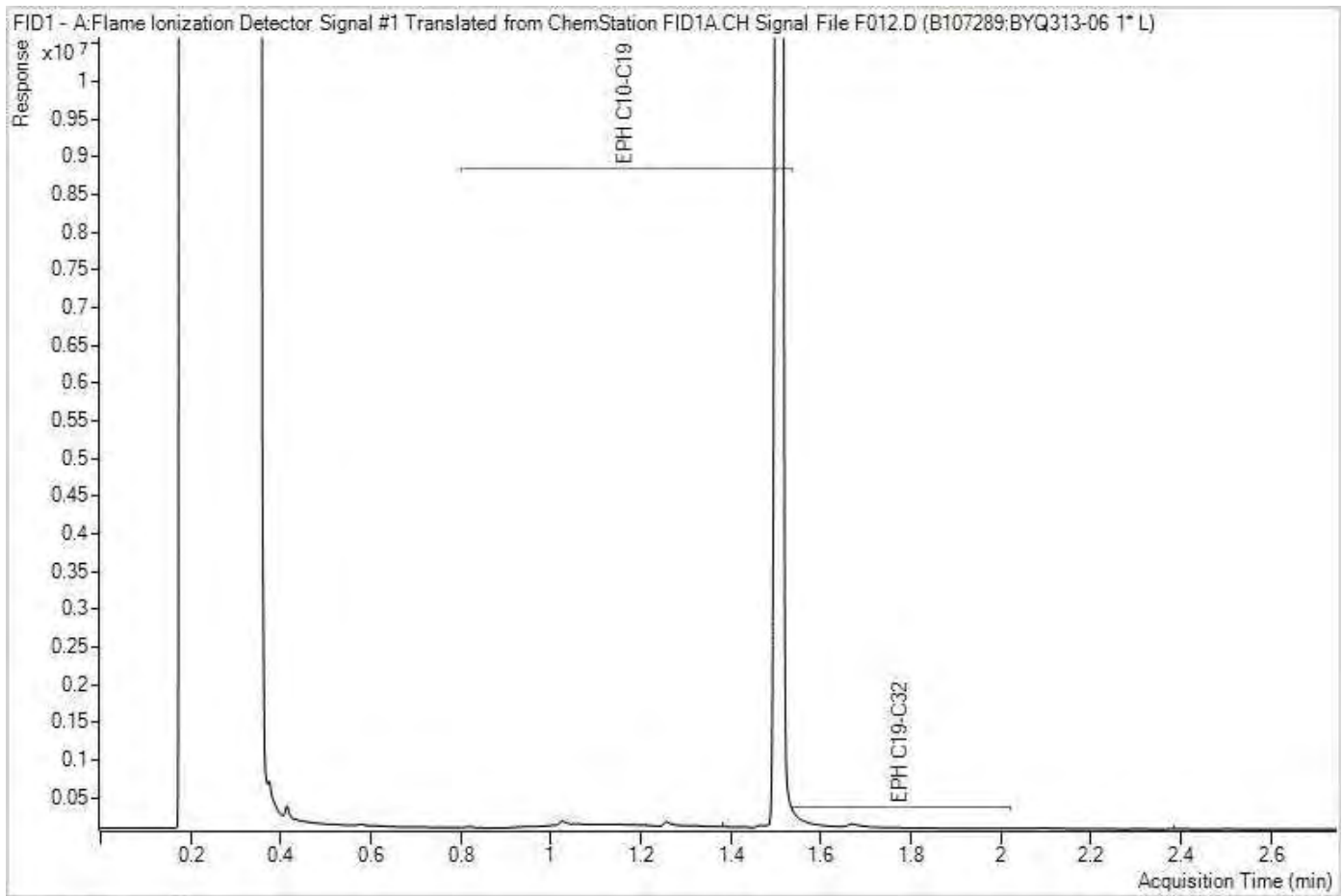
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

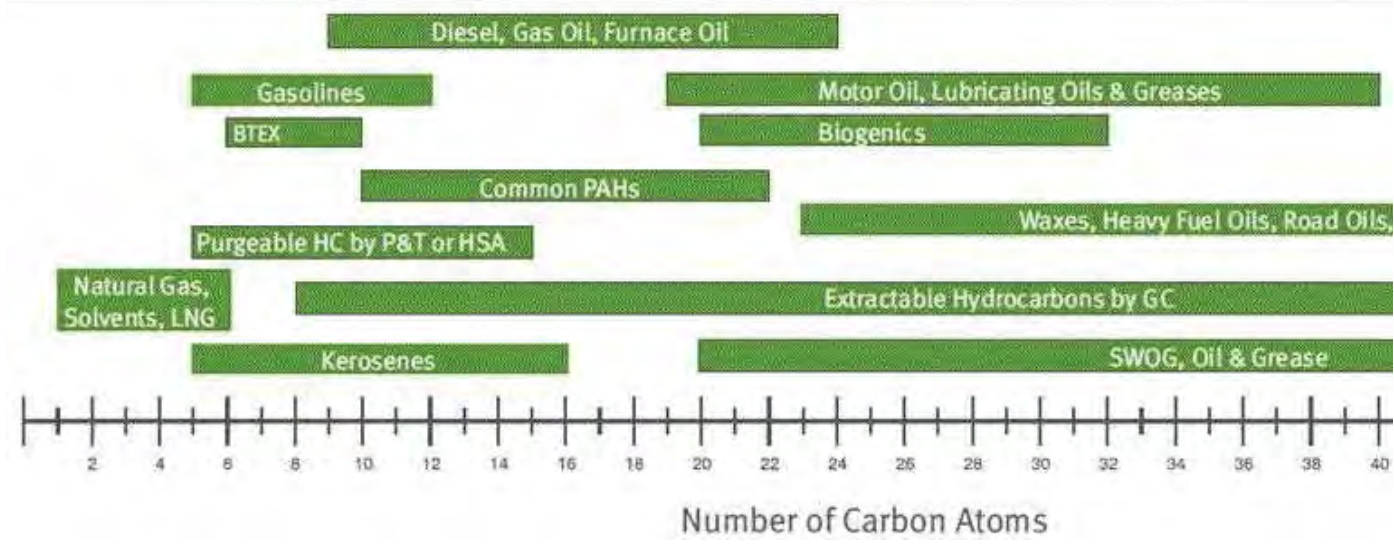
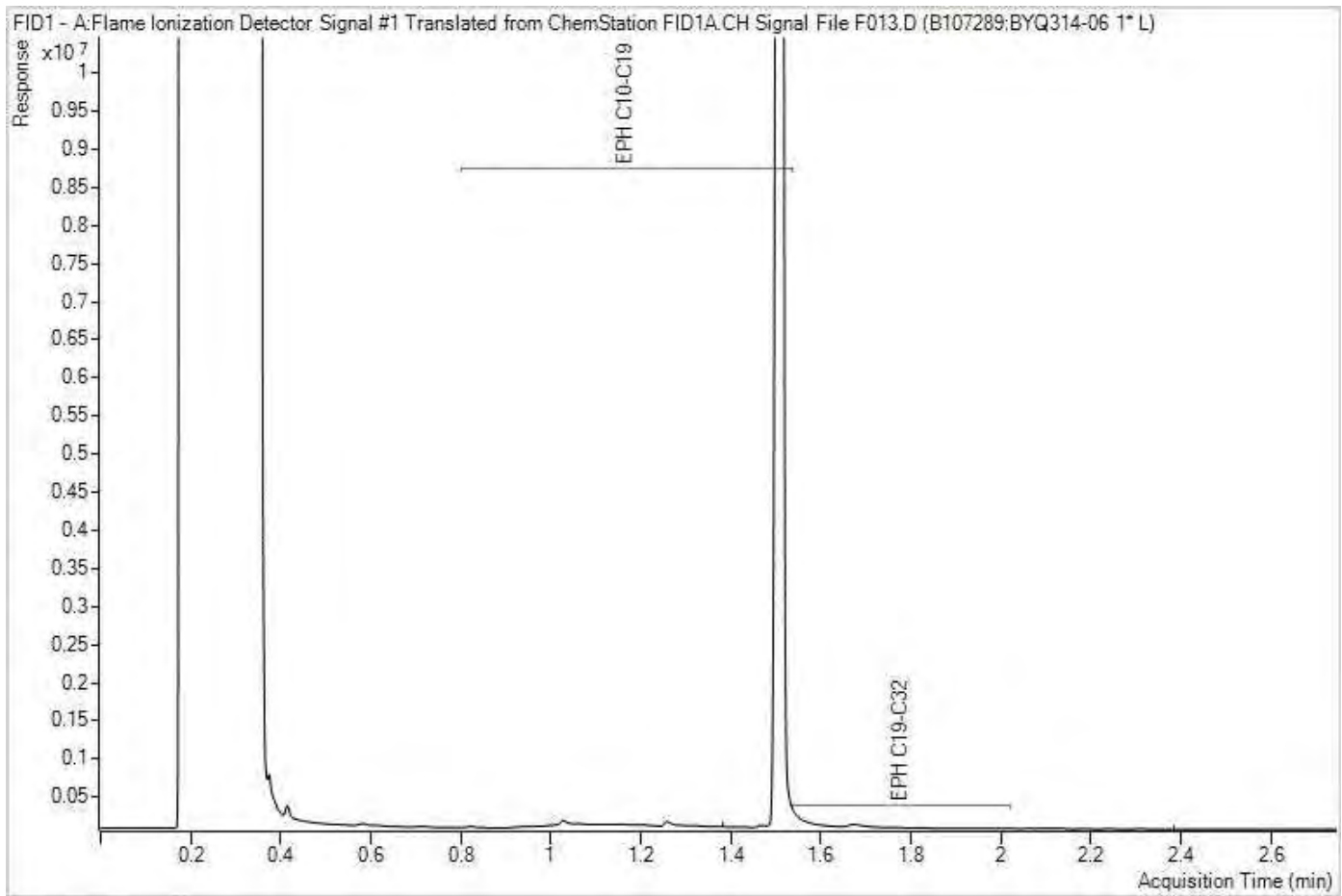


EPH in Water when PAH required Chromatogram



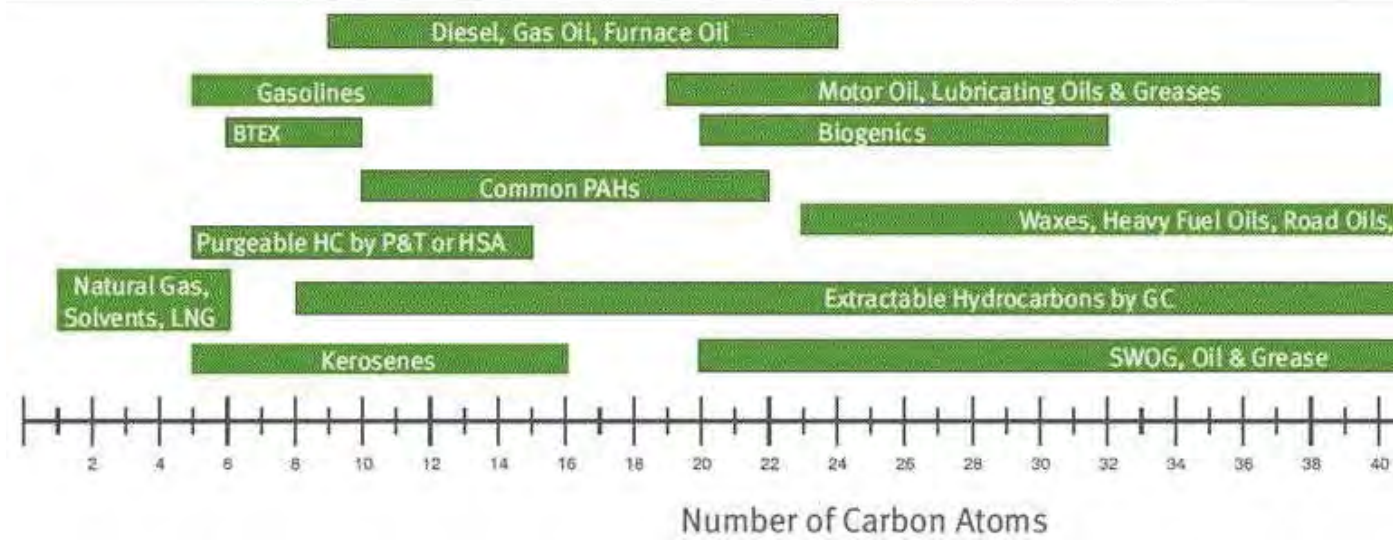
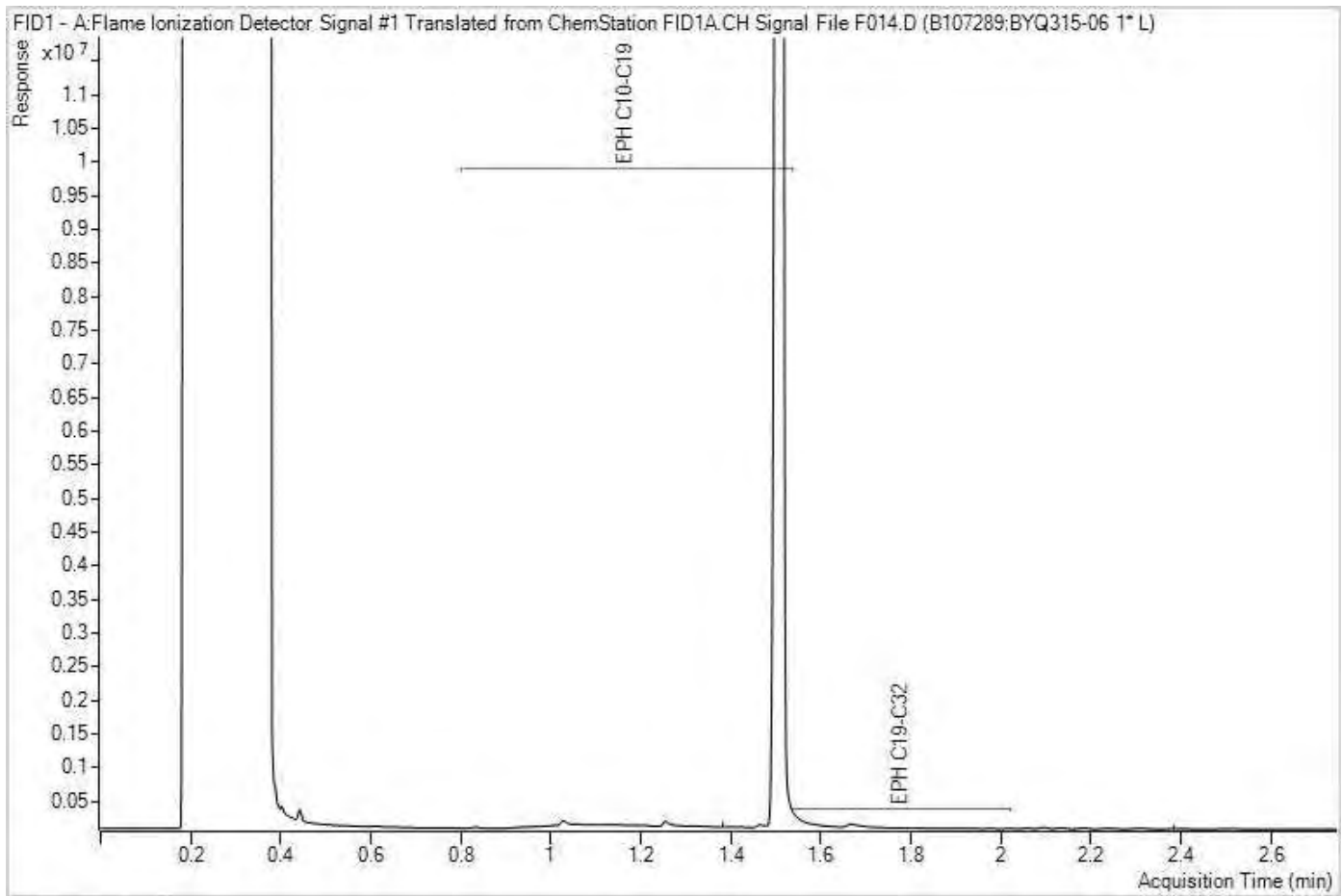
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

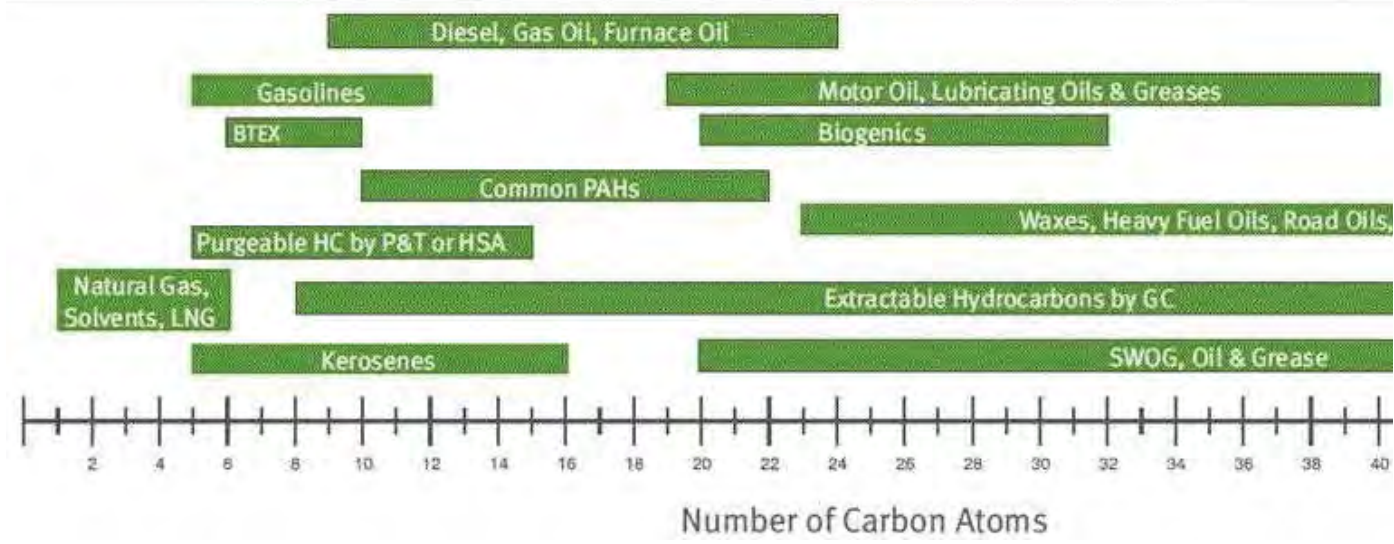
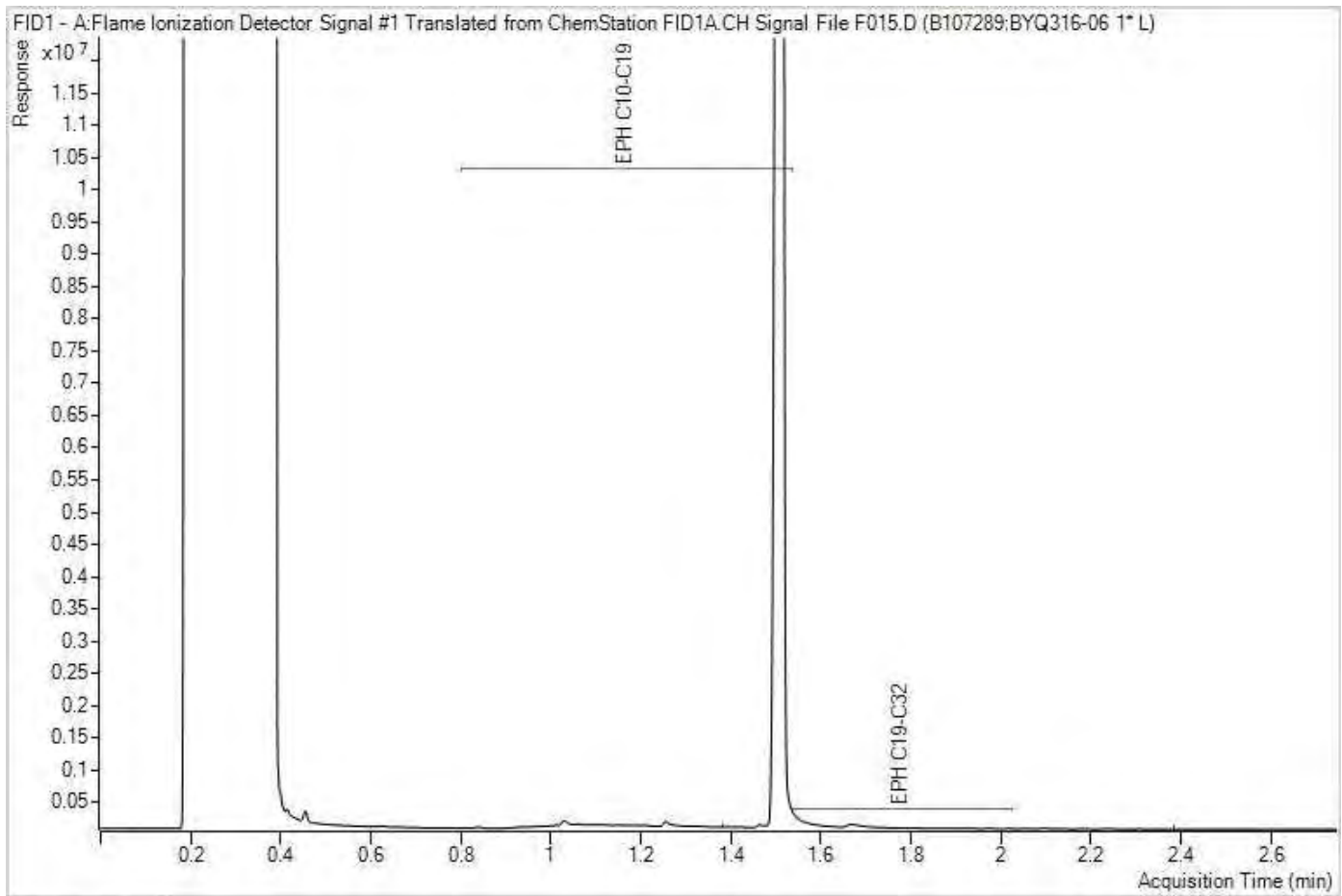
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

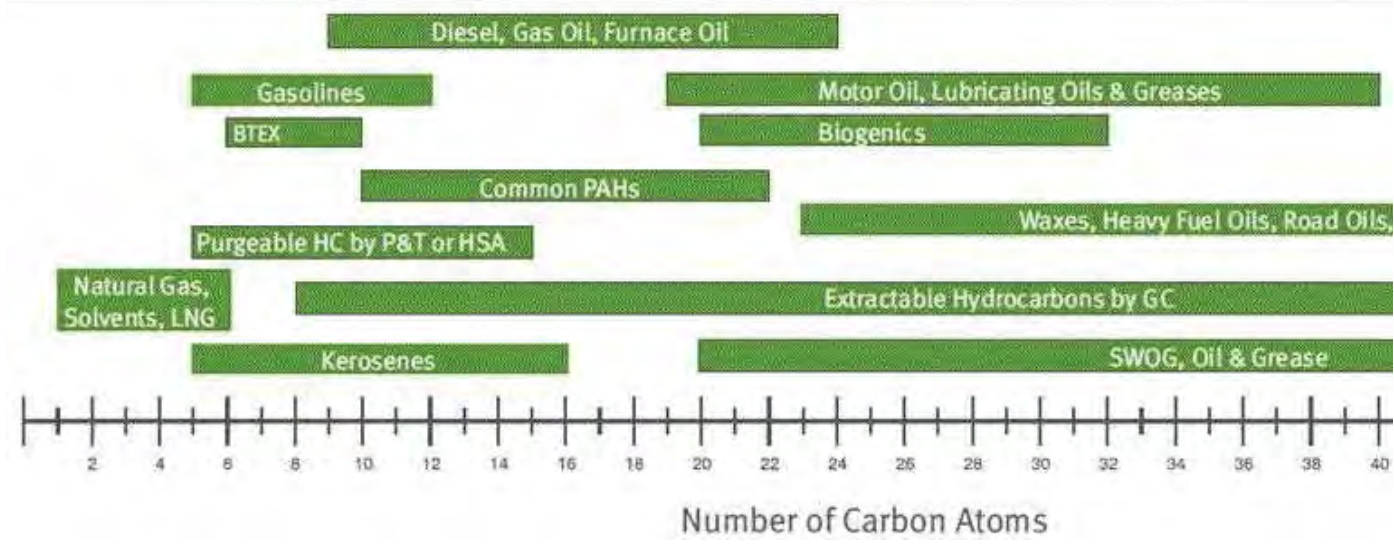
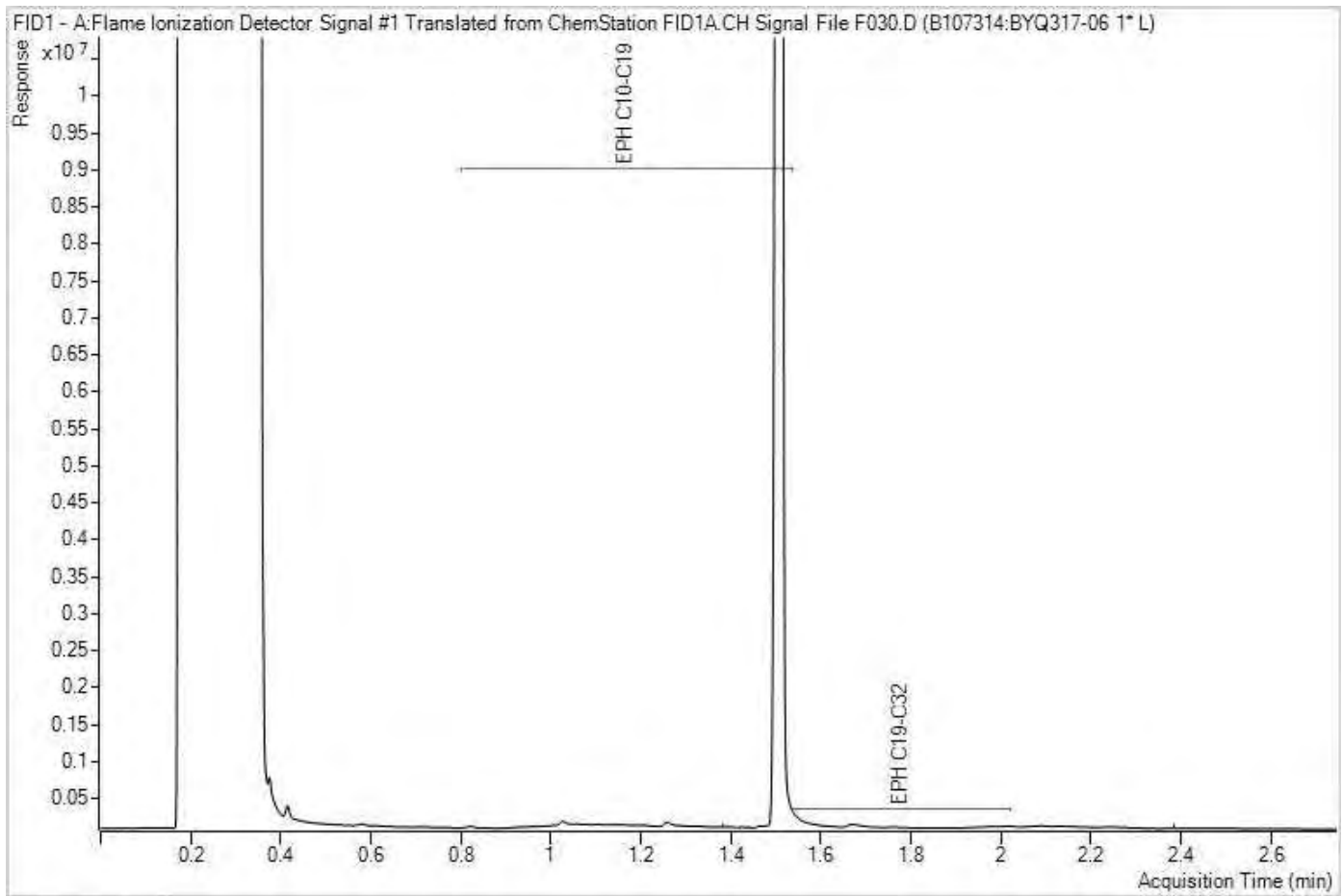


EPH in Water when PAH required Chromatogram



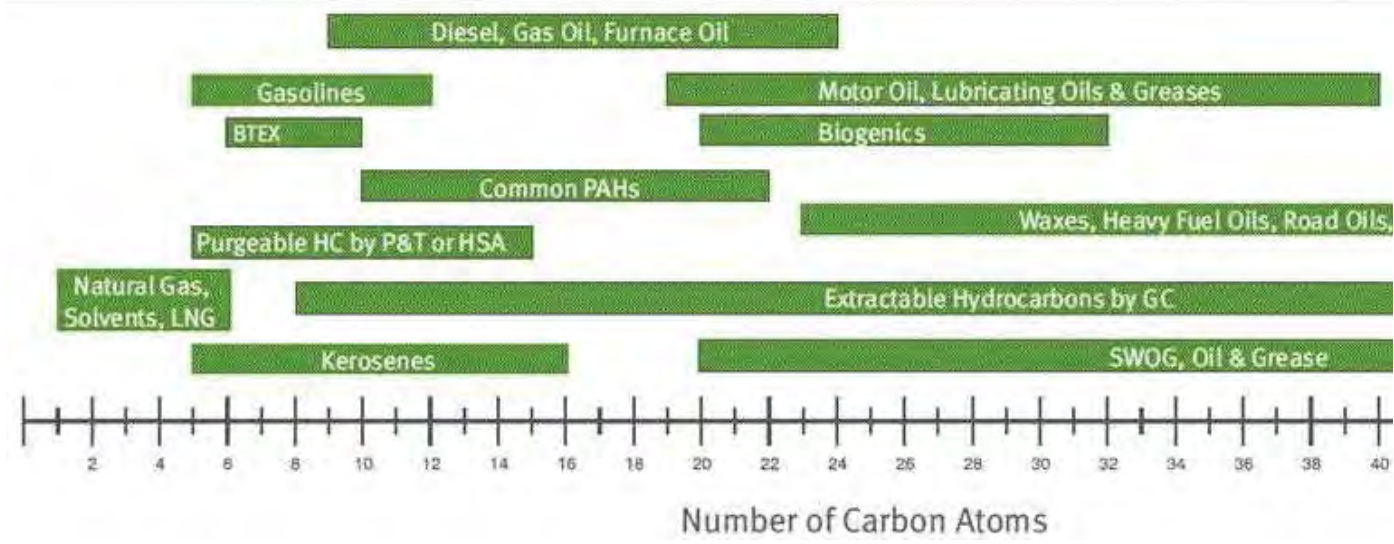
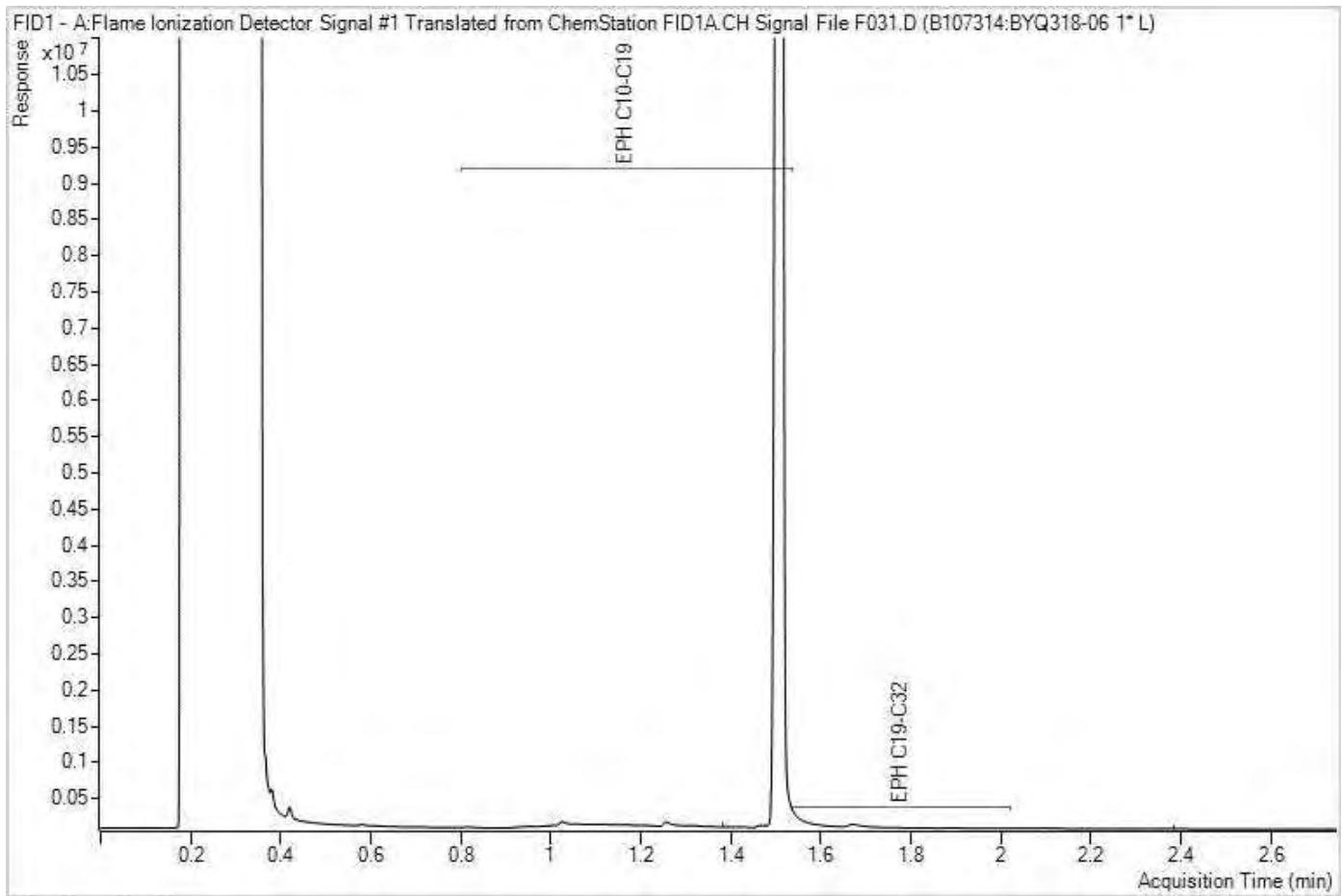
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



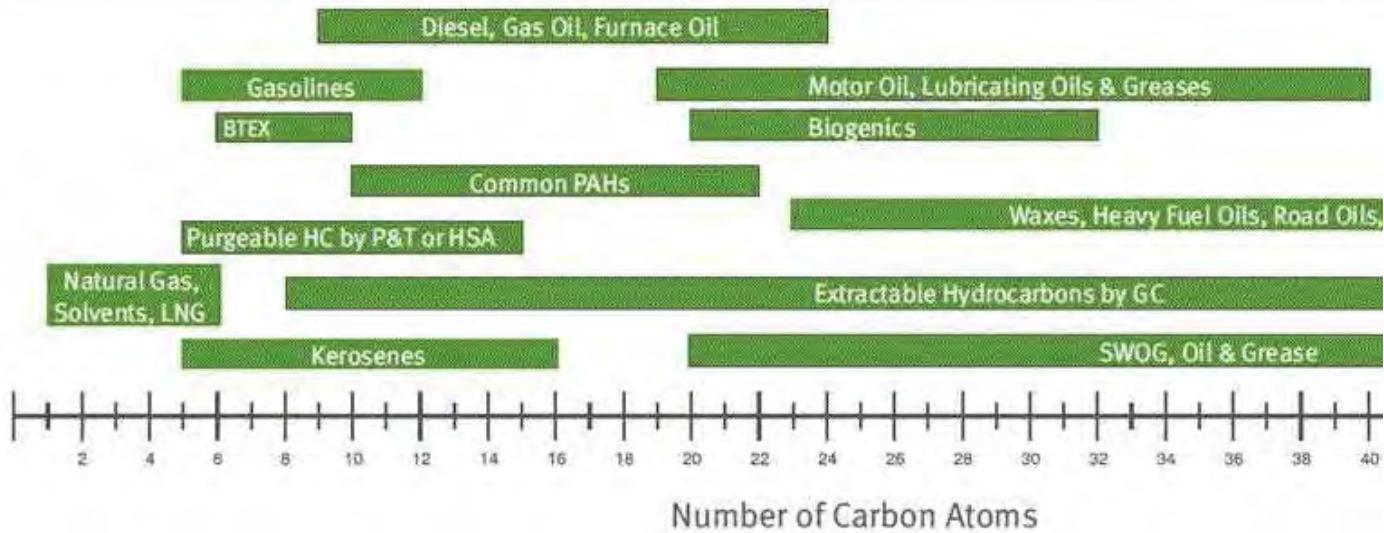
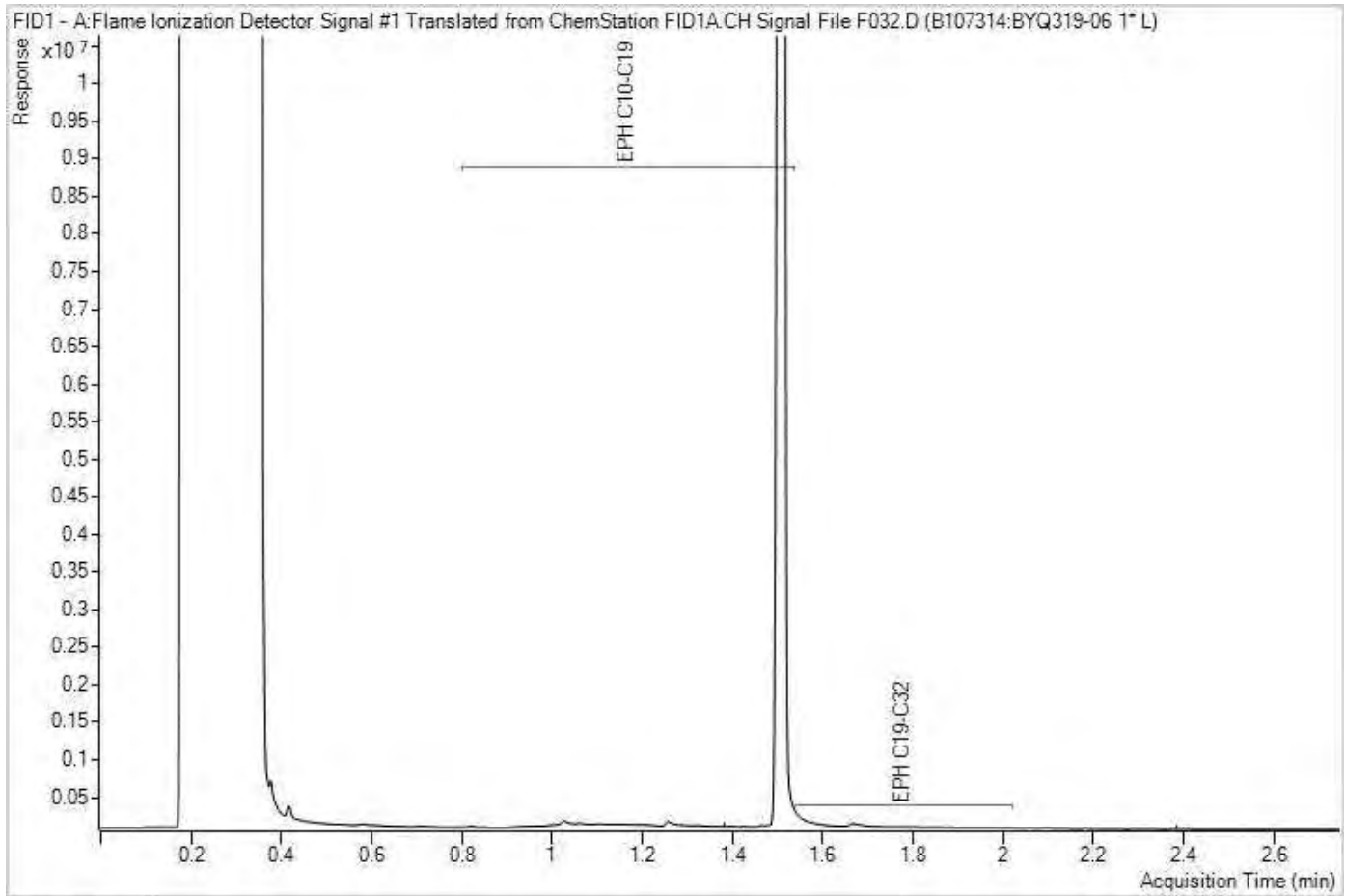
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

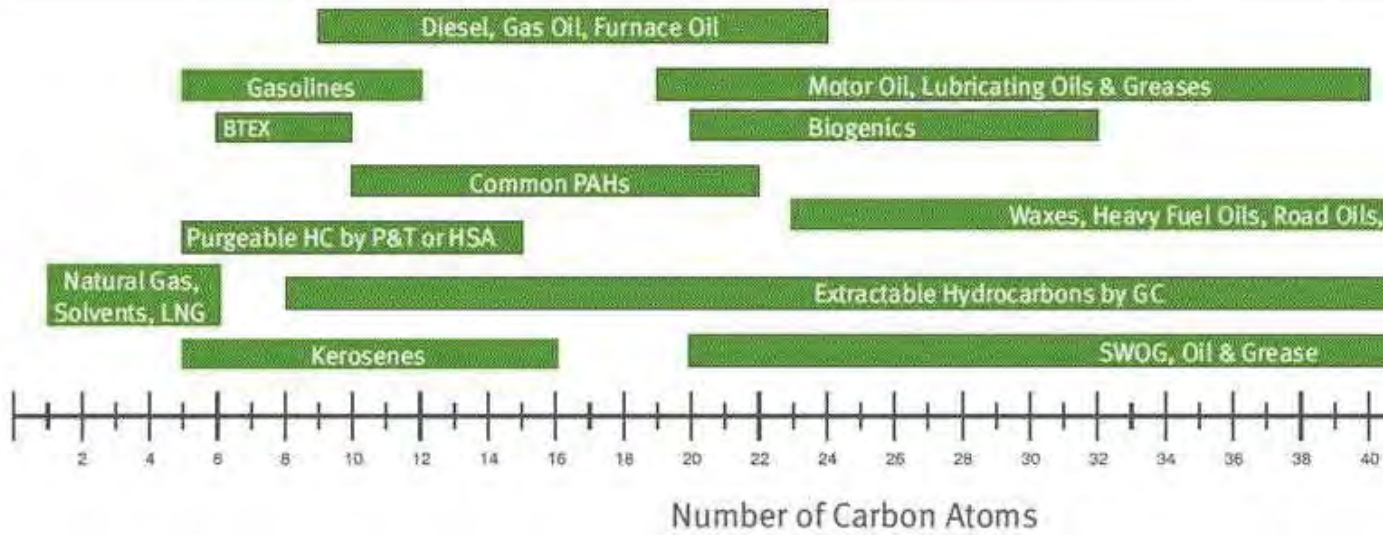
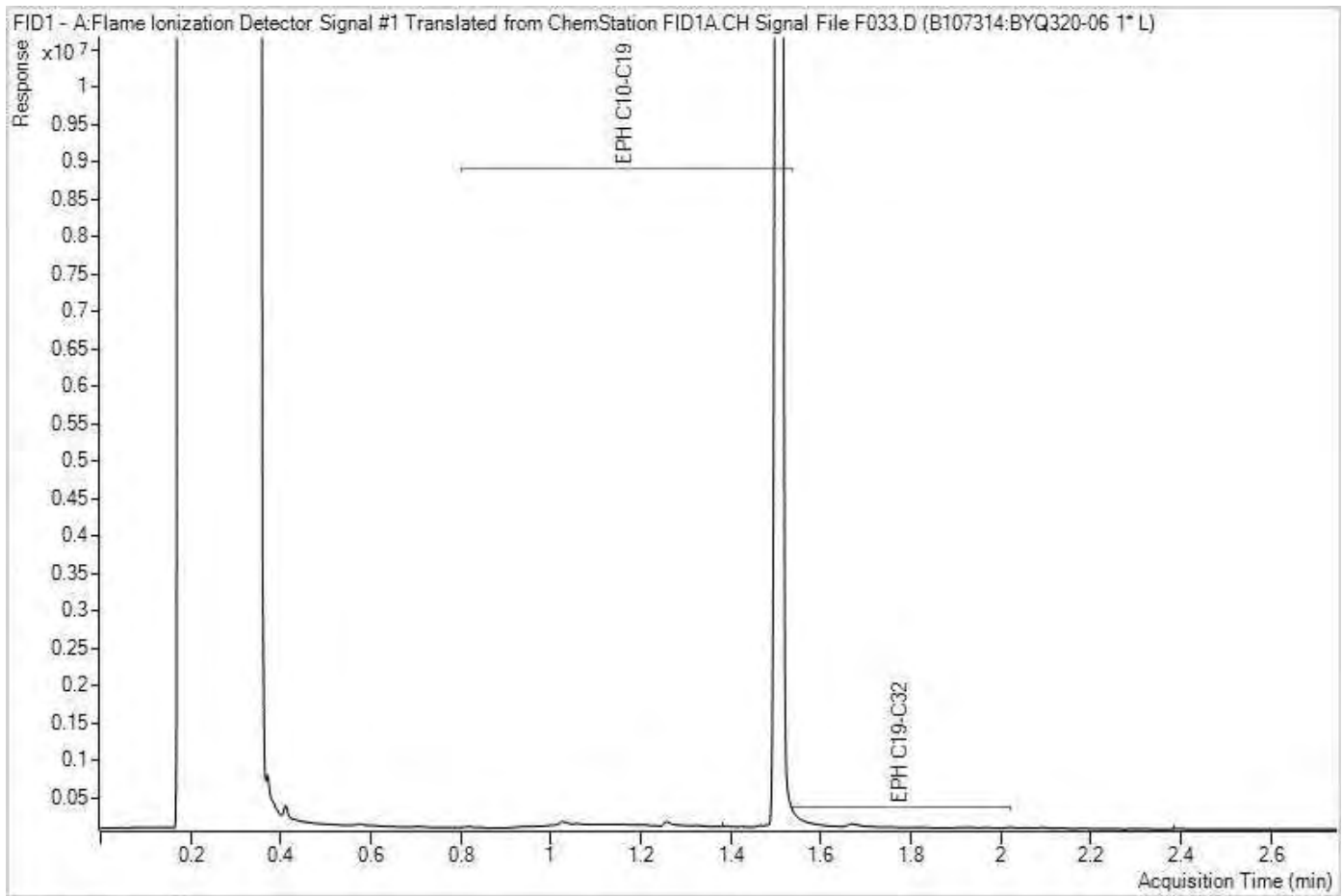
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

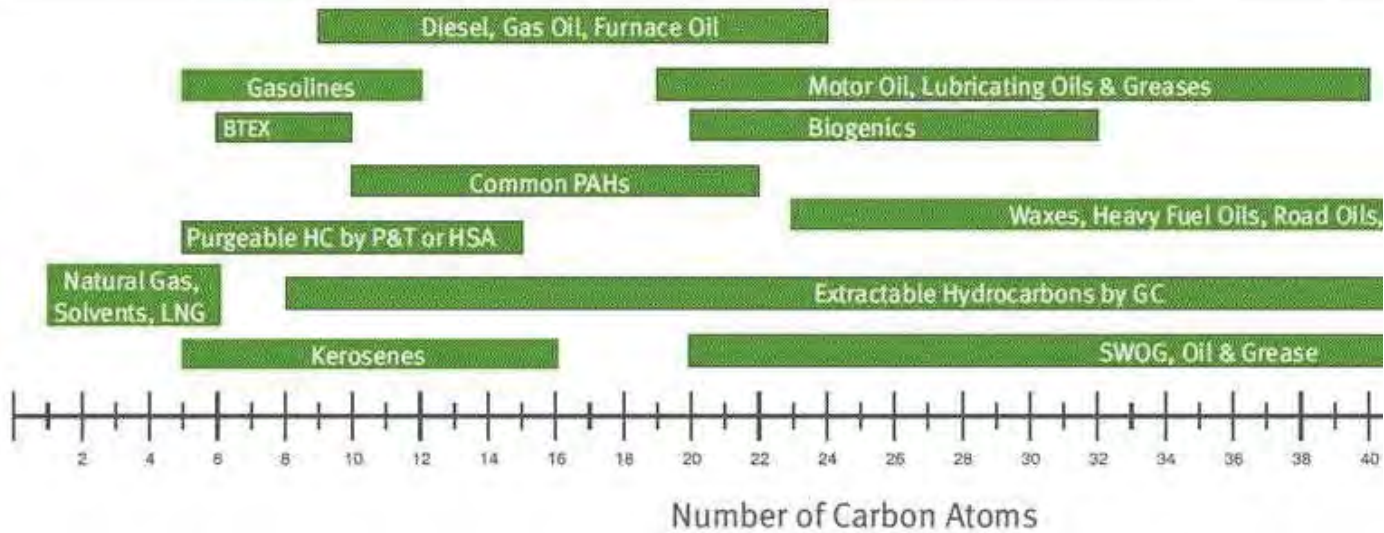
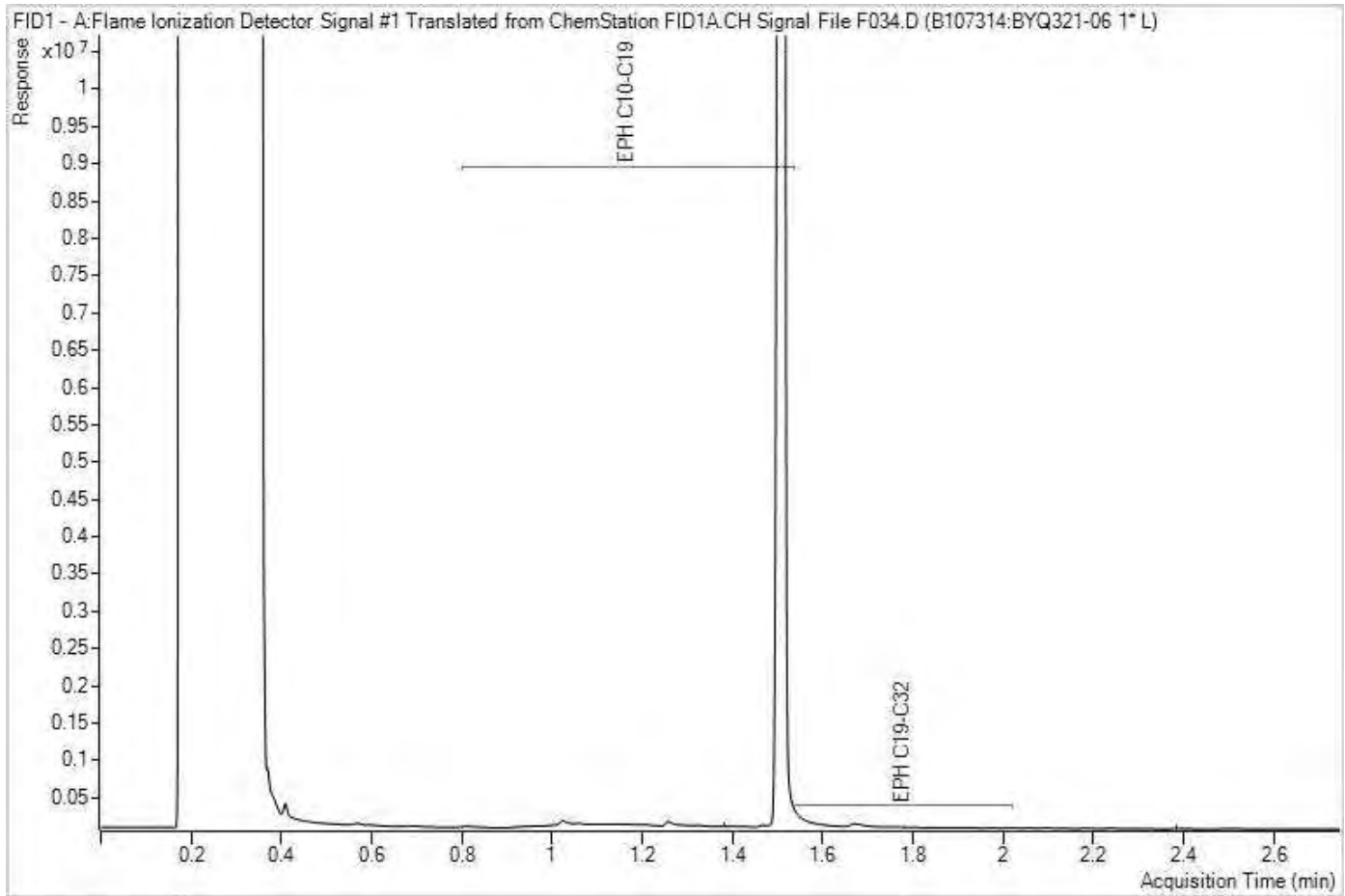


EPH in Water when PAH required Chromatogram



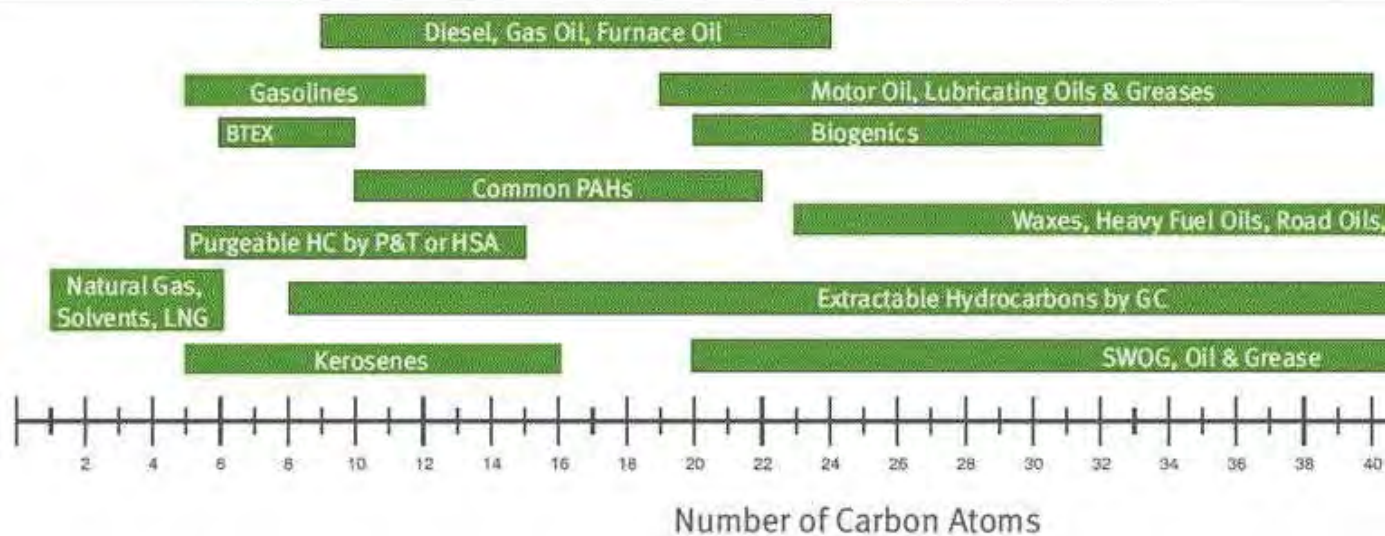
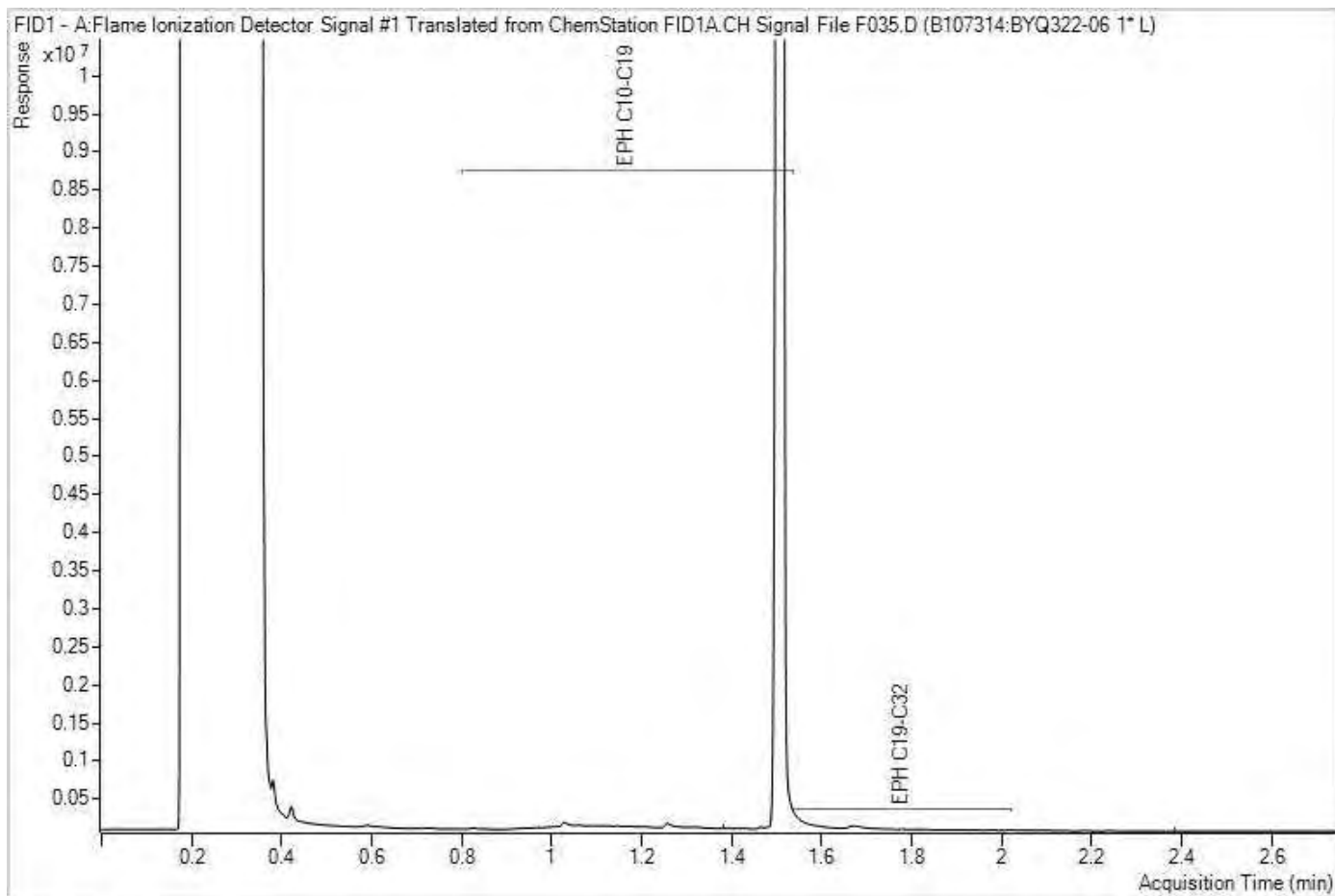
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



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EPH in Water when PAH required Chromatogram



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Your P.O. #: 735-002640-5  
 Your Project #: 11222680-15.1  
 Site#: GROUND WATER  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your C.O.C. #: 705547-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/12/05**  
 Report #: R3436670  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C397191**

**Received: 2023/11/29, 09:55**

Sample Matrix: Water  
 # Samples Received: 5

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	5	N/A	2023/11/30	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry (1)	5	N/A	2023/12/01	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Conductivity @25C (1)	5	N/A	2023/11/30	BBY6SOP-00026	SM 24 2510 B m
Sulphide (as H2S) (2)	5	N/A	2023/12/04		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc (1)	5	N/A	2023/12/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3) (1)	5	N/A	2023/12/05	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (1, 3)	5	2023/12/05	2023/12/05	AB SOP-00084	BCMOE BCLM Oct2013 m
EPH in Water when PAH required (1)	5	2023/12/01	2023/12/01	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	5	N/A	2023/12/05	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (1, 3)	5	N/A	2023/12/04	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total) (1)	5	N/A	2023/12/01	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N) (1)	5	N/A	2023/11/30	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water (1)	5	N/A	2023/11/30	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N) (1)	5	N/A	2023/11/30	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM) (1)	5	2023/12/01	2023/12/02	BBY8SOP-00021	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (1, 4)	5	N/A	2023/12/02	BBY WI-00033	Auto Calc
Orthophosphate by Automated Analyzer (1, 5)	5	N/A	2023/11/30	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (2)	5	N/A	2023/12/04	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue) (1)	5	2023/11/30	2023/12/01	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (1, 6)	5	N/A	2023/12/02	BBY WI-00033	Auto Calc
Field pH (1)	5	N/A	2023/12/01		
Field Temperature (1)	5	N/A	2023/12/01		

**Remarks:**

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

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



Your P.O. #: 735-002640-5  
 Your Project #: 11222680-15.1  
 Site#: GROUND WATER  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your C.O.C. #: 705547-01-01

**Attention: Stephanie Berton**

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 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/12/05**  
 Report #: R3436670  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C397191**

**Received: 2023/11/29, 09:55**

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

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

(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5

(2) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8

(3) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(4) Total PAHs in Water include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene.

(5) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

(6) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)

HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)

Encryption Key



Bureau Veritas

05 Dec 2023 16:35:00

Please direct all questions regarding this Certificate of Analysis to:  
 Brody Andersen, B.Sc., B.Sc., Program Specialist—Emergency Spill Response  
 Email: brody.andersen@bureauveritas.com  
 Phone# (780)742-1616

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 This report has been generated and distributed using a secure automated process.

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



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		CFQ135	CFQ135	CFQ136		
<b>Sampling Date</b>		2023/11/27 13:10	2023/11/27 13:10	2023/11/27 14:15		
<b>COC Number</b>		705547-01-01	705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-01</b>	<b>WG-11222680-271123 -KH-01 Lab-Dup</b>	<b>WG-11222680-271123 -KH-02</b>	<b>RDL</b>	<b>QC Batch</b>

**ANIONS**

Nitrite (N)	mg/L	<0.0050	N/A	<0.0050	0.0050	B219129
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**Calculated Parameters**

Dissolved Hardness (CaCO3)	mg/L	32.0	N/A	156	0.50	B218178
Nitrate (N)	mg/L	0.044	N/A	0.804	0.020	B218461
Sulphide (as H2S)	mg/L	<0.0020	N/A	<0.0020	0.0020	B217989
Low Molecular Weight PAH's	ug/L	<0.10	N/A	<0.10	0.10	B218123
High Molecular Weight PAH's	ug/L	<0.050	N/A	<0.050	0.050	B218123
Total PAH	ug/L	<0.10	N/A	<0.10	0.10	B218123

**Field Parameters**

Field pH	pH	7.63	N/A	7.98	N/A	ONSITE
Field Temperature	°C	17.08	N/A	10.84	N/A	ONSITE

**Misc. Inorganics**

Conductivity	uS/cm	68	N/A	360	2.0	B219142
Total Dissolved Solids	mg/L	56	N/A	220	10	B218644

**Anions**

Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	<1.0	1.0	B219127
Alkalinity (Total as CaCO3)	mg/L	29	N/A	110	1.0	B219127
Bicarbonate (HCO3)	mg/L	36	N/A	140	1.0	B219127
Carbonate (CO3)	mg/L	<1.0	N/A	<1.0	1.0	B219127
Hydroxide (OH)	mg/L	<1.0	N/A	<1.0	1.0	B219127
Total Sulphide	mg/L	<0.0018	<0.0018	<0.0018	0.0018	B221917
Chloride (Cl)	mg/L	<1.0	N/A	14	1.0	B219884
Sulphate (SO4)	mg/L	2.9	N/A	40	1.0	B219884

**Nutrients**

Total Ammonia (N)	mg/L	<0.015	N/A	<0.015	0.015	B220627
Orthophosphate (P)	mg/L	<0.0030	N/A	0.0069	0.0030	B218450
Nitrate plus Nitrite (N)	mg/L	0.044	N/A	0.804	0.020	B219125

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		CFQ137		CFQ138	CFQ138		
<b>Sampling Date</b>		2023/11/27 16:00		2023/11/27 16:10	2023/11/27 16:10		
<b>COC Number</b>		705547-01-01		705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-03</b>	<b>QC Batch</b>	<b>WG-11222680-271123 -KH-04</b>	<b>WG-11222680-271123 -KH-04 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	B219129	<0.0050	<0.0050	0.0050	B219129
<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	143	B218178	144	N/A	0.50	B218178
Nitrate (N)	mg/L	3.51	B218461	3.49	N/A	0.10	B218461
Sulphide (as H2S)	mg/L	<0.0020	B217989	<0.0020	N/A	0.0020	B217989
Low Molecular Weight PAH's	ug/L	<0.10	B218123	<0.10	N/A	0.10	B218123
High Molecular Weight PAH's	ug/L	<0.050	B218123	<0.050	N/A	0.050	B218123
Total PAH	ug/L	<0.10	B218123	<0.10	N/A	0.10	B218123
<b>Field Parameters</b>							
Field pH	pH	7.25	ONSITE	7.25	N/A	N/A	ONSITE
Field Temperature	°C	9.48	ONSITE	9.48	N/A	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	340	B219142	340	N/A	2.0	B219142
Total Dissolved Solids	mg/L	220	B218644	240	N/A	10	B218644
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	B219127	<1.0	N/A	1.0	B219127
Alkalinity (Total as CaCO3)	mg/L	90	B219127	89	N/A	1.0	B219127
Bicarbonate (HCO3)	mg/L	110	B219127	110	N/A	1.0	B219127
Carbonate (CO3)	mg/L	<1.0	B219127	<1.0	N/A	1.0	B219127
Hydroxide (OH)	mg/L	<1.0	B219127	<1.0	N/A	1.0	B219127
Total Sulphide	mg/L	<0.0018	B221917	<0.0018	N/A	0.0018	B221917
Chloride (Cl)	mg/L	8.2	B219884	8.3	N/A	1.0	B219887
Sulphate (SO4)	mg/L	48	B219884	47	N/A	1.0	B219887
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	B220627	<0.015	N/A	0.015	B220627
Orthophosphate (P)	mg/L	0.0032	B218450	0.0031	N/A	0.0030	B218450
Nitrate plus Nitrite (N)	mg/L	3.51	B219125	3.49	3.46	0.10	B219125
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		CFQ139		
<b>Sampling Date</b>		2023/11/27 16:50		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>
<b>ANIONS</b>				
Nitrite (N)	mg/L	<0.0050	0.0050	B219129
<b>Calculated Parameters</b>				
Dissolved Hardness (CaCO3)	mg/L	41.7	0.50	B218178
Nitrate (N)	mg/L	0.416	0.020	B218461
Sulphide (as H2S)	mg/L	<0.0020	0.0020	B217989
Low Molecular Weight PAH's	ug/L	<0.10	0.10	B218123
High Molecular Weight PAH's	ug/L	<0.050	0.050	B218123
Total PAH	ug/L	<0.10	0.10	B218123
<b>Field Parameters</b>				
Field pH	pH	7.54	N/A	ONSITE
Field Temperature	°C	13.12	N/A	ONSITE
<b>Misc. Inorganics</b>				
Conductivity	uS/cm	100	2.0	B219142
Total Dissolved Solids	mg/L	78	10	B218644
<b>Anions</b>				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B219127
Alkalinity (Total as CaCO3)	mg/L	41	1.0	B219127
Bicarbonate (HCO3)	mg/L	50	1.0	B219127
Carbonate (CO3)	mg/L	<1.0	1.0	B219127
Hydroxide (OH)	mg/L	<1.0	1.0	B219127
Total Sulphide	mg/L	<0.0018	0.0018	B221917
Chloride (Cl)	mg/L	3.3	1.0	B219887
Sulphate (SO4)	mg/L	2.9	1.0	B219887
<b>Nutrients</b>				
Total Ammonia (N)	mg/L	<0.015	0.015	B220627
Orthophosphate (P)	mg/L	0.0042	0.0030	B218450
Nitrate plus Nitrite (N)	mg/L	0.416	0.020	B219125
RDL = Reportable Detection Limit N/A = Not Applicable				



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		CFQ135	CFQ136	CFQ137	CFQ138		
Sampling Date		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00	2023/11/27 16:10		
COC Number		705547-01-01	705547-01-01	705547-01-01	705547-01-01		
	UNITS	WG-11222680-271123 -KH-01	WG-11222680-271123 -KH-02	WG-11222680-271123 -KH-03	WG-11222680-271123 -KH-04	RDL	QC Batch

Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B220005
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B220005
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B220005
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B220005
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B220005
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B220005
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B220005
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B220005
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	B220005
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B220005
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	B220005
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B220005

Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	99	95	94	92	N/A	B220005
D8-ACENAPHTHYLENE (sur.)	%	95	92	89	87	N/A	B220005
D8-NAPHTHALENE (sur.)	%	97	94	93	90	N/A	B220005
TERPHENYL-D14 (sur.)	%	93	90	92	89	N/A	B220005

RDL = Reportable Detection Limit  
 N/A = Not Applicable



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

<b>Bureau Veritas ID</b>		CFQ139		
<b>Sampling Date</b>		2023/11/27 16:50		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Polycyclic Aromatics</b>				
Quinoline	ug/L	<0.020	0.020	B220005
Naphthalene	ug/L	<0.10	0.10	B220005
1-Methylnaphthalene	ug/L	<0.050	0.050	B220005
2-Methylnaphthalene	ug/L	<0.10	0.10	B220005
Acenaphthylene	ug/L	<0.050	0.050	B220005
Acenaphthene	ug/L	<0.050	0.050	B220005
Fluorene	ug/L	<0.050	0.050	B220005
Phenanthrene	ug/L	<0.050	0.050	B220005
Anthracene	ug/L	<0.010	0.010	B220005
Acridine	ug/L	<0.050	0.050	B220005
Fluoranthene	ug/L	<0.020	0.020	B220005
Pyrene	ug/L	<0.020	0.020	B220005
Benzo(a)anthracene	ug/L	<0.010	0.010	B220005
Chrysene	ug/L	<0.020	0.020	B220005
Benzo(b&j)fluoranthene	ug/L	<0.030	0.030	B220005
Benzo(k)fluoranthene	ug/L	<0.050	0.050	B220005
Benzo(a)pyrene	ug/L	<0.0050	0.0050	B220005
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	B220005
Dibenz(a,h)anthracene	ug/L	<0.0030	0.0030	B220005
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	B220005
<b>Surrogate Recovery (%)</b>				
D10-ANTHRACENE (sur.)	%	93	N/A	B220005
D8-ACENAPHTHYLENE (sur.)	%	86	N/A	B220005
D8-NAPHTHALENE (sur.)	%	89	N/A	B220005
TERPHENYL-D14 (sur.)	%	91	N/A	B220005
RDL = Reportable Detection Limit N/A = Not Applicable				





Bureau Veritas Job #: C397191  
 Report Date: 2023/12/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-5  
 Sampler Initials: KH

**MERCURY BY COLD VAPOR (WATER)**

<b>Bureau Veritas ID</b>		CFQ135	CFQ136	CFQ137	CFQ138		
<b>Sampling Date</b>		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00	2023/11/27 16:10		
<b>COC Number</b>		705547-01-01	705547-01-01	705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-01</b>	<b>WG-11222680-271123 -KH-02</b>	<b>WG-11222680-271123 -KH-03</b>	<b>WG-11222680-271123 -KH-04</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	0.0055	<0.0019	<0.0019	0.0019	B223426
RDL = Reportable Detection Limit							

<b>Bureau Veritas ID</b>		CFQ139		
<b>Sampling Date</b>		2023/11/27 16:50		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Elements</b>				
Dissolved Mercury (Hg)	ug/L	<0.0019	0.0019	B223426
RDL = Reportable Detection Limit				



**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

Bureau Veritas ID		CFQ135	CFQ136	CFQ137	CFQ138		
Sampling Date		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00	2023/11/27 16:10		
COC Number		705547-01-01	705547-01-01	705547-01-01	705547-01-01		
	UNITS	WG-11222680-271123 -KH-01	WG-11222680-271123 -KH-02	WG-11222680-271123 -KH-03	WG-11222680-271123 -KH-04	RDL	QC Batch

Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	B221019
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	B221019
Dissolved Arsenic (As)	ug/L	<0.10	0.34	<0.10	<0.10	0.10	B221019
Dissolved Barium (Ba)	ug/L	1.3	6.8	4.4	4.4	1.0	B221019
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B221019
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B221019
Dissolved Boron (B)	ug/L	<50	742	171	167	50	B221019
Dissolved Cadmium (Cd)	ug/L	<0.010	0.012	<0.010	0.010	0.010	B221019
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B221019
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B221019
Dissolved Copper (Cu)	ug/L	<0.20	1.92	0.68	0.66	0.20	B221019
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B221019
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	B221019
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	B221019
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	1.8	1.9	1.0	B221019
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B221019
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	B221019
Dissolved Phosphorus (P)	ug/L	<10	13	<10	<10	10	B221019
Dissolved Selenium (Se)	ug/L	<0.10	0.14	0.23	0.22	0.10	B221019
Dissolved Silicon (Si)	ug/L	4550	7400	8240	8280	100	B221019
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B221019
Dissolved Strontium (Sr)	ug/L	15.5	74.8	76.2	76.1	1.0	B221019
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B221019
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B221019
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B221019
Dissolved Uranium (U)	ug/L	<0.10	0.17	<0.10	<0.10	0.10	B221019
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B221019
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	B221019
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B221019
Dissolved Calcium (Ca)	mg/L	10.7	49.8	43.2	43.7	0.050	B218179
Dissolved Magnesium (Mg)	mg/L	1.30	7.59	8.54	8.52	0.050	B218179

RDL = Reportable Detection Limit



Bureau Veritas Job #: C397191  
 Report Date: 2023/12/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-5  
 Sampler Initials: KH

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

Bureau Veritas ID		CFQ135	CFQ136	CFQ137	CFQ138		
Sampling Date		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00	2023/11/27 16:10		
COC Number		705547-01-01	705547-01-01	705547-01-01	705547-01-01		
	UNITS	<b>WG-11222680-271123 -KH-01</b>	<b>WG-11222680-271123 -KH-02</b>	<b>WG-11222680-271123 -KH-03</b>	<b>WG-11222680-271123 -KH-04</b>	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.208	0.529	0.404	0.402	0.050	B218179
Dissolved Sodium (Na)	mg/L	1.10	10.2	8.67	8.67	0.050	B218179
Dissolved Sulphur (S)	mg/L	<3.0	13.4	16.4	16.4	3.0	B218179
RDL = Reportable Detection Limit							



**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Bureau Veritas ID</b>		CFQ139		
<b>Sampling Date</b>		2023/11/27 16:50		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Dissolved Metals by ICPMS</b>				
Dissolved Aluminum (Al)	ug/L	<3.0	3.0	B221019
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	B221019
Dissolved Arsenic (As)	ug/L	0.13	0.10	B221019
Dissolved Barium (Ba)	ug/L	1.2	1.0	B221019
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	B221019
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	B221019
Dissolved Boron (B)	ug/L	<50	50	B221019
Dissolved Cadmium (Cd)	ug/L	<0.010	0.010	B221019
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	B221019
Dissolved Cobalt (Co)	ug/L	<0.20	0.20	B221019
Dissolved Copper (Cu)	ug/L	1.30	0.20	B221019
Dissolved Iron (Fe)	ug/L	<5.0	5.0	B221019
Dissolved Lead (Pb)	ug/L	<0.20	0.20	B221019
Dissolved Lithium (Li)	ug/L	<2.0	2.0	B221019
Dissolved Manganese (Mn)	ug/L	<1.0	1.0	B221019
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	B221019
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	B221019
Dissolved Phosphorus (P)	ug/L	<10	10	B221019
Dissolved Selenium (Se)	ug/L	0.12	0.10	B221019
Dissolved Silicon (Si)	ug/L	4990	100	B221019
Dissolved Silver (Ag)	ug/L	<0.020	0.020	B221019
Dissolved Strontium (Sr)	ug/L	21.0	1.0	B221019
Dissolved Thallium (Tl)	ug/L	<0.010	0.010	B221019
Dissolved Tin (Sn)	ug/L	<5.0	5.0	B221019
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	B221019
Dissolved Uranium (U)	ug/L	<0.10	0.10	B221019
Dissolved Vanadium (V)	ug/L	<5.0	5.0	B221019
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	B221019
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B221019
Dissolved Calcium (Ca)	mg/L	13.8	0.050	B218179
Dissolved Magnesium (Mg)	mg/L	1.74	0.050	B218179
RDL = Reportable Detection Limit				



Bureau Veritas Job #: C397191  
 Report Date: 2023/12/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-5  
 Sampler Initials: KH

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Bureau Veritas ID</b>		CFQ139		
<b>Sampling Date</b>		2023/11/27 16:50		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>
Dissolved Potassium (K)	mg/L	0.176	0.050	B218179
Dissolved Sodium (Na)	mg/L	1.86	0.050	B218179
Dissolved Sulphur (S)	mg/L	<3.0	3.0	B218179
RDL = Reportable Detection Limit				



**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Bureau Veritas ID		CFQ135	CFQ136	CFQ137	CFQ138		
Sampling Date		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00	2023/11/27 16:10		
COC Number		705547-01-01	705547-01-01	705547-01-01	705547-01-01		
	UNITS	WG-11222680-271123 -KH-01	WG-11222680-271123 -KH-02	WG-11222680-271123 -KH-03	WG-11222680-271123 -KH-04	RDL	QC Batch
<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B218097
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B218097
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B220011
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B220011
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	100	99	101	100	N/A	B220011
RDL = Reportable Detection Limit N/A = Not Applicable							

Bureau Veritas ID		CFQ139		
Sampling Date		2023/11/27 16:50		
COC Number		705547-01-01		
	UNITS	WG-11222680-271123 -KH-05	RDL	QC Batch
<b>Calculated Parameters</b>				
LEPH (C10-C19 less PAH)	mg/L	<0.20	0.20	B218097
HEPH (C19-C32 less PAH)	mg/L	<0.20	0.20	B218097
<b>Ext. Pet. Hydrocarbon</b>				
EPH (C10-C19)	mg/L	<0.20	0.20	B220011
EPH (C19-C32)	mg/L	<0.20	0.20	B220011
<b>Surrogate Recovery (%)</b>				
O-TERPHENYL (sur.)	%	101	N/A	B220011
RDL = Reportable Detection Limit N/A = Not Applicable				



Bureau Veritas Job #: C397191  
 Report Date: 2023/12/05

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-5  
 Sampler Initials: KH

**MISCELLANEOUS (WATER)**

<b>Bureau Veritas ID</b>		CFQ135	CFQ136	CFQ137		
<b>Sampling Date</b>		2023/11/27 13:10	2023/11/27 14:15	2023/11/27 16:00		
<b>COC Number</b>		705547-01-01	705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-01</b>	<b>WG-11222680-271123 -KH-02</b>	<b>WG-11222680-271123 -KH-03</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B218692
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B218692
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		CFQ138	CFQ139		
<b>Sampling Date</b>		2023/11/27 16:10	2023/11/27 16:50		
<b>COC Number</b>		705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WG-11222680-271123 -KH-04</b>	<b>WG-11222680-271123 -KH-05</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>					
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	0.0050	B218692
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	0.0050	B218692
RDL = Reportable Detection Limit					





Bureau Veritas Job #: C397191  
Report Date: 2023/12/05

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-5  
Sampler Initials: KH

### GENERAL COMMENTS

Results relate only to the items tested.



### QUALITY ASSURANCE REPORT

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-5  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B220005	D10-ANTHRACENE (sur.)	2023/12/01			101	50 - 140	95	%		
B220005	D8-ACENAPHTHYLENE (sur.)	2023/12/01			99	50 - 140	93	%		
B220005	D8-NAPHTHALENE (sur.)	2023/12/01			99	50 - 140	94	%		
B220005	TERPHENYL-D14 (sur.)	2023/12/01			97	50 - 140	95	%		
B220011	O-TERPHENYL (sur.)	2023/12/01			100	60 - 140	99	%		
B218450	Orthophosphate (P)	2023/11/30			94	80 - 120	<0.0030	mg/L		
B218644	Total Dissolved Solids	2023/12/01	101	80 - 120	103	80 - 120	<10	mg/L	6.5 (1)	20
B219125	Nitrate plus Nitrite (N)	2023/11/30	NC (2)	80 - 120	110	80 - 120	<0.020	mg/L	0.91 (3)	25
B219127	Alkalinity (PP as CaCO3)	2023/11/30					<1.0	mg/L	NC (1)	20
B219127	Alkalinity (Total as CaCO3)	2023/11/30			92	80 - 120	<1.0	mg/L	0.41 (1)	20
B219127	Bicarbonate (HCO3)	2023/11/30					<1.0	mg/L	0.41 (1)	20
B219127	Carbonate (CO3)	2023/11/30					<1.0	mg/L	NC (1)	20
B219127	Hydroxide (OH)	2023/11/30					<1.0	mg/L	NC (1)	20
B219129	Nitrite (N)	2023/11/30	105 (2)	80 - 120	105	80 - 120	<0.0050	mg/L	NC (3)	20
B219142	Conductivity	2023/11/30			99	90 - 110	<2.0	uS/cm	0 (1)	10
B219884	Chloride (Cl)	2023/12/01	NC	80 - 120	96	80 - 120	<1.0	mg/L	0.15 (1)	20
B219884	Sulphate (SO4)	2023/12/01	NC	80 - 120	96	80 - 120	<1.0	mg/L	0.78 (1)	20
B219887	Chloride (Cl)	2023/12/01	97	80 - 120	96	80 - 120	<1.0	mg/L	NC (1)	20
B219887	Sulphate (SO4)	2023/12/01	NC	80 - 120	96	80 - 120	<1.0	mg/L	0.71 (1)	20
B220005	1-Methylnaphthalene	2023/12/02			103	50 - 140	<0.050	ug/L	NC (1)	40
B220005	2-Methylnaphthalene	2023/12/02			100	50 - 140	<0.10	ug/L	NC (1)	40
B220005	Acenaphthene	2023/12/02			102	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Acenaphthylene	2023/12/02			103	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Acridine	2023/12/02			99	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Anthracene	2023/12/02			106	50 - 140	<0.010	ug/L	NC (1)	40
B220005	Benzo(a)anthracene	2023/12/02			85	50 - 140	<0.010	ug/L	NC (1)	40
B220005	Benzo(a)pyrene	2023/12/02			89	50 - 140	<0.0050	ug/L	NC (1)	40
B220005	Benzo(b&j)fluoranthene	2023/12/02			102	50 - 140	<0.030	ug/L	NC (1)	40
B220005	Benzo(g,h,i)perylene	2023/12/02			86	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Benzo(k)fluoranthene	2023/12/02			98	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Chrysene	2023/12/02			89	50 - 140	<0.020	ug/L	NC (1)	40



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B220005	Dibenz(a,h)anthracene	2023/12/02			89	50 - 140	<0.0030	ug/L	NC (1)	40
B220005	Fluoranthene	2023/12/02			79	50 - 140	<0.020	ug/L	NC (1)	40
B220005	Fluorene	2023/12/02			99	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Indeno(1,2,3-cd)pyrene	2023/12/02			90	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Naphthalene	2023/12/02			101	50 - 140	<0.10	ug/L	NC (1)	40
B220005	Phenanthrene	2023/12/02			102	50 - 140	<0.050	ug/L	NC (1)	40
B220005	Pyrene	2023/12/02			82	50 - 140	<0.020	ug/L	NC (1)	40
B220005	Quinoline	2023/12/02			106	50 - 140	<0.020	ug/L	NC (1)	40
B220011	EPH (C10-C19)	2023/12/01			90	70 - 130	<0.20	mg/L	NC (1)	30
B220011	EPH (C19-C32)	2023/12/01			94	70 - 130	<0.20	mg/L	NC (1)	30
B220627	Total Ammonia (N)	2023/12/01	-6.6 (4)	80 - 120	101	80 - 120	<0.015	mg/L	5.4 (1)	20
B221019	Dissolved Aluminum (Al)	2023/12/04	103	80 - 120	102	80 - 120	<3.0	ug/L	20 (1)	20
B221019	Dissolved Antimony (Sb)	2023/12/04	105	80 - 120	102	80 - 120	<0.50	ug/L	NC (1)	20
B221019	Dissolved Arsenic (As)	2023/12/04	108	80 - 120	103	80 - 120	<0.10	ug/L	0.80 (1)	20
B221019	Dissolved Barium (Ba)	2023/12/04	NC	80 - 120	102	80 - 120	<1.0	ug/L	1.1 (1)	20
B221019	Dissolved Beryllium (Be)	2023/12/04	106	80 - 120	101	80 - 120	<0.10	ug/L	NC (1)	20
B221019	Dissolved Bismuth (Bi)	2023/12/04	99	80 - 120	99	80 - 120	<1.0	ug/L	NC (1)	20
B221019	Dissolved Boron (B)	2023/12/04	113	80 - 120	110	80 - 120	<50	ug/L	NC (1)	20
B221019	Dissolved Cadmium (Cd)	2023/12/04	101	80 - 120	99	80 - 120	<0.010	ug/L	2.2 (1)	20
B221019	Dissolved Chromium (Cr)	2023/12/04	96	80 - 120	96	80 - 120	<1.0	ug/L	NC (1)	20
B221019	Dissolved Cobalt (Co)	2023/12/04	93	80 - 120	95	80 - 120	<0.20	ug/L	NC (1)	20
B221019	Dissolved Copper (Cu)	2023/12/04	92	80 - 120	95	80 - 120	<0.20	ug/L	3.8 (1)	20
B221019	Dissolved Iron (Fe)	2023/12/04	103	80 - 120	101	80 - 120	<5.0	ug/L	NC (1)	20
B221019	Dissolved Lead (Pb)	2023/12/04	101	80 - 120	100	80 - 120	<0.20	ug/L	NC (1)	20
B221019	Dissolved Lithium (Li)	2023/12/04	101	80 - 120	101	80 - 120	<2.0	ug/L	NC (1)	20
B221019	Dissolved Manganese (Mn)	2023/12/04	99	80 - 120	100	80 - 120	<1.0	ug/L	1.4 (1)	20
B221019	Dissolved Molybdenum (Mo)	2023/12/04	106	80 - 120	102	80 - 120	<1.0	ug/L	NC (1)	20
B221019	Dissolved Nickel (Ni)	2023/12/04	97	80 - 120	99	80 - 120	<1.0	ug/L	0.59 (1)	20
B221019	Dissolved Phosphorus (P)	2023/12/04	107	80 - 120	101	80 - 120	<10	ug/L		
B221019	Dissolved Selenium (Se)	2023/12/04	105	80 - 120	100	80 - 120	<0.10	ug/L	3.1 (1)	20
B221019	Dissolved Silicon (Si)	2023/12/04	NC	80 - 120	114	80 - 120	<100	ug/L	1.0 (1)	20



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B221019	Dissolved Silver (Ag)	2023/12/04	103	80 - 120	101	80 - 120	<0.020	ug/L	NC (1)	20
B221019	Dissolved Strontium (Sr)	2023/12/04	NC	80 - 120	102	80 - 120	<1.0	ug/L	0.018 (1)	20
B221019	Dissolved Thallium (Tl)	2023/12/04	102	80 - 120	101	80 - 120	<0.010	ug/L	6.8 (1)	20
B221019	Dissolved Tin (Sn)	2023/12/04	103	80 - 120	101	80 - 120	<5.0	ug/L	NC (1)	20
B221019	Dissolved Titanium (Ti)	2023/12/04	104	80 - 120	103	80 - 120	<5.0	ug/L	NC (1)	20
B221019	Dissolved Uranium (U)	2023/12/04	105	80 - 120	101	80 - 120	<0.10	ug/L	0.89 (1)	20
B221019	Dissolved Vanadium (V)	2023/12/04	102	80 - 120	100	80 - 120	<5.0	ug/L	NC (1)	20
B221019	Dissolved Zinc (Zn)	2023/12/04	96	80 - 120	99	80 - 120	<5.0	ug/L	NC (1)	20
B221019	Dissolved Zirconium (Zr)	2023/12/04	106	80 - 120	101	80 - 120	<0.10	ug/L	NC (1)	20
B221917	Total Sulphide	2023/12/04	108 (5)	80 - 120	101	80 - 120	<0.0018	mg/L	NC (6)	20
B223426	Dissolved Mercury (Hg)	2023/12/05	99	80 - 120	111	80 - 120	<0.0019	ug/L	NC (1)	20

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [CFQ138-01]

(3) Duplicate Parent ID [CFQ138-01]

(4) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(5) Matrix Spike Parent ID [CFQ136-03]

(6) Duplicate Parent ID [CFQ135-03]



Bureau Veritas Job #: C397191  
Report Date: 2023/12/05

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-5  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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



<b>INVOICE TO:</b>		<b>Report Information</b>		<b>Project Information</b>	
Company Name #163 GHD Limited	Contact Name AP Invoices - 735	Company Name Stephanie Berton	Contact Name Stephanie Berton	Quotation # C30090	P.O. # 735-002640-3
Address 455 PHILLIP STREET WATERLOO ON N2L 3X2	Phone (519) 884-0510	Address	Phone (519) 725-1394	Project # 11222680-15.1	Project Name Upland Landfill
Email APInvoices-735@ghd.com		Email NationalEDDSupport@maxam.ca.stephanie.berton@ghd.com		Site # Groundwater	Sampled By Kathleen Hasler



C397191\_COC

Project Manager  
Brodie Anderson

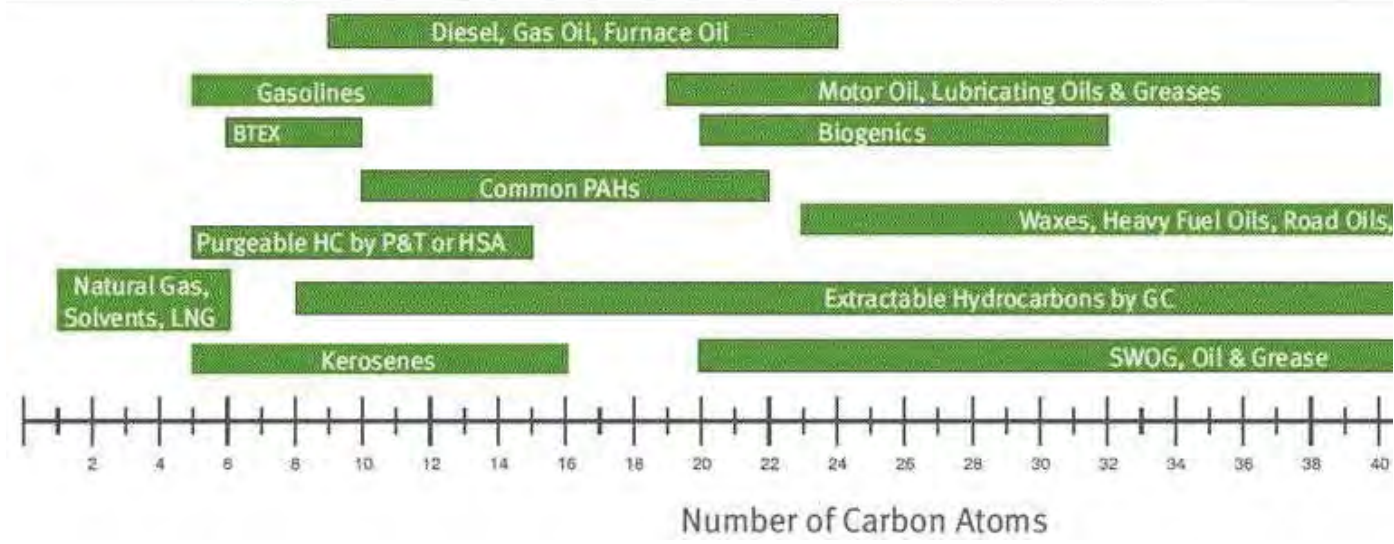
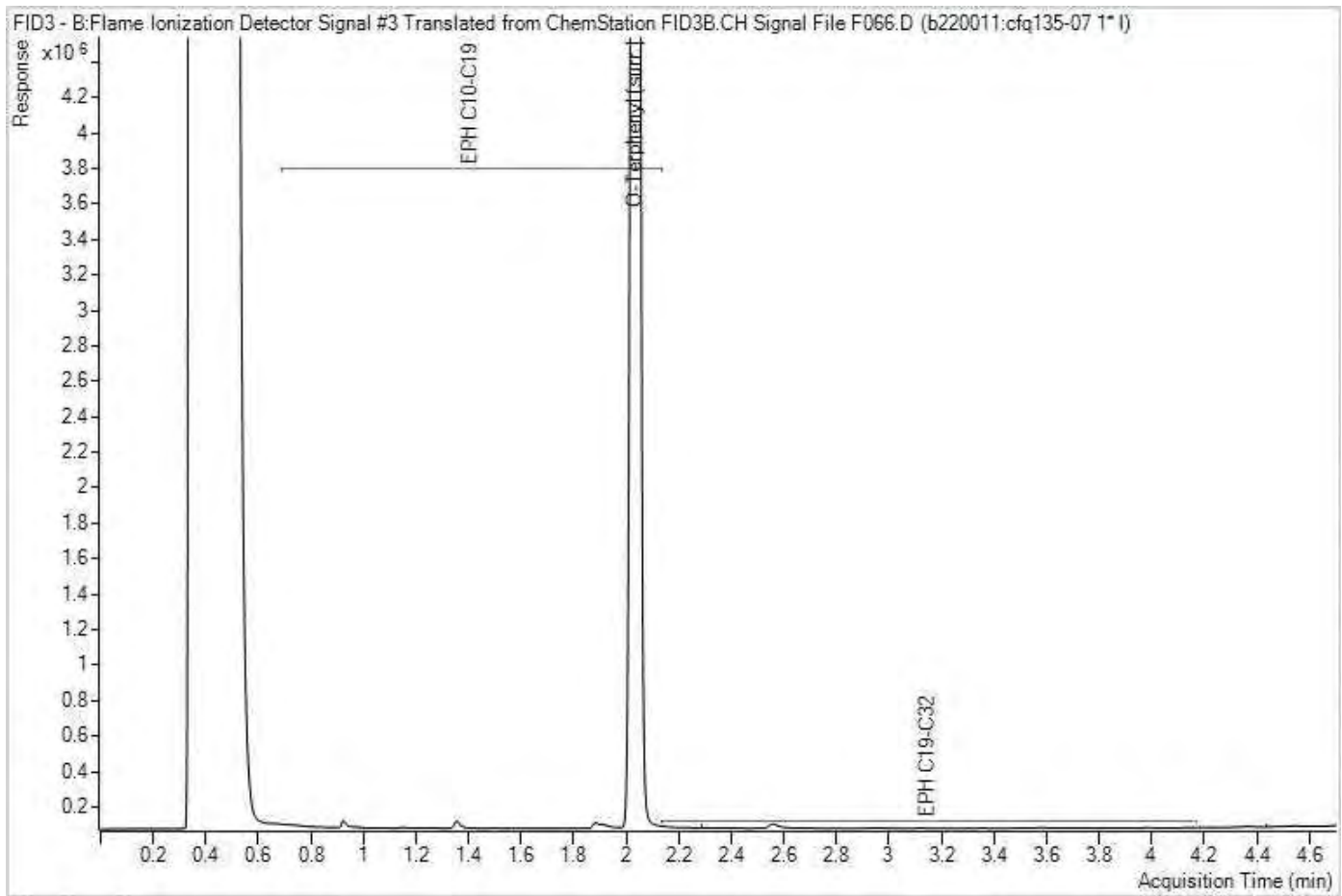
Regulatory Criteria: <input type="checkbox"/> CSR <input type="checkbox"/> CCME <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other	Special Instructions Bottles were field filtered and preserved as indicated.	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): Metals Field Filtered? (Y/N) [Y] Conductivity, Cl, SO4, NO2, NO3, N-N, PO4 Speciated Alkalinity Sulphide + H2S Calc Sulphide, Un-ionized (as H2S) (Calc) Ammonia-N (Total) Dissolved Metals with CV Hg, Hardness Total Dissolved Solids (Filt. Residue) LEPH/HEPH with subtracted PAHs Field pH Field Temperature	Turnaround Time (TAT) Required: Please provide advance notice for rush projects. Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: _____ Rush Confirmation Number: _____ (fill in for #)
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SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness	Total Dissolved Solids (Filt. Residue)	LEPH/HEPH with subtracted PAHs	Field pH	Field Temperature	# of Bottles	Comments
1	WG-11222680-271123-KH-01	27/11/23	13:10	W	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7	
2	WG-11222680-271123-KH-02		14:15		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7	
3	WG-11222680-271123-KH-03		16:00		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7	
4	WG-11222680-271123-KH-04		16:10		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7	
5	WG-11222680-271123-KH-05		16:50		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7	
6																	
7																	
8																	
9																	
10																	

RELINQUISHED BY: (Signature/Print) <i>Debra Tong</i>	Date: (YYMMDD) 23/11/23	Time 07:00	RECEIVED BY: (Signature/Print) <i>NMT</i>	Date: (YYMMDD) 23/11/23	Time 09:55	# Jars used and not submitted	Lab Use Only
							Time Sensitive <input type="checkbox"/> Temperature (°C) on Receipt: 5 6 6

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.  
\*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

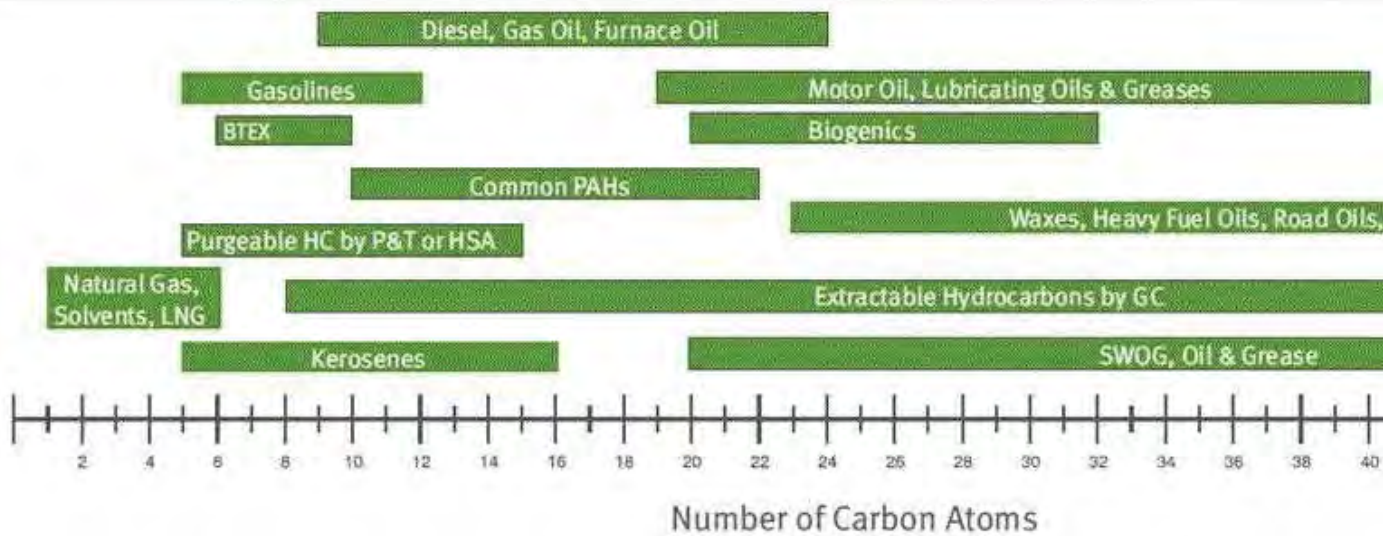
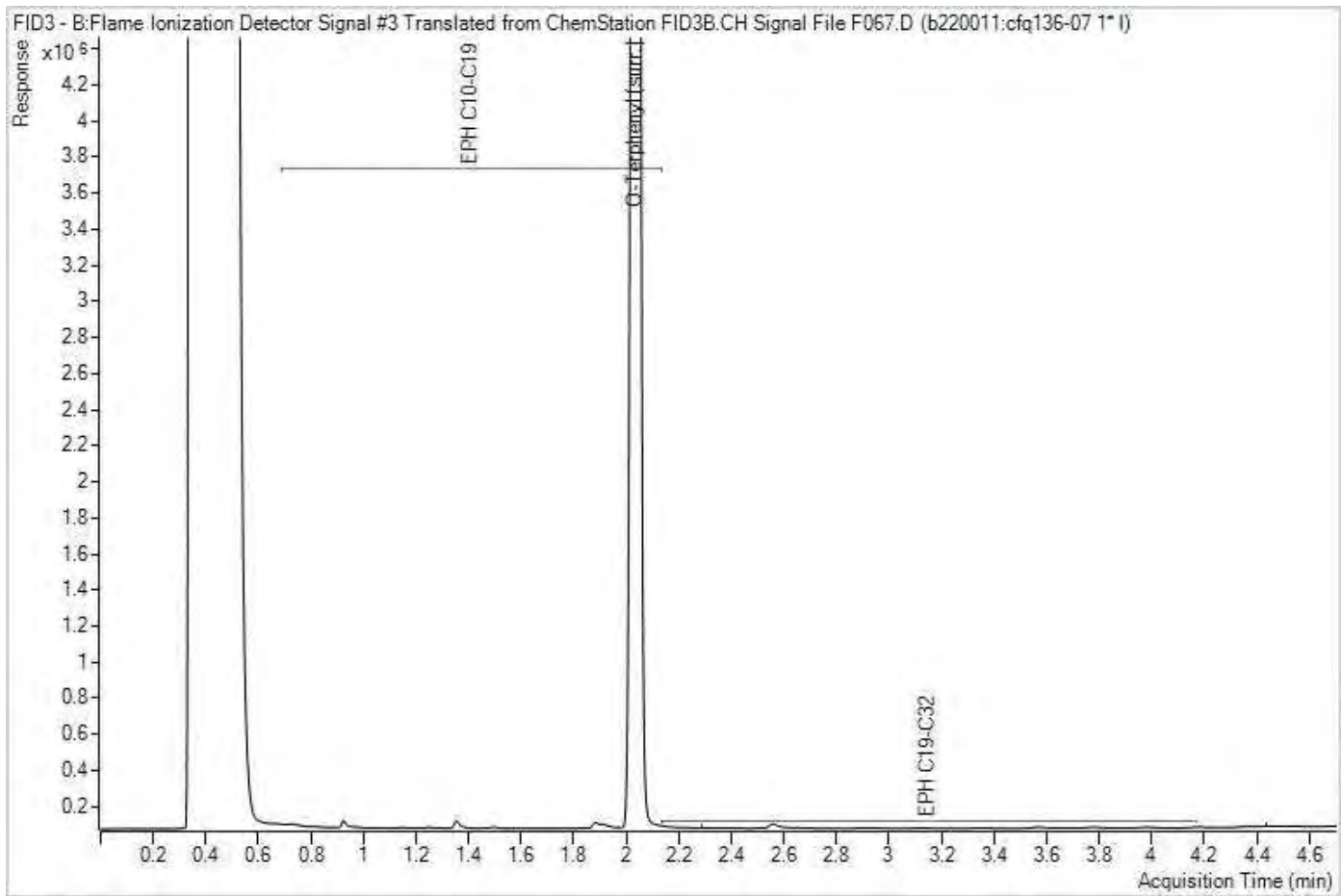
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

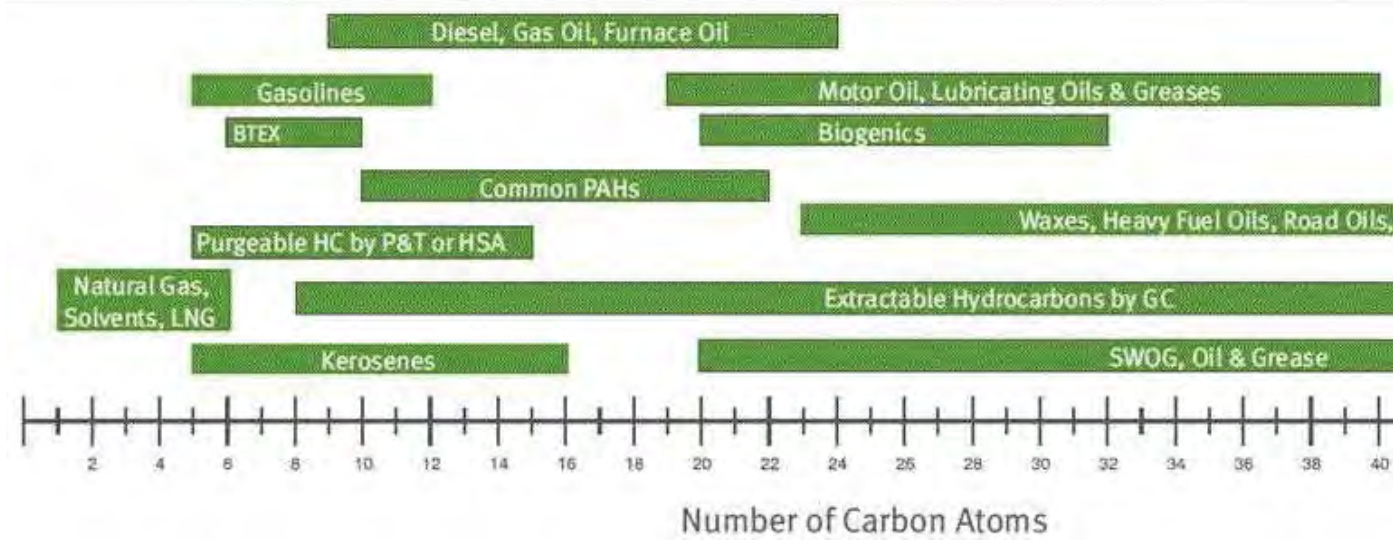
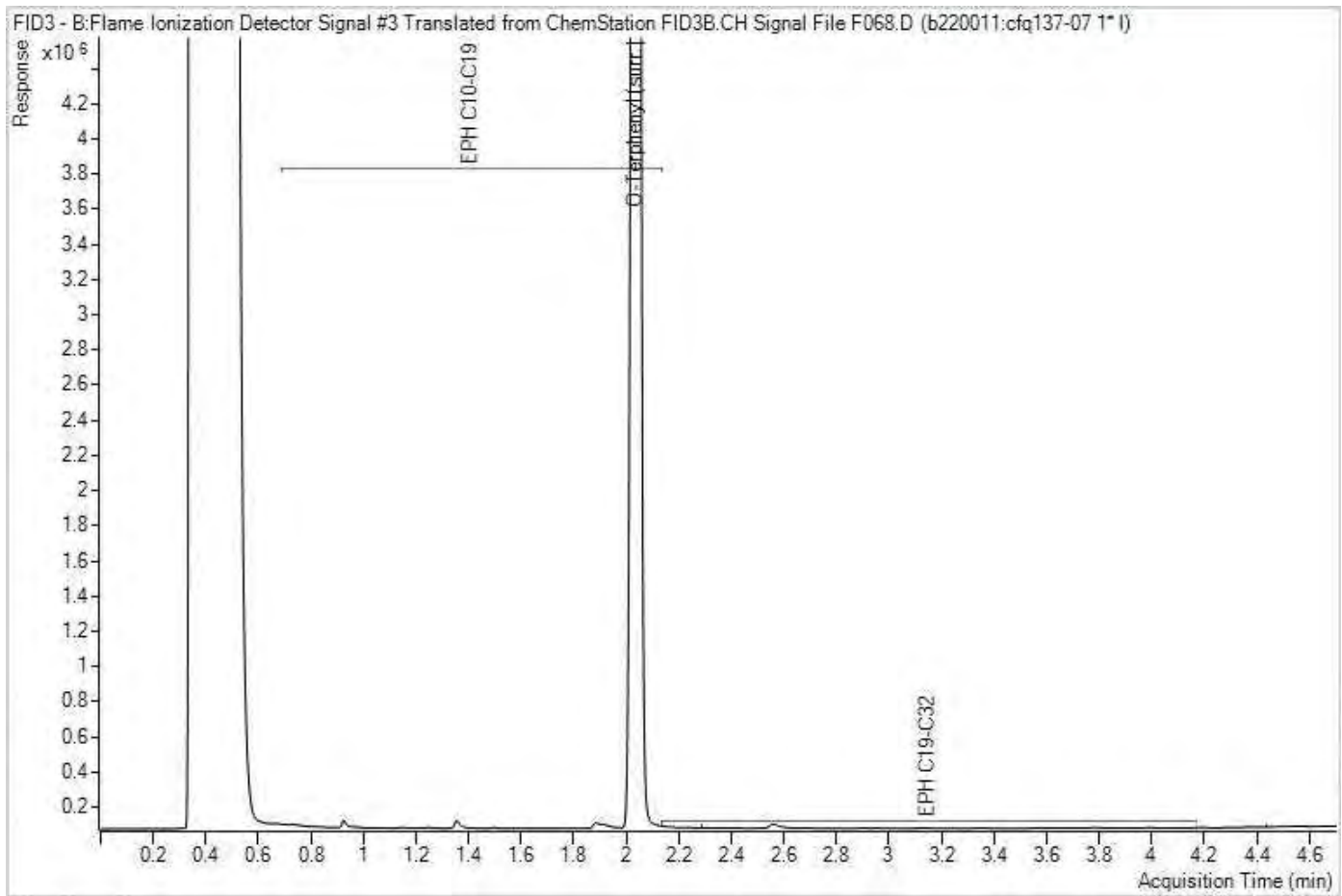


EPH in Water when PAH required Chromatogram



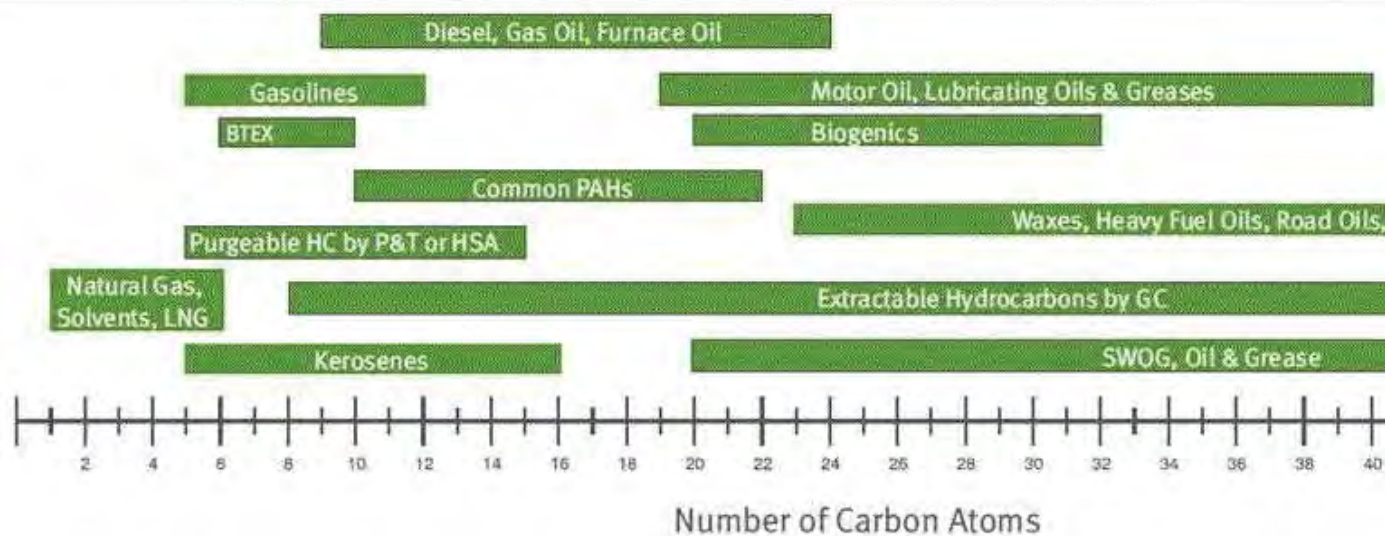
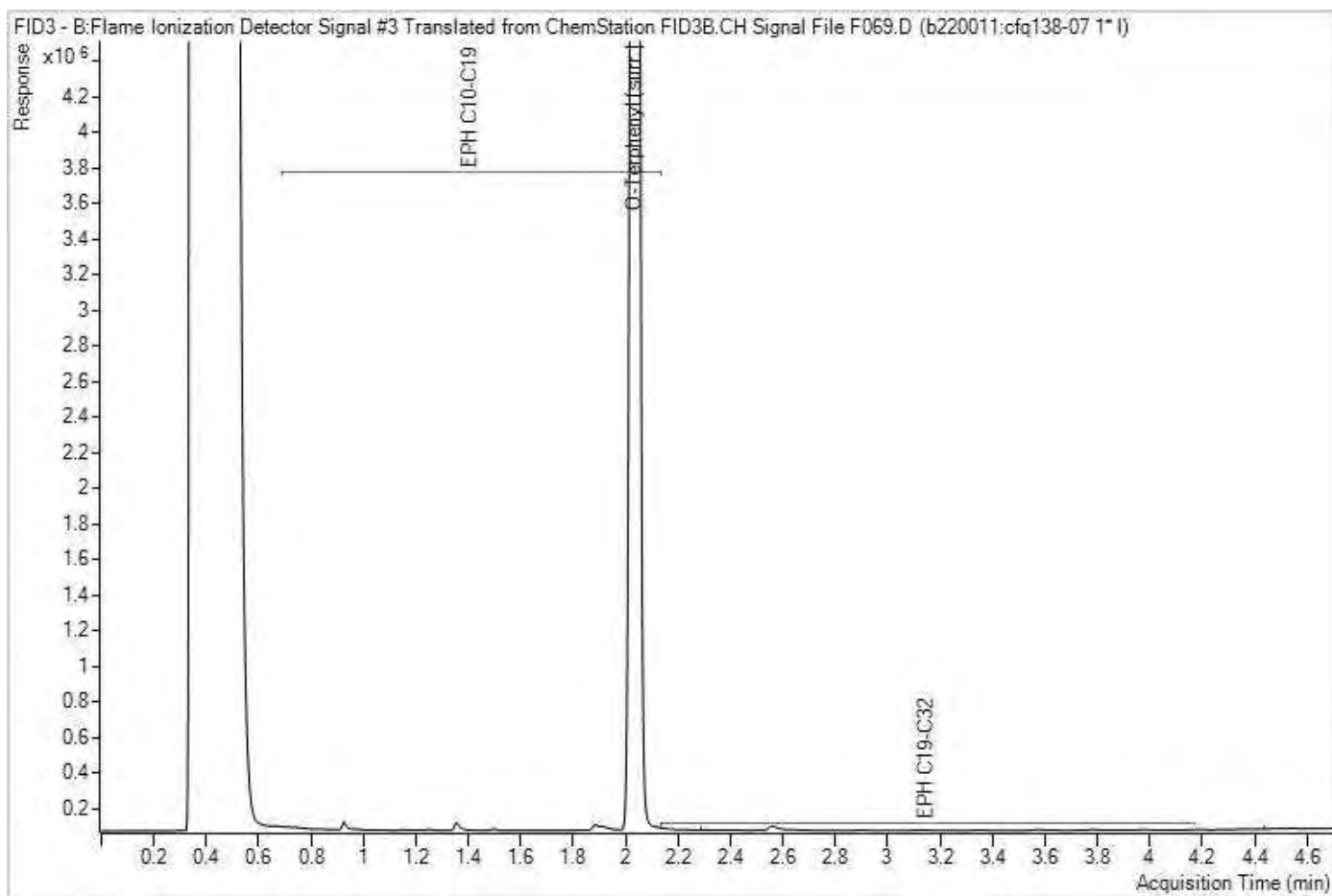
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

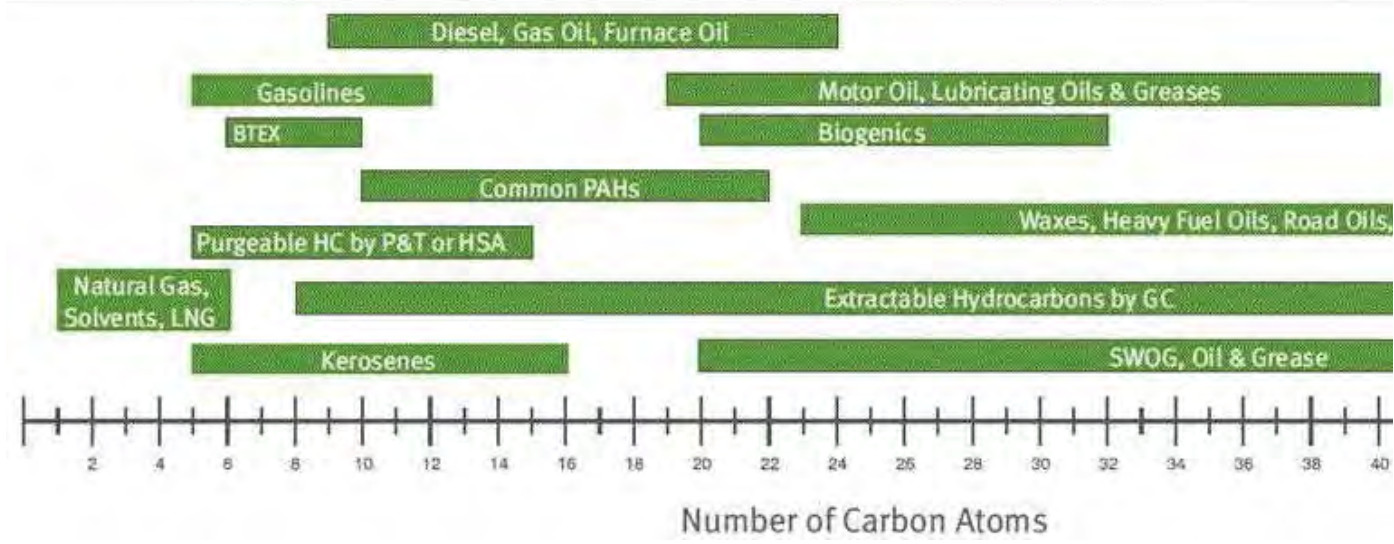
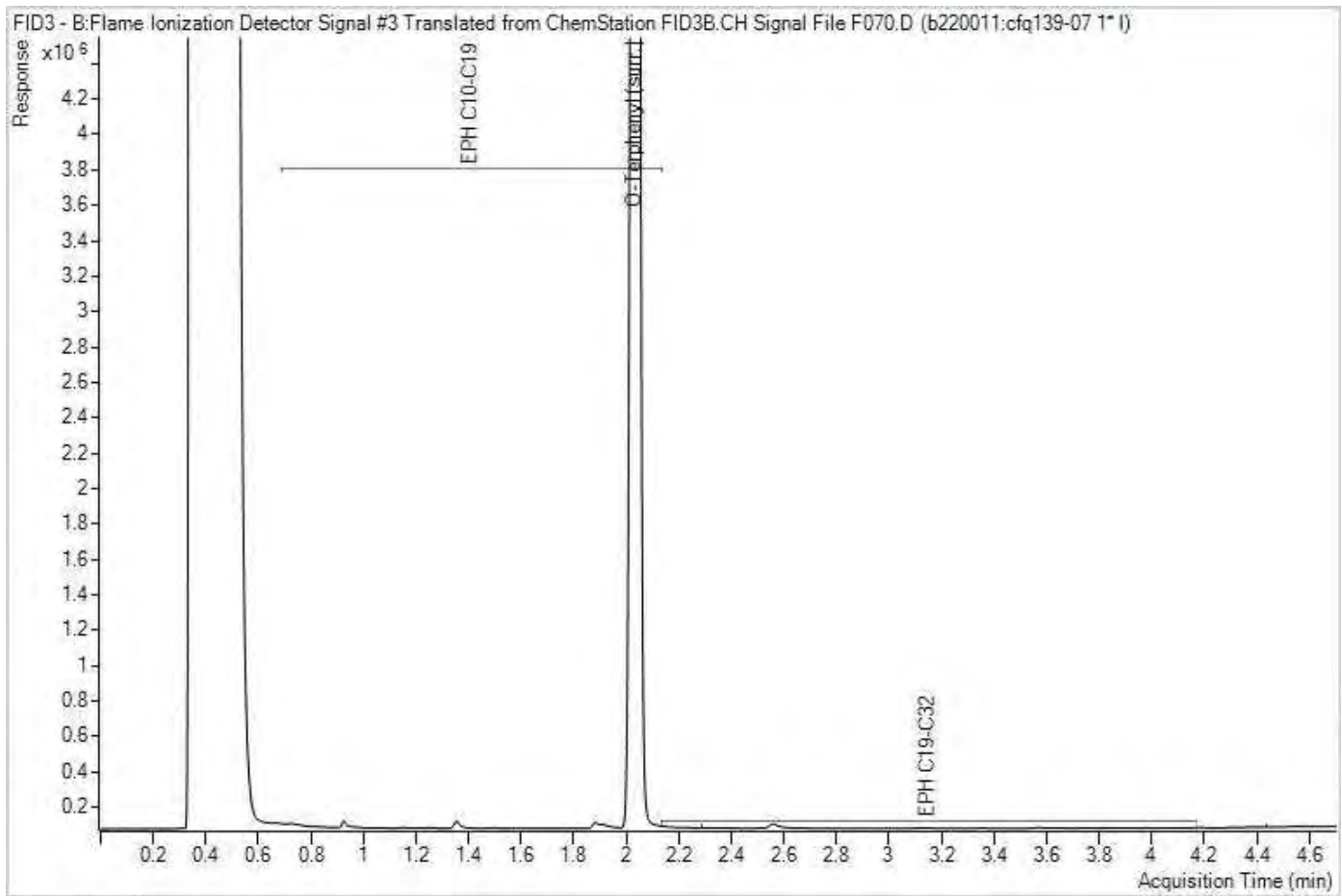
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your P.O. #: 735-002640-4  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your C.O.C. #: 705547-03-01, 705547-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/12/07**  
 Report #: R3437781  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C397797**

**Received: 2023/11/30, 11:42**

Sample Matrix: Water  
 # Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	8	N/A	2023/12/01	BBY6SOP-00026	SM 24 2320 B m
Biochemical Oxygen Demand	1	2023/12/01	2023/12/06	BBY6SOP-00045	SM 23 5210 B m
BTEX/MTBE LH, VH, F1 SIM/MS	1	N/A	2023/12/01	BBY8SOP-00010 / BBY8SOP-00011 / BBY8SOP-00012	BCMOE BCLM Jul 2017
Chloride/Sulphate by Auto Colourimetry	8	N/A	2023/12/01	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
COD by Colorimeter	1	N/A	2023/12/04	BBY6SOP-00024	SM 24 5220 D m
Phenols in Water by GCMS	1	2023/12/06	2023/12/06	BBY8SOP-00025 / BBY8SOP-00054	BCMOE BCLM Jul2017 m
Conductivity @25C	8	N/A	2023/12/01	BBY6SOP-00026	SM 24 2510 B m
Fluoride	8	N/A	2023/12/02	BBY6SOP-00048	SM 24 4500-F C m
Sulphide (as H2S) (1)	8	N/A	2023/12/04		Auto Calc
Un-ionized Hydrogen Sulphide as S Calc	8	N/A	2023/12/04	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO3) (2)	3	N/A	2023/12/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	3	N/A	2023/12/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	5	N/A	2023/12/06	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (3)	5	2023/12/05	2023/12/05	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Total) by CV	3	2023/12/05	2023/12/05	AB SOP-00084	BCMOE BCLM Oct2013 m
ICP-OES Dissolved Metals in Water (3)	3	N/A	2023/12/04	BBY7SOP-00018	EPA 6010d m
EPH in Water when PAH required	6	2023/12/04	2023/12/04	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2023/12/06	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (3)	5	N/A	2023/12/05	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	2023/12/01	2023/12/04	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	3	2023/12/04	2023/12/04	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Non-Chlorinated Phenols in Water by GCMS	1	2023/12/06	2023/12/06	BBY8SOP-00054	BCMOE BCLM Jul 2017
Ammonia-N (Total)	8	N/A	2023/12/05	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	8	N/A	2023/12/01	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water	8	N/A	2023/12/01	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N)	8	N/A	2023/12/01	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	6	2023/12/04	2023/12/05	BBY8SOP-00021	BCMOE BCLM Jul2017m



Your P.O. #: 735-002640-4  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your C.O.C. #: 705547-03-01, 705547-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/12/07**  
 Report #: R3437781  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C397797**

**Received: 2023/11/30, 11:42**

Sample Matrix: Water  
 # Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
pH @25°C (4)	8	N/A	2023/12/01	BBY6SOP-00026	SM 24 4500-H+ B m
Phenols (Totals) in Water - Calc. (5)	1	N/A	2023/12/07	BBY WI-00033	Auto Calc
Orthophosphate by Automated Analyzer (6)	8	N/A	2023/12/01	BBY6SOP-00013	SM 24 4500-P E m
Total Sulphide (1)	8	N/A	2023/12/05	AB SOP-00080	SM 23 4500 S2-A D Fm
Total Dissolved Solids (Filt. Residue)	8	2023/12/01	2023/12/02	BBY6SOP-00033	SM 24 2540 C m
EPH less PAH in Water by GC/FID (7)	6	N/A	2023/12/05	BBY WI-00033	Auto Calc
Total Suspended Solids (NFR)	3	2023/12/01	2023/12/02	BBY6SOP-00034	SM 24 2540 D m
Field pH	8	N/A	2023/12/01		
Field Temperature	8	N/A	2023/12/01		
VOCs, VH, F1, LH in Water by HS GC/MS	1	N/A	2023/12/04	BBY8SOP-00009 / BBY8SOP-00011 / BBY8SOP-00012	BCMOE BCLM Jul2017 m
Volatile HC-BTEX (8)	1	N/A	2023/12/03	BBY WI-00033	Auto Calc
Volatile HC-BTEX (8)	1	N/A	2023/12/05	BBY WI-00033	Auto Calc

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.



Your P.O. #: 735-002640-4  
 Your Project #: 11222680-15.1  
 Site#: GROUNDWATER  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your C.O.C. #: 705547-03-01, 705547-01-01

**Attention: Stephanie Berton**

GHD Limited  
 455 PHILLIP STREET  
 WATERLOO, ON  
 CANADA N2L 3X2

**Report Date: 2023/12/07**  
 Report #: R3437781  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C397797**

**Received: 2023/11/30, 11:42**

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

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

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

- (1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
- (2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (3) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (4) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
- (5) Total Phenols include (from BC Lab Manual): Nonchlorinated Phenols [Phenol, 2,4-Dimethylphenol, 2,6-Dimethylphenol, 3,4-Dimethylphenol, 2-Methylphenol (ortho-Cresol), 3-Methylphenol (meta-Cresol), 4-Methylphenol (para-Cresol), 2-Hydroxyphenol (Catechol), 3-Hydroxyphenol (Resorcinol), 4-Hydroxyphenol(Hydroquinone)]; Nitrophenols [2,4-Dinitrophenol, 2-Methyl-4,6-Dinitrophenol, 2-Nitrophenol, 4-Nitrophenol]; Chlorophenols [2-Chlorophenol, 3-Chlorophenol, 4-Chlorophenol, 4-Chloro-3-Methylphenol, 2,3-Dichlorophenol, 2,4-Dichlorophenol, 2,5-Dichlorophenol, 2,6-Dichlorophenol, 3,4-Dichlorophenol, 3,5-Dichlorophenol, 2,3,4-Trichlorophenol, 2,3,5-Trichlorophenol, 2,3,6-Trichlorophenol, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 3,4,5-Trichlorophenol, 2,3,4,5-Tetrachlorophenol, 2,3,4,6-Tetrachlorophenol, 2,3,5,6-Tetrachlorophenol, Pentachlorophenol].
- (6) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (7) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)  
 HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)
- (8) VPH = VH - (Benzene + Toluene + Ethylbenzene + m & p-Xylene + o-Xylene + Styrene)

Encryption Key



Bureau Veritas  
 07 Dec 2023 13:03:55

Please direct all questions regarding this Certificate of Analysis to:  
 Brody Andersen, B.Sc., B.Sc., Program Specialist—Emergency Spill Response  
 Email: brody.andersen@bureauveritas.com  
 Phone# (780)742-1616

=====

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**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		CFS920	CFS920		CFS921		
Sampling Date		2023/11/28 09:30	2023/11/28 09:30		2023/11/28 14:45		
COC Number		705547-03-01	705547-03-01		705547-03-01		
	UNITS	WG-11222680-281123 -KH-06	WG-11222680-281123 -KH-06 Lab-Dup	QC Batch	WG-11222680-281123 -KH-07	RDL	QC Batch
<b>ANIONS</b>							
Nitrite (N)	mg/L	<0.0050	<0.0050	B220651	<0.0050	0.0050	B220651
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	0.719	N/A	B219834	0.237	0.020	B219834
Sulphide (as H2S)	mg/L	<0.0020	N/A	B219572	<0.0020	0.0020	B220226
<b>Field Parameters</b>							
Field pH	pH	7.37	N/A	ONSITE	7.73	N/A	ONSITE
Field Temperature	°C	10.72	N/A	ONSITE	10.55	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	320	N/A	B220395	180	2.0	B220395
pH	pH	7.40	N/A	B220393	7.32	N/A	B220393
Total Dissolved Solids	mg/L	180	N/A	B220589	88	10	B220589
<b>Anions</b>							
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	B220389	<1.0	1.0	B220389
Alkalinity (Total as CaCO3)	mg/L	140	N/A	B220389	72	1.0	B220389
Bicarbonate (HCO3)	mg/L	170	N/A	B220389	87	1.0	B220389
Carbonate (CO3)	mg/L	<1.0	N/A	B220389	<1.0	1.0	B220389
Dissolved Fluoride (F)	mg/L	<0.050	N/A	B220735	<0.050	0.050	B220735
Hydroxide (OH)	mg/L	<1.0	N/A	B220389	<1.0	1.0	B220389
Total Sulphide	mg/L	<0.0018	N/A	B221929	<0.0018	0.0018	B221929
Chloride (Cl)	mg/L	4.7	N/A	B220245	4.1	1.0	B220590
Sulphate (SO4)	mg/L	7.7	N/A	B220245	7.1	1.0	B220590
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	<0.015	N/A	B223595	<0.015	0.015	B223595
Orthophosphate (P)	mg/L	0.0081	N/A	B220019	<0.0030	0.0030	B220019
Nitrate plus Nitrite (N)	mg/L	0.719	0.719	B220649	0.237	0.020	B220649
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



BUREAU  
VERITAS

Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

### RESULTS OF CHEMICAL ANALYSES OF WATER

<b>Bureau Veritas ID</b>		CFS921	CFS922	CFS923	CFS924		
<b>Sampling Date</b>		2023/11/28 14:45	2023/11/28 15:00	2023/11/28 16:30	2023/11/29 09:45		
<b>COC Number</b>		705547-03-01	705547-03-01	705547-03-01	705547-03-01		
	<b>UNITS</b>	<b>WG-11222680-281123 -KH-07 Lab-Dup</b>	<b>WG-11222680-281123 -KH-08</b>	<b>WG-11222680-281123 -KH-09</b>	<b>WG-11222680-291123 -KH-10</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>							
Nitrite (N)	mg/L	N/A	<0.0050	<0.0050	<0.0050	0.0050	B220651
<b>Calculated Parameters</b>							
Nitrate (N)	mg/L	N/A	0.043	0.610	1.52	0.020	B219834
Sulphide (as H <sub>2</sub> S)	mg/L	N/A	<0.0020	<0.0020	<0.0020	0.0020	B220226
<b>Field Parameters</b>							
Field pH	pH	N/A	8.38	7.19	6.50	N/A	ONSITE
Field Temperature	°C	N/A	10.97	9.64	9.54	N/A	ONSITE
<b>Misc. Inorganics</b>							
Conductivity	uS/cm	N/A	84	490	130	2.0	B220395
pH	pH	N/A	7.25	7.12	6.91	N/A	B220393
Total Dissolved Solids	mg/L	88	44	280	80	10	B220589
<b>Anions</b>							
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	N/A	<1.0	<1.0	<1.0	1.0	B220389
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	N/A	36	78	43	1.0	B220389
Bicarbonate (HCO <sub>3</sub> )	mg/L	N/A	44	96	53	1.0	B220389
Carbonate (CO <sub>3</sub> )	mg/L	N/A	<1.0	<1.0	<1.0	1.0	B220389
Dissolved Fluoride (F)	mg/L	N/A	<0.050	<0.050	<0.050	0.050	B220735
Hydroxide (OH)	mg/L	N/A	<1.0	<1.0	<1.0	1.0	B220389
Total Sulphide	mg/L	N/A	<0.0018	<0.0018	<0.0018	0.0018	B221929
Chloride (Cl)	mg/L	4.1	<1.0	85	2.6	1.0	B220590
Sulphate (SO <sub>4</sub> )	mg/L	6.9	2.6	5.3	6.7	1.0	B220590
<b>Nutrients</b>							
Total Ammonia (N)	mg/L	N/A	<0.015	<0.015	<0.015	0.015	B223595
Orthophosphate (P)	mg/L	N/A	0.022	0.0052	0.0039	0.0030	B220019
Nitrate plus Nitrite (N)	mg/L	N/A	0.043	0.610	1.52	0.020	B220649

RDL = Reportable Detection Limit  
Lab-Dup = Laboratory Initiated Duplicate  
N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		CFS925	CFS925			CFS932		
<b>Sampling Date</b>		2023/11/28 14:45	2023/11/28 14:45			2023/11/28 10:00		
<b>COC Number</b>		705547-03-01	705547-03-01			705547-01-01		
	<b>UNITS</b>	<b>WL-11222680-281123-KH-01</b>	<b>WL-11222680-281123-KH-01 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>WS-11222680-281123-KH-01</b>	<b>RDL</b>	<b>QC Batch</b>

<b>ANIONS</b>								
Nitrite (N)	mg/L	0.0414	N/A	0.0050	B220651	<0.0050	0.0050	B220651
<b>Calculated Parameters</b>								
Dissolved Hardness (CaCO3)	mg/L	1090	N/A	0.50	B220055	22.6	0.50	B220055
Nitrate (N)	mg/L	7.37	N/A	0.10	B219834	<0.020	0.020	B219834
Sulphide (as H2S)	mg/L	0.027	N/A	0.0020	B220226	<0.0020	0.0020	B220226
<b>Demand Parameters</b>								
Biochemical Oxygen Demand	mg/L	5.2 (1)	N/A	3.0	B220137	N/A	N/A	B220137
Chemical Oxygen Demand	mg/L	311	N/A	10	B222249	N/A	N/A	B222249
<b>Field Parameters</b>								
Field pH	pH	6.53	N/A	N/A	ONSITE	8.12	N/A	ONSITE
Field Temperature	°C	9.61	N/A	N/A	ONSITE	8.26	N/A	ONSITE
<b>Misc. Inorganics</b>								
Conductivity	uS/cm	3600	N/A	2.0	B220395	55	2.0	B220395
pH	pH	7.35	7.38	N/A	B220393	6.85	N/A	B220393
Total Dissolved Solids	mg/L	2400	N/A	10	B220589	34	10	B220589
Total Suspended Solids	mg/L	4.8	N/A	1.0	B220197	<1.1 (2)	1.1	B220197
<b>Anions</b>								
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	1.0	B220389	<1.0	1.0	B220389
Alkalinity (Total as CaCO3)	mg/L	690	700	1.0	B220389	22	1.0	B220389
Bicarbonate (HCO3)	mg/L	850	850	1.0	B220389	27	1.0	B220389
Carbonate (CO3)	mg/L	<1.0	<1.0	1.0	B220389	<1.0	1.0	B220389
Dissolved Fluoride (F)	mg/L	0.19	N/A	0.050	B220735	<0.050	0.050	B220735
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	B220389	<1.0	1.0	B220389
Total Sulphide	mg/L	0.025	N/A	0.0018	B221929	<0.0018	0.0018	B221929
Chloride (Cl)	mg/L	290	N/A	5.0	B220590	<1.0	1.0	B220245
Sulphate (SO4)	mg/L	720	N/A	10	B220590	2.6	1.0	B220245

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable  
 (1) Detection limit raised based on sample volume used for analysis. Sample overdiluted based on physical properties of sample.  
 (2) RDL raised due to limited initial sample amount.



BUREAU  
VERITAS

Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

### RESULTS OF CHEMICAL ANALYSES OF WATER

<b>Bureau Veritas ID</b>		CFS925	CFS925			CFS932		
<b>Sampling Date</b>		2023/11/28 14:45	2023/11/28 14:45			2023/11/28 10:00		
<b>COC Number</b>		705547-03-01	705547-03-01			705547-01-01		
	<b>UNITS</b>	<b>WL-11222680-281123- KH-01</b>	<b>WL-11222680-281123- KH-01 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>WS-11222680-281123- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Nutrients</b>								
Total Ammonia (N)	mg/L	30	N/A	0.38	B223595	<0.015	0.015	B223595
Orthophosphate (P)	mg/L	0.013	N/A	0.0030	B220019	<0.0030	0.0030	B220019
Nitrate plus Nitrite (N)	mg/L	7.41	N/A	0.10	B220649	<0.020	0.020	B220649

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable



**RESULTS OF CHEMICAL ANALYSES OF WATER**

Bureau Veritas ID		CFS932	CFS933		
Sampling Date		2023/11/28 10:00	2023/11/28 10:30		
COC Number		705547-01-01	705547-01-01		
	UNITS	WS-11222680-281123- KH-01 Lab-Dup	WS-11222680-281123- KH-02	RDL	QC Batch
<b>ANIONS</b>					
Nitrite (N)	mg/L	N/A	<0.0050	0.0050	B220651
<b>Calculated Parameters</b>					
Dissolved Hardness (CaCO3)	mg/L	N/A	17.5	0.50	B220055
Nitrate (N)	mg/L	N/A	0.357	0.020	B219834
Sulphide (as H2S)	mg/L	N/A	<0.0020	0.0020	B220226
<b>Field Parameters</b>					
Field pH	pH	N/A	7.57	N/A	ONSITE
Field Temperature	°C	N/A	6.33	N/A	ONSITE
<b>Misc. Inorganics</b>					
Conductivity	uS/cm	N/A	65	2.0	B220395
pH	pH	N/A	6.47	N/A	B220393
Total Dissolved Solids	mg/L	N/A	38	10	B220589
Total Suspended Solids	mg/L	N/A	2.3 (1)	1.1	B220197
<b>Anions</b>					
Alkalinity (PP as CaCO3)	mg/L	N/A	<1.0	1.0	B220389
Alkalinity (Total as CaCO3)	mg/L	N/A	18	1.0	B220389
Bicarbonate (HCO3)	mg/L	N/A	22	1.0	B220389
Carbonate (CO3)	mg/L	N/A	<1.0	1.0	B220389
Dissolved Fluoride (F)	mg/L	<0.050	<0.050	0.050	B220735
Hydroxide (OH)	mg/L	N/A	<1.0	1.0	B220389
Total Sulphide	mg/L	N/A	<0.0018	0.0018	B221929
Chloride (Cl)	mg/L	N/A	5.5	1.0	B220245
Sulphate (SO4)	mg/L	N/A	1.0	1.0	B220245
<b>Nutrients</b>					
Total Ammonia (N)	mg/L	N/A	0.063	0.015	B223595
Orthophosphate (P)	mg/L	N/A	<0.0030	0.0030	B220019
Nitrate plus Nitrite (N)	mg/L	N/A	0.357	0.020	B220649
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable (1) RDL raised due to limited initial sample amount.					



BUREAU  
VERITAS

Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

### SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		CFS920	CFS921	CFS922	CFS923		
Sampling Date		2023/11/28 09:30	2023/11/28 14:45	2023/11/28 15:00	2023/11/28 16:30		
COC Number		705547-03-01	705547-03-01	705547-03-01	705547-03-01		
	UNITS	WG-11222680-281123 -KH-06	WG-11222680-281123 -KH-07	WG-11222680-281123 -KH-08	WG-11222680-281123 -KH-09	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	B222170
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B222170
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B222170
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B222170
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B222170
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	B222170
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B222170
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	B222170
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	B222170
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B222170
<b>Surrogate Recovery (%)</b>							
D10-ANTHRACENE (sur.)	%	83	83	84	83	N/A	B222170
D8-ACENAPHTHYLENE (sur.)	%	78	78	78	76	N/A	B222170
D8-NAPHTHALENE (sur.)	%	75	76	77	75	N/A	B222170
TERPHENYL-D14 (sur.)	%	73	73	73	72	N/A	B222170
RDL = Reportable Detection Limit N/A = Not Applicable							



**SEMIVOLATILE ORGANICS BY GC-MS (WATER)**

Bureau Veritas ID		CFS924	CFS925		
Sampling Date		2023/11/29 09:45	2023/11/28 14:45		
COC Number		705547-03-01	705547-03-01		
	UNITS	WG-11222680-291123 -KH-10	WL-11222680-281123- KH-01	RDL	QC Batch
<b>Polycyclic Aromatics</b>					
Naphthalene	ug/L	<0.10	1.6	0.10	B222170
Acenaphthene	ug/L	<0.050	0.48	0.050	B222170
Fluorene	ug/L	<0.050	0.37	0.050	B222170
Phenanthrene	ug/L	<0.050	0.47	0.050	B222170
Anthracene	ug/L	<0.010	0.098	0.010	B222170
Acridine	ug/L	<0.050	0.078	0.050	B222170
Fluoranthene	ug/L	<0.020	0.25	0.020	B222170
Pyrene	ug/L	<0.020	0.26	0.020	B222170
Benzo(a)anthracene	ug/L	<0.010	0.031	0.010	B222170
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	0.0050	B222170
<b>Surrogate Recovery (%)</b>					
D10-ANTHRACENE (sur.)	%	80	76	N/A	B222170
D8-ACENAPHTHYLENE (sur.)	%	75	77	N/A	B222170
D8-NAPHTHALENE (sur.)	%	74	72	N/A	B222170
TERPHENYL-D14 (sur.)	%	70	63	N/A	B222170
RDL = Reportable Detection Limit N/A = Not Applicable					





Bureau Veritas Job #: C397797  
 Report Date: 2023/12/07

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Bureau Veritas ID</b>		CFS925		CFS932	CFS932		
<b>Sampling Date</b>		2023/11/28 14:45		2023/11/28 10:00	2023/11/28 10:00		
<b>COC Number</b>		705547-03-01		705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WL-11222680-281123- KH-01</b>	<b>RDL</b>	<b>WS-11222680-281123- KH-01</b>	<b>WS-11222680-281123- KH-01 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Dissolved Metals by ICP</b>							
Dissolved Calcium (Ca)	mg/L	348	0.10	7.72	7.68	0.050	B222471
Dissolved Magnesium (Mg)	mg/L	54.8	0.050	0.800	0.794	0.050	B222471

RDL = Reportable Detection Limit  
 Lab-Dup = Laboratory Initiated Duplicate

<b>Bureau Veritas ID</b>		CFS933		
<b>Sampling Date</b>		2023/11/28 10:30		
<b>COC Number</b>		705547-01-01		
	<b>UNITS</b>	<b>WS-11222680-281123- KH-02</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Dissolved Metals by ICP</b>				
Dissolved Calcium (Ca)	mg/L	5.05	0.050	B222471
Dissolved Magnesium (Mg)	mg/L	1.19	0.050	B222471

RDL = Reportable Detection Limit



**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Bureau Veritas ID		CFS920	CFS921	CFS922	CFS923		
Sampling Date		2023/11/28 09:30	2023/11/28 14:45	2023/11/28 15:00	2023/11/28 16:30		
COC Number		705547-03-01	705547-03-01	705547-03-01	705547-03-01		
	UNITS	WG-11222680-281123 -KH-06	WG-11222680-281123 -KH-07	WG-11222680-281123 -KH-08	WG-11222680-281123 -KH-09	RDL	QC Batch
<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B219718
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B219718
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B222174
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	B222174
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	100	100	100	99	N/A	B222174
RDL = Reportable Detection Limit N/A = Not Applicable							

Bureau Veritas ID		CFS924	CFS925		
Sampling Date		2023/11/29 09:45	2023/11/28 14:45		
COC Number		705547-03-01	705547-03-01		
	UNITS	WG-11222680-291123 -KH-10	WL-11222680-281123- KH-01	RDL	QC Batch
<b>Calculated Parameters</b>					
LEPH (C10-C19 less PAH)	mg/L	<0.20	0.21	0.20	B219718
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	0.20	B219718
<b>Ext. Pet. Hydrocarbon</b>					
EPH (C10-C19)	mg/L	<0.20	0.21	0.20	B222174
EPH (C19-C32)	mg/L	<0.20	<0.20	0.20	B222174
<b>Surrogate Recovery (%)</b>					
O-TERPHENYL (sur.)	%	100	88	N/A	B222174
RDL = Reportable Detection Limit N/A = Not Applicable					



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Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

### MISCELLANEOUS (WATER)

<b>Bureau Veritas ID</b>		CFS920	CFS921	CFS922		
<b>Sampling Date</b>		2023/11/28 09:30	2023/11/28 14:45	2023/11/28 15:00		
<b>COC Number</b>		705547-03-01	705547-03-01	705547-03-01		
	<b>UNITS</b>	<b>WG-11222680-281123 -KH-06</b>	<b>WG-11222680-281123 -KH-07</b>	<b>WG-11222680-281123 -KH-08</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B220212
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	<0.0050	0.0050	B220212
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		CFS923	CFS924	CFS925		
<b>Sampling Date</b>		2023/11/28 16:30	2023/11/29 09:45	2023/11/28 14:45		
<b>COC Number</b>		705547-03-01	705547-03-01	705547-03-01		
	<b>UNITS</b>	<b>WG-11222680-281123 -KH-09</b>	<b>WG-11222680-291123 -KH-10</b>	<b>WL-11222680-281123- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>						
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	0.020	0.0050	B220212
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	0.021	0.0050	B220212
RDL = Reportable Detection Limit						

<b>Bureau Veritas ID</b>		CFS932	CFS933		
<b>Sampling Date</b>		2023/11/28 10:00	2023/11/28 10:30		
<b>COC Number</b>		705547-01-01	705547-01-01		
	<b>UNITS</b>	<b>WS-11222680-281123- KH-01</b>	<b>WS-11222680-281123- KH-02</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>					
Total Un-ionized Hydrogen Sulfide as S	mg/L	<0.0050	<0.0050	0.0050	B220212
Total Un-ionized Hydrogen Sulfide as H2S	mg/L	<0.0050	<0.0050	0.0050	B220212
RDL = Reportable Detection Limit					



**CSR BTEX/VPH IN WATER (WATER)**

<b>Bureau Veritas ID</b>		CFS925		
<b>Sampling Date</b>		2023/11/28 14:45		
<b>COC Number</b>		705547-03-01		
	<b>UNITS</b>	<b>WL-11222680-281123-KH-01</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
VPH (VHW6 to 10 - BTEX)	ug/L	<300	300	B219721
<b>Volatiles</b>				
Methyl-tert-butylether (MTBE)	ug/L	<4.0	4.0	B220357
Benzene	ug/L	<0.40	0.40	B220357
Toluene	ug/L	<0.40	0.40	B220357
Ethylbenzene	ug/L	<0.40	0.40	B220357
m & p-Xylene	ug/L	0.63 (1)	0.40	B220357
o-Xylene	ug/L	0.65	0.40	B220357
Styrene	ug/L	<0.40	0.40	B220357
Xylenes (Total)	ug/L	1.3	0.40	B220357
VH C6-C10	ug/L	<300	300	B220357
<b>Surrogate Recovery (%)</b>				
1,4-Difluorobenzene (sur.)	%	99	N/A	B220357
4-Bromofluorobenzene (sur.)	%	103	N/A	B220357
D4-1,2-Dichloroethane (sur.)	%	104	N/A	B220357
RDL = Reportable Detection Limit N/A = Not Applicable (1) Tentatively identified result and may be potentially biased high due to matrix interference.				



**COMBINED CP/NCP PHENOLS IN WATER (WATER)**

<b>Bureau Veritas ID</b>		CFS925		
<b>Sampling Date</b>		2023/11/28 14:45		
<b>COC Number</b>		705547-03-01		
	<b>UNITS</b>	<b>WL-11222680-281123- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Total Monochlorophenols	ug/L	<0.080	0.080	B220231
Total Dichlorophenols	ug/L	<0.10	0.10	B220231
Total Trichlorophenols	ug/L	0.16	0.10	B220231
Total Tetrachlorophenols	ug/L	<0.10	0.10	B220231
Total Chlorophenols	ug/L	0.52	0.10	B220231
Total Nonchlorinated Phenols	ug/L	<10	10	B220231
Total Phenolic Compounds	ug/L	<10	10	B220231
<b>SEMI-VOLATILE ORGANICS</b>				
Phenol	ug/L	<0.50	0.50	B224440
2-chlorophenol	ug/L	<0.080	0.080	B224439
3 & 4-chlorophenol	ug/L	<0.080	0.080	B224439
2-methylphenol	ug/L	<0.50	0.50	B224440
3 & 4-methylphenol	ug/L	<0.50	0.50	B224440
2-nitrophenol	ug/L	<0.50	0.50	B224440
2,4-dimethylphenol	ug/L	<0.50	0.50	B224440
2,4 + 2,5-Dichlorophenol	ug/L	<0.10	0.10	B224439
2,3-Dichlorophenol	ug/L	<0.10	0.10	B224439
2,6-dichlorophenol	ug/L	<0.10	0.10	B224439
3,5-Dichlorophenol	ug/L	<0.10	0.10	B224439
3,4-Dichlorophenol	ug/L	<0.10	0.10	B224439
2,4,5-trichlorophenol	ug/L	<0.10	0.10	B224439
2,4,6-trichlorophenol	ug/L	0.16	0.10	B224439
2,3,5-trichlorophenol	ug/L	<0.10	0.10	B224439
2,3,6-Trichlorophenol	ug/L	<0.10	0.10	B224439
2,3,4-trichlorophenol	ug/L	<0.10	0.10	B224439
3,4,5-Trichlorophenol	ug/L	<0.10	0.10	B224439
2,4-dinitrophenol	ug/L	<0.50	0.50	B224440
4,6-dinitro-2-methylphenol	ug/L	<0.50	0.50	B224440
2,3,4,6-tetrachlorophenol	ug/L	<0.10	0.10	B224439
2,3,4,5-tetrachlorophenol	ug/L	<0.10	0.10	B224439
2,3,5,6-tetrachlorophenol	ug/L	<0.10	0.10	B224439
RDL = Reportable Detection Limit				



**COMBINED CP/NCP PHENOLS IN WATER (WATER)**

<b>Bureau Veritas ID</b>		CFS925		
<b>Sampling Date</b>		2023/11/28 14:45		
<b>COC Number</b>		705547-03-01		
	<b>UNITS</b>	<b>WL-11222680-281123- KH-01</b>	<b>RDL</b>	<b>QC Batch</b>
4-nitrophenol	ug/L	<0.50	0.50	B224440
3,4-Dimethylphenol	ug/L	<0.50	0.50	B224440
2,6-Dimethylphenol	ug/L	<0.50	0.50	B224440
Pentachlorophenol	ug/L	0.37	0.10	B224439
4-Chloro-3-Methylphenol	ug/L	<1.0	1.0	B224439
2-Hydroxyphenol (Catechol)	ug/L	<10	10	B224440
3-Hydroxyphenol (Resorcinol)	ug/L	<10	10	B224440
4-Hydroxyphenol (Hydroquinone)	ug/L	<1.0	1.0	B224440
<b>Surrogate Recovery (%)</b>				
2,4,6-TRIBROMOPHENOL (sur.)	%	95	N/A	B224439
2,4-DIBROMOPHENOL (sur.)	%	77	N/A	B224439
2,4,6-TRIBROMOPHENOL (sur.)	%	95	N/A	B224440
2,4-DIBROMOPHENOL (sur.)	%	77	N/A	B224440
RDL = Reportable Detection Limit N/A = Not Applicable				



**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		CFS925	CFS932	CFS933		
Sampling Date		2023/11/28 14:45	2023/11/28 10:00	2023/11/28 10:30		
COC Number		705547-03-01	705547-01-01	705547-01-01		
	UNITS	WL-11222680-281123- KH-01	WS-11222680-281123- KH-01	WS-11222680-281123- KH-02	RDL	QC Batch
<b>Calculated Parameters</b>						
Total Hardness (CaCO3)	mg/L	934	19.8	16.0	0.50	B220026
<b>Elements</b>						
Total Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	0.0019	B223930
<b>Total Metals by ICPMS</b>						
Total Aluminum (Al)	ug/L	313	5.8	19.9	3.0	B221831
Total Antimony (Sb)	ug/L	3.21	<0.50	<0.50	0.50	B221831
Total Arsenic (As)	ug/L	4.86	<0.10	<0.10	0.10	B221831
Total Barium (Ba)	ug/L	116	2.3	2.4	1.0	B221831
Total Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	0.10	B221831
Total Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	1.0	B221831
Total Boron (B)	ug/L	11500	351	167	50	B221831
Total Cadmium (Cd)	ug/L	0.111	<0.010	<0.010	0.010	B221831
Total Chromium (Cr)	ug/L	7.8	<1.0	<1.0	1.0	B221831
Total Cobalt (Co)	ug/L	4.38	<0.20	<0.20	0.20	B221831
Total Copper (Cu)	ug/L	66.0	<0.50	0.51	0.50	B221831
Total Iron (Fe)	ug/L	1970	<10	225	10	B221831
Total Lead (Pb)	ug/L	0.29	<0.20	<0.20	0.20	B221831
Total Lithium (Li)	ug/L	5.0	<2.0	<2.0	2.0	B221831
Total Manganese (Mn)	ug/L	1530	1.8	11.8	1.0	B221831
Total Molybdenum (Mo)	ug/L	7.7	<1.0	<1.0	1.0	B221831
Total Nickel (Ni)	ug/L	11.5	<1.0	<1.0	1.0	B221831
Total Phosphorus (P)	ug/L	164	<10	<10	10	B221831
Total Selenium (Se)	ug/L	0.50	<0.10	<0.10	0.10	B221831
Total Silicon (Si)	ug/L	14500	1590	956	100	B221831
Total Silver (Ag)	ug/L	<0.020	<0.020	<0.020	0.020	B221831
Total Strontium (Sr)	ug/L	1890	9.4	13.9	1.0	B221831
Total Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	0.010	B221831
Total Tin (Sn)	ug/L	<5.0	<5.0	<5.0	5.0	B221831
Total Titanium (Ti)	ug/L	16.7	<5.0	<5.0	5.0	B221831
Total Uranium (U)	ug/L	1.72	<0.10	<0.10	0.10	B221831
Total Vanadium (V)	ug/L	6.0	<5.0	<5.0	5.0	B221831
RDL = Reportable Detection Limit						





Bureau Veritas Job #: C397797  
 Report Date: 2023/12/07

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

**CSR TOTAL METALS IN WATER WITH CV HG (WATER)**

Bureau Veritas ID		CFS925	CFS932	CFS933		
Sampling Date		2023/11/28 14:45	2023/11/28 10:00	2023/11/28 10:30		
COC Number		705547-03-01	705547-01-01	705547-01-01		
	UNITS	WL-11222680-281123-KH-01	WS-11222680-281123-KH-01	WS-11222680-281123-KH-02	RDL	QC Batch
Total Zinc (Zn)	ug/L	67.0	<5.0	<5.0	5.0	B221831
Total Zirconium (Zr)	ug/L	1.55	<0.10	<0.10	0.10	B221831
Total Calcium (Ca)	mg/L	295	6.78	4.56	0.050	B220008
Total Magnesium (Mg)	mg/L	47.7	0.696	1.11	0.050	B220008
Total Potassium (K)	mg/L	39.2	0.069	0.130	0.050	B220008
Total Sodium (Na)	mg/L	276	0.699	3.77	0.050	B220008
Total Sulphur (S)	mg/L	235	<3.0	<3.0	3.0	B220008
RDL = Reportable Detection Limit						



**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		CFS920	CFS921		CFS922		
Sampling Date		2023/11/28 09:30	2023/11/28 14:45		2023/11/28 15:00		
COC Number		705547-03-01	705547-03-01		705547-03-01		
	UNITS	WG-11222680-281123 -KH-06	WG-11222680-281123 -KH-07	QC Batch	WG-11222680-281123 -KH-08	RDL	QC Batch
<b>Calculated Parameters</b>							
Dissolved Hardness (CaCO3)	mg/L	145	78.1	B220055	37.4	0.50	B220055
<b>Elements</b>							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	B223962	<0.0019	0.0019	B223962
<b>Dissolved Metals by ICPMS</b>							
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	B223175	3.9	3.0	B223187
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	B223175	<0.50	0.50	B223187
Dissolved Arsenic (As)	ug/L	0.21	<0.10	B223175	0.85	0.10	B223187
Dissolved Barium (Ba)	ug/L	9.2	2.2	B223175	1.9	1.0	B223187
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	B223175	<0.10	0.10	B223187
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	B223175	<1.0	1.0	B223187
Dissolved Boron (B)	ug/L	<50	<50	B223175	<50	50	B223187
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	B223175	<0.010	0.010	B223187
Dissolved Chromium (Cr)	ug/L	1.0	<1.0	B223175	<1.0	1.0	B223187
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	B223175	<0.20	0.20	B223187
Dissolved Copper (Cu)	ug/L	<0.20	0.26	B223175	<0.20	0.20	B223187
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	B223175	<5.0	5.0	B223187
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	B223175	<0.20	0.20	B223187
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	B223175	<2.0	2.0	B223187
Dissolved Manganese (Mn)	ug/L	<1.0	<1.0	B223175	<1.0	1.0	B223187
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	B223175	<1.0	1.0	B223187
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	B223175	<1.0	1.0	B223187
Dissolved Phosphorus (P)	ug/L	14	<10	B223175	29	10	B223187
Dissolved Selenium (Se)	ug/L	0.13	<0.10	B223175	<0.10	0.10	B223187
Dissolved Silicon (Si)	ug/L	13000	6950	B223175	4250	100	B223187
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	B223175	<0.020	0.020	B223187
Dissolved Strontium (Sr)	ug/L	74.7	40.2	B223175	15.2	1.0	B223187
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	B223175	<0.010	0.010	B223187
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	B223175	<5.0	5.0	B223187
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	B223175	<5.0	5.0	B223187
Dissolved Uranium (U)	ug/L	<0.10	<0.10	B223175	<0.10	0.10	B223187
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	B223175	7.2	5.0	B223187
RDL = Reportable Detection Limit							



BUREAU  
VERITAS

Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		CFS920	CFS921		CFS922		
Sampling Date		2023/11/28 09:30	2023/11/28 14:45		2023/11/28 15:00		
COC Number		705547-03-01	705547-03-01		705547-03-01		
	UNITS	WG-11222680-281123 -KH-06	WG-11222680-281123 -KH-07	QC Batch	WG-11222680-281123 -KH-08	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	B223175	<5.0	5.0	B223187
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	B223175	<0.10	0.10	B223187
Dissolved Calcium (Ca)	mg/L	46.0	24.7	B220184	12.1	0.050	B220184
Dissolved Magnesium (Mg)	mg/L	7.35	4.00	B220184	1.73	0.050	B220184
Dissolved Potassium (K)	mg/L	0.467	0.254	B220184	0.178	0.050	B220184
Dissolved Sodium (Na)	mg/L	5.88	3.84	B220184	1.05	0.050	B220184
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	B220184	<3.0	3.0	B220184
RDL = Reportable Detection Limit							



**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		CFS923	CFS924		
Sampling Date		2023/11/28 16:30	2023/11/29 09:45		
COC Number		705547-03-01	705547-03-01		
	UNITS	WG-11222680-281123 -KH-09	WG-11222680-291123 -KH-10	RDL	QC Batch
<b>Calculated Parameters</b>					
Dissolved Hardness (CaCO3)	mg/L	145	44.7	0.50	B220055
<b>Elements</b>					
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	0.0019	B223962
<b>Dissolved Metals by ICPMS</b>					
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	3.0	B223187
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	0.50	B223187
Dissolved Arsenic (As)	ug/L	0.14	<0.10	0.10	B223187
Dissolved Barium (Ba)	ug/L	13.2	<1.0	1.0	B223187
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	0.10	B223187
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	B223187
Dissolved Boron (B)	ug/L	<50	<50	50	B223187
Dissolved Cadmium (Cd)	ug/L	0.012	<0.010	0.010	B223187
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	1.0	B223187
Dissolved Cobalt (Co)	ug/L	<0.20	<0.20	0.20	B223187
Dissolved Copper (Cu)	ug/L	0.45	<0.20	0.20	B223187
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	5.0	B223187
Dissolved Lead (Pb)	ug/L	<0.20	<0.20	0.20	B223187
Dissolved Lithium (Li)	ug/L	<2.0	<2.0	2.0	B223187
Dissolved Manganese (Mn)	ug/L	15.7	<1.0	1.0	B223187
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	1.0	B223187
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	1.0	B223187
Dissolved Phosphorus (P)	ug/L	<10	<10	10	B223187
Dissolved Selenium (Se)	ug/L	<0.10	0.13	0.10	B223187
Dissolved Silicon (Si)	ug/L	14500	7420	100	B223187
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	0.020	B223187
Dissolved Strontium (Sr)	ug/L	98.7	24.8	1.0	B223187
Dissolved Thallium (Tl)	ug/L	<0.010	<0.010	0.010	B223187
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	5.0	B223187
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	5.0	B223187
Dissolved Uranium (U)	ug/L	<0.10	<0.10	0.10	B223187
Dissolved Vanadium (V)	ug/L	<5.0	<5.0	5.0	B223187
RDL = Reportable Detection Limit					



Bureau Veritas Job #: C397797  
 Report Date: 2023/12/07

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

**CSR D. METALS W/CV HG-DISS (WATER)**

Bureau Veritas ID		CFS923	CFS924		
Sampling Date		2023/11/28 16:30	2023/11/29 09:45		
COC Number		705547-03-01	705547-03-01		
	UNITS	WG-11222680-281123 -KH-09	WG-11222680-291123 -KH-10	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	5.0	B223187
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	0.10	B223187
Dissolved Calcium (Ca)	mg/L	35.7	12.8	0.050	B220184
Dissolved Magnesium (Mg)	mg/L	13.5	3.07	0.050	B220184
Dissolved Potassium (K)	mg/L	1.04	0.175	0.050	B220184
Dissolved Sodium (Na)	mg/L	26.9	6.77	0.050	B220184
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	3.0	B220184
RDL = Reportable Detection Limit					



**CSR VOC + VPH IN WATER (WATER)**

Bureau Veritas ID		CFS926	CFS926		
Sampling Date		2023/11/28	2023/11/28		
COC Number		705547-03-01	705547-03-01		
	UNITS	TRIP BLANK	TRIP BLANK Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>					
VPH (VHW6 to 10 - BTEX)	ug/L	<300	N/A	300	B219721
<b>Volatiles</b>					
VH C6-C10	ug/L	<300	<300	300	B222071
Benzene	ug/L	<0.40	<0.40	0.40	B222071
Ethylbenzene	ug/L	<0.40	<0.40	0.40	B222071
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	B222071
Styrene	ug/L	<0.50	<0.50	0.50	B222071
Toluene	ug/L	<0.40	<0.40	0.40	B222071
m & p-Xylene	ug/L	<0.40	<0.40	0.40	B222071
o-Xylene	ug/L	<0.40	<0.40	0.40	B222071
Xylenes (Total)	ug/L	<0.40	<0.40	0.40	B222071
<b>Surrogate Recovery (%)</b>					
1,4-Difluorobenzene (sur.)	%	102	102	N/A	B222071
4-Bromofluorobenzene (sur.)	%	96	95	N/A	B222071
D4-1,2-Dichloroethane (sur.)	%	80	79	N/A	B222071
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					



BUREAU  
VERITAS

Bureau Veritas Job #: C397797

Report Date: 2023/12/07

GHD Limited

Client Project #: 11222680-15.1

Site Location: NEW LANDFILL-UPLAND LANDFILL

Your P.O. #: 735-002640-4

Sampler Initials: KH

## GENERAL COMMENTS

Results relate only to the items tested.





Bureau Veritas Job #: C397797  
 Report Date: 2023/12/07

### QUALITY ASSURANCE REPORT

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B220357	1,4-Difluorobenzene (sur.)	2023/12/01	94	70 - 130	96	70 - 130	98	%		
B220357	4-Bromofluorobenzene (sur.)	2023/12/01	105	70 - 130	105	70 - 130	104	%		
B220357	D4-1,2-Dichloroethane (sur.)	2023/12/01	100	70 - 130	101	70 - 130	104	%		
B222071	1,4-Difluorobenzene (sur.)	2023/12/04	100 (11)	50 - 140	100	50 - 140	102	%		
B222071	4-Bromofluorobenzene (sur.)	2023/12/04	105 (11)	50 - 140	105	50 - 140	97	%		
B222071	D4-1,2-Dichloroethane (sur.)	2023/12/04	78 (11)	50 - 140	77	50 - 140	78	%		
B222170	D10-ANTHRACENE (sur.)	2023/12/04			90	50 - 140	84	%		
B222170	D8-ACENAPHTHYLENE (sur.)	2023/12/04			82	50 - 140	80	%		
B222170	D8-NAPHTHALENE (sur.)	2023/12/04			77	50 - 140	75	%		
B222170	TERPHENYL-D14 (sur.)	2023/12/04			76	50 - 140	73	%		
B222174	O-TERPHENYL (sur.)	2023/12/04			98	60 - 140	100	%		
B224439	2,4,6-TRIBROMOPHENOL (sur.)	2023/12/06			109	60 - 130	101	%		
B224439	2,4-DIBROMOPHENOL (sur.)	2023/12/06			96	60 - 130	93	%		
B224440	2,4,6-TRIBROMOPHENOL (sur.)	2023/12/06			109	60 - 130	101	%		
B224440	2,4-DIBROMOPHENOL (sur.)	2023/12/06			96	60 - 130	93	%		
B220019	Orthophosphate (P)	2023/12/01	NC	80 - 120	100	80 - 120	<0.0030	mg/L	2.3 (1)	20
B220137	Biochemical Oxygen Demand	2023/12/06			101	85 - 115	<2.0 (2)	mg/L	4.9 (1)	20
B220197	Total Suspended Solids	2023/12/02	100	80 - 120	101	80 - 120	<1.0	mg/L	NC (1)	20
B220245	Chloride (Cl)	2023/12/01	104	80 - 120	102	80 - 120	<1.0	mg/L	2.8 (1)	20
B220245	Sulphate (SO4)	2023/12/01	NC	80 - 120	99	80 - 120	<1.0	mg/L	0.87 (1)	20
B220357	Benzene	2023/12/01	98	70 - 130	100	70 - 130	<0.40	ug/L	5.0 (1)	30
B220357	Ethylbenzene	2023/12/01	113	70 - 130	106	70 - 130	<0.40	ug/L	NC (1)	30
B220357	m & p-Xylene	2023/12/01	111	70 - 130	106	70 - 130	<0.40	ug/L	NC (1)	30
B220357	Methyl-tert-butylether (MTBE)	2023/12/01	100	70 - 130	98	70 - 130	<4.0	ug/L	NC (1)	30
B220357	o-Xylene	2023/12/01	112	70 - 130	106	70 - 130	<0.40	ug/L	NC (1)	30
B220357	Styrene	2023/12/01	113	70 - 130	106	70 - 130	<0.40	ug/L	NC (1)	30
B220357	Toluene	2023/12/01	104	70 - 130	101	70 - 130	<0.40	ug/L	NC (1)	30
B220357	VH C6-C10	2023/12/01			82	70 - 130	<300	ug/L	NC (1)	30
B220357	Xylenes (Total)	2023/12/01					<0.40	ug/L	NC (1)	30
B220389	Alkalinity (PP as CaCO3)	2023/12/01					<1.0	mg/L	NC (3)	20
B220389	Alkalinity (Total as CaCO3)	2023/12/01			99	80 - 120	<1.0	mg/L	0.31 (3)	20



Bureau Veritas Job #: C397797  
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**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B220389	Bicarbonate (HCO3)	2023/12/01					<1.0	mg/L	0.31 (3)	20
B220389	Carbonate (CO3)	2023/12/01					<1.0	mg/L	NC (3)	20
B220389	Hydroxide (OH)	2023/12/01					<1.0	mg/L	NC (3)	20
B220393	pH	2023/12/01			100	97 - 103			0.31 (3)	N/A
B220395	Conductivity	2023/12/01			102	90 - 110	<2.0	uS/cm		
B220589	Total Dissolved Solids	2023/12/02	101 (4)	80 - 120	100	80 - 120	<10	mg/L	0 (5)	20
B220590	Chloride (Cl)	2023/12/01	106 (6)	80 - 120	95	80 - 120	<1.0	mg/L	0.71 (5)	20
B220590	Sulphate (SO4)	2023/12/01	106 (6)	80 - 120	97	80 - 120	<1.0	mg/L	3.1 (5)	20
B220649	Nitrate plus Nitrite (N)	2023/12/01	NC (7)	80 - 120	110	80 - 120	<0.020	mg/L	0.033 (8)	25
B220651	Nitrite (N)	2023/12/01	106 (7)	80 - 120	106	80 - 120	<0.0050	mg/L	NC (8)	20
B220735	Dissolved Fluoride (F)	2023/12/02	98 (9)	80 - 120	101	80 - 120	<0.050	mg/L	NC (10)	20
B221831	Total Aluminum (Al)	2023/12/04	NC	80 - 120	99	80 - 120	<3.0	ug/L	0.82 (1)	20
B221831	Total Antimony (Sb)	2023/12/04	101	80 - 120	101	80 - 120	<0.50	ug/L	NC (1)	20
B221831	Total Arsenic (As)	2023/12/04	104	80 - 120	99	80 - 120	<0.10	ug/L	1.7 (1)	20
B221831	Total Barium (Ba)	2023/12/04	100	80 - 120	99	80 - 120	<1.0	ug/L	1.5 (1)	20
B221831	Total Beryllium (Be)	2023/12/04	91	80 - 120	96	80 - 120	<0.10	ug/L	1.4 (1)	20
B221831	Total Bismuth (Bi)	2023/12/04	93	80 - 120	96	80 - 120	<1.0	ug/L	NC (1)	20
B221831	Total Boron (B)	2023/12/04	85	80 - 120	101	80 - 120	<50	ug/L	11 (1)	20
B221831	Total Cadmium (Cd)	2023/12/04	NC	80 - 120	99	80 - 120	<0.010	ug/L	1.1 (1)	20
B221831	Total Chromium (Cr)	2023/12/04	89	80 - 120	93	80 - 120	<1.0	ug/L	NC (1)	20
B221831	Total Cobalt (Co)	2023/12/04	NC	80 - 120	94	80 - 120	<0.20	ug/L	2.5 (1)	20
B221831	Total Copper (Cu)	2023/12/04	85	80 - 120	93	80 - 120	<0.50	ug/L	0.65 (1)	20
B221831	Total Iron (Fe)	2023/12/04	NC	80 - 120	102	80 - 120	<10	ug/L	0.50 (1)	20
B221831	Total Lead (Pb)	2023/12/04	96	80 - 120	97	80 - 120	<0.20	ug/L	NC (1)	20
B221831	Total Lithium (Li)	2023/12/04	NC	80 - 120	104	80 - 120	<2.0	ug/L	1.7 (1)	20
B221831	Total Manganese (Mn)	2023/12/04	NC	80 - 120	97	80 - 120	<1.0	ug/L	0.91 (1)	20
B221831	Total Molybdenum (Mo)	2023/12/04	104	80 - 120	100	80 - 120	<1.0	ug/L	NC (1)	20
B221831	Total Nickel (Ni)	2023/12/04	NC	80 - 120	96	80 - 120	<1.0	ug/L	1.2 (1)	20
B221831	Total Phosphorus (P)	2023/12/04	105	80 - 120	100	80 - 120	<10	ug/L	NC (1)	20
B221831	Total Selenium (Se)	2023/12/04	104	80 - 120	100	80 - 120	<0.10	ug/L	0.41 (1)	20
B221831	Total Silicon (Si)	2023/12/04	NC	80 - 120	114	80 - 120	<100	ug/L	0.029 (1)	20



Bureau Veritas Job #: C397797  
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**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B221831	Total Silver (Ag)	2023/12/04	93	80 - 120	99	80 - 120	<0.020	ug/L	NC (1)	20
B221831	Total Strontium (Sr)	2023/12/04	NC	80 - 120	96	80 - 120	<1.0	ug/L	0.074 (1)	20
B221831	Total Thallium (Tl)	2023/12/04	97	80 - 120	96	80 - 120	<0.010	ug/L	0.063 (1)	20
B221831	Total Tin (Sn)	2023/12/04	98	80 - 120	100	80 - 120	<5.0	ug/L	NC (1)	20
B221831	Total Titanium (Ti)	2023/12/04	100	80 - 120	99	80 - 120	<5.0	ug/L	NC (1)	20
B221831	Total Uranium (U)	2023/12/04	105	80 - 120	100	80 - 120	<0.10	ug/L	1.8 (1)	20
B221831	Total Vanadium (V)	2023/12/04	94	80 - 120	95	80 - 120	<5.0	ug/L	NC (1)	20
B221831	Total Zinc (Zn)	2023/12/04	NC	80 - 120	98	80 - 120	<5.0	ug/L	1.4 (1)	20
B221831	Total Zirconium (Zr)	2023/12/04	105	80 - 120	98	80 - 120	<0.10	ug/L	NC (1)	20
B221929	Total Sulphide	2023/12/05	90	80 - 120	106	80 - 120	<0.0018	mg/L	NC (1)	20
B222071	Benzene	2023/12/05	114 (11)	50 - 140	111	60 - 130	<0.40	ug/L	NC (12)	30
B222071	Ethylbenzene	2023/12/05	117 (11)	50 - 140	115	60 - 130	<0.40	ug/L	NC (12)	30
B222071	m & p-Xylene	2023/12/05	101 (11)	50 - 140	99	60 - 130	<0.40	ug/L	NC (12)	30
B222071	Methyl-tert-butylether (MTBE)	2023/12/05	110 (11)	50 - 140	106	60 - 130	<4.0	ug/L	NC (12)	30
B222071	o-Xylene	2023/12/05	119 (11)	50 - 140	117	60 - 130	<0.40	ug/L	NC (12)	30
B222071	Styrene	2023/12/05	98 (11)	50 - 140	96	60 - 130	<0.50	ug/L	NC (12)	30
B222071	Toluene	2023/12/05	116 (11)	50 - 140	115	60 - 130	<0.40	ug/L	NC (12)	30
B222071	VH C6-C10	2023/12/05			87	70 - 130	<300	ug/L	NC (12)	30
B222071	Xylenes (Total)	2023/12/05					<0.40	ug/L	NC (12)	30
B222170	Acenaphthene	2023/12/05			82	50 - 140	<0.050	ug/L	7.8 (1)	40
B222170	Acridine	2023/12/05			93	50 - 140	<0.050	ug/L	6.4 (1)	40
B222170	Anthracene	2023/12/05			85	50 - 140	<0.010	ug/L	4.7 (1)	40
B222170	Benzo(a)anthracene	2023/12/05			68	50 - 140	<0.010	ug/L	NC (1)	40
B222170	Benzo(a)pyrene	2023/12/05			83	50 - 140	<0.0050	ug/L	NC (1)	40
B222170	Fluoranthene	2023/12/05			65	50 - 140	<0.020	ug/L	6.8 (1)	40
B222170	Fluorene	2023/12/05			82	50 - 140	<0.050	ug/L	8.8 (1)	40
B222170	Naphthalene	2023/12/05			79	50 - 140	<0.10	ug/L	9.6 (1)	40
B222170	Phenanthrene	2023/12/05			86	50 - 140	<0.050	ug/L	7.4 (1)	40
B222170	Pyrene	2023/12/05			76	50 - 140	<0.020	ug/L	7.5 (1)	40
B222174	EPH (C10-C19)	2023/12/04			91	70 - 130	<0.20	mg/L	NC (1)	30
B222174	EPH (C19-C32)	2023/12/04			92	70 - 130	<0.20	mg/L	NC (1)	30



**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B22249	Chemical Oxygen Demand	2023/12/04	NC	80 - 120	102	80 - 120	<10	mg/L	0.85 (1)	20
B222471	Dissolved Calcium (Ca)	2023/12/04	95 (13)	80 - 120	98	80 - 120	<0.050	mg/L	0.54 (14)	20
B222471	Dissolved Magnesium (Mg)	2023/12/04	94 (13)	80 - 120	95	80 - 120	<0.050	mg/L	0.71 (14)	20
B223175	Dissolved Aluminum (Al)	2023/12/05	105	80 - 120	103	80 - 120	<3.0	ug/L	NC (1)	20
B223175	Dissolved Antimony (Sb)	2023/12/05	106	80 - 120	101	80 - 120	<0.50	ug/L	NC (1)	20
B223175	Dissolved Arsenic (As)	2023/12/05	109	80 - 120	102	80 - 120	<0.10	ug/L	0.60 (1)	20
B223175	Dissolved Barium (Ba)	2023/12/05	NC	80 - 120	101	80 - 120	<1.0	ug/L	0.056 (1)	20
B223175	Dissolved Beryllium (Be)	2023/12/05	106	80 - 120	105	80 - 120	<0.10	ug/L	NC (1)	20
B223175	Dissolved Bismuth (Bi)	2023/12/05	100	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
B223175	Dissolved Boron (B)	2023/12/05	109	80 - 120	115	80 - 120	<50	ug/L	NC (1)	20
B223175	Dissolved Cadmium (Cd)	2023/12/05	102	80 - 120	101	80 - 120	<0.010	ug/L	NC (1)	20
B223175	Dissolved Chromium (Cr)	2023/12/05	100	80 - 120	100	80 - 120	<1.0	ug/L	NC (1)	20
B223175	Dissolved Cobalt (Co)	2023/12/05	97	80 - 120	98	80 - 120	<0.20	ug/L	3.8 (1)	20
B223175	Dissolved Copper (Cu)	2023/12/05	95	80 - 120	98	80 - 120	<0.20	ug/L	NC (1)	20
B223175	Dissolved Iron (Fe)	2023/12/05	NC	80 - 120	104	80 - 120	<5.0	ug/L	0.59 (1)	20
B223175	Dissolved Lead (Pb)	2023/12/05	102	80 - 120	101	80 - 120	<0.20	ug/L	NC (1)	20
B223175	Dissolved Lithium (Li)	2023/12/05	104	80 - 120	104	80 - 120	<2.0	ug/L	NC (1)	20
B223175	Dissolved Manganese (Mn)	2023/12/05	NC	80 - 120	102	80 - 120	<1.0	ug/L	0.083 (1)	20
B223175	Dissolved Molybdenum (Mo)	2023/12/05	107	80 - 120	102	80 - 120	<1.0	ug/L	4.2 (1)	20
B223175	Dissolved Nickel (Ni)	2023/12/05	100	80 - 120	101	80 - 120	<1.0	ug/L	1.1 (1)	20
B223175	Dissolved Phosphorus (P)	2023/12/05	112	80 - 120	102	80 - 120	<10	ug/L	0.33 (1)	20
B223175	Dissolved Selenium (Se)	2023/12/05	110	80 - 120	103	80 - 120	<0.10	ug/L	NC (1)	20
B223175	Dissolved Silicon (Si)	2023/12/05	NC	80 - 120	118	80 - 120	<100	ug/L	1.8 (1)	20
B223175	Dissolved Silver (Ag)	2023/12/05	96	80 - 120	102	80 - 120	<0.020	ug/L	NC (1)	20
B223175	Dissolved Strontium (Sr)	2023/12/05	NC	80 - 120	102	80 - 120	<1.0	ug/L	1.3 (1)	20
B223175	Dissolved Thallium (Tl)	2023/12/05	103	80 - 120	102	80 - 120	<0.010	ug/L	NC (1)	20
B223175	Dissolved Tin (Sn)	2023/12/05	104	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
B223175	Dissolved Titanium (Ti)	2023/12/05	104	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
B223175	Dissolved Uranium (U)	2023/12/05	110	80 - 120	105	80 - 120	<0.10	ug/L	0.62 (1)	20
B223175	Dissolved Vanadium (V)	2023/12/05	104	80 - 120	101	80 - 120	<5.0	ug/L	NC (1)	20
B223175	Dissolved Zinc (Zn)	2023/12/05	96	80 - 120	103	80 - 120	<5.0	ug/L	NC (1)	20



Bureau Veritas Job #: C397797  
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**QUALITY ASSURANCE REPORT(CONT'D)**

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 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B223175	Dissolved Zirconium (Zr)	2023/12/05	110	80 - 120	100	80 - 120	<0.10	ug/L	NC (1)	20
B223187	Dissolved Aluminum (Al)	2023/12/05	101	80 - 120	103	80 - 120	<3.0	ug/L	NC (1)	20
B223187	Dissolved Antimony (Sb)	2023/12/05	102	80 - 120	103	80 - 120	<0.50	ug/L	NC (1)	20
B223187	Dissolved Arsenic (As)	2023/12/05	104	80 - 120	103	80 - 120	<0.10	ug/L	0.50 (1)	20
B223187	Dissolved Barium (Ba)	2023/12/05	NC	80 - 120	101	80 - 120	<1.0	ug/L	2.9 (1)	20
B223187	Dissolved Beryllium (Be)	2023/12/05	100	80 - 120	99	80 - 120	<0.10	ug/L	NC (1)	20
B223187	Dissolved Bismuth (Bi)	2023/12/05	97	80 - 120	100	80 - 120	<1.0	ug/L	NC (1)	20
B223187	Dissolved Boron (B)	2023/12/05	105	80 - 120	105	80 - 120	<50	ug/L	NC (1)	20
B223187	Dissolved Cadmium (Cd)	2023/12/05	99	80 - 120	101	80 - 120	<0.010	ug/L	6.8 (1)	20
B223187	Dissolved Chromium (Cr)	2023/12/05	97	80 - 120	100	80 - 120	<1.0	ug/L	NC (1)	20
B223187	Dissolved Cobalt (Co)	2023/12/05	94	80 - 120	98	80 - 120	<0.20	ug/L	NC (1)	20
B223187	Dissolved Copper (Cu)	2023/12/05	92	80 - 120	98	80 - 120	<0.20	ug/L	0.14 (1)	20
B223187	Dissolved Iron (Fe)	2023/12/05	101	80 - 120	103	80 - 120	<5.0	ug/L	NC (1)	20
B223187	Dissolved Lead (Pb)	2023/12/05	98	80 - 120	100	80 - 120	<0.20	ug/L	NC (1)	20
B223187	Dissolved Lithium (Li)	2023/12/05	98	80 - 120	102	80 - 120	<2.0	ug/L	NC (1)	20
B223187	Dissolved Manganese (Mn)	2023/12/05	98	80 - 120	102	80 - 120	<1.0	ug/L	2.2 (1)	20
B223187	Dissolved Molybdenum (Mo)	2023/12/05	103	80 - 120	101	80 - 120	<1.0	ug/L	0.66 (1)	20
B223187	Dissolved Nickel (Ni)	2023/12/05	95	80 - 120	101	80 - 120	<1.0	ug/L	NC (1)	20
B223187	Dissolved Phosphorus (P)	2023/12/05	107	80 - 120	102	80 - 120	<10	ug/L	0.053 (1)	20
B223187	Dissolved Selenium (Se)	2023/12/05	103	80 - 120	100	80 - 120	<0.10	ug/L	0.15 (1)	20
B223187	Dissolved Silicon (Si)	2023/12/05	NC	80 - 120	114	80 - 120	<100	ug/L	2.1 (1)	20
B223187	Dissolved Silver (Ag)	2023/12/05	98	80 - 120	102	80 - 120	<0.020	ug/L	NC (1)	20
B223187	Dissolved Strontium (Sr)	2023/12/05	NC	80 - 120	103	80 - 120	<1.0	ug/L	1.9 (1)	20
B223187	Dissolved Thallium (Tl)	2023/12/05	100	80 - 120	100	80 - 120	<0.010	ug/L	3.3 (1)	20
B223187	Dissolved Tin (Sn)	2023/12/05	100	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
B223187	Dissolved Titanium (Ti)	2023/12/05	101	80 - 120	102	80 - 120	<5.0	ug/L	NC (1)	20
B223187	Dissolved Uranium (U)	2023/12/05	104	80 - 120	104	80 - 120	<0.10	ug/L	2.1 (1)	20
B223187	Dissolved Vanadium (V)	2023/12/05	100	80 - 120	103	80 - 120	<5.0	ug/L	NC (1)	20
B223187	Dissolved Zinc (Zn)	2023/12/05	94	80 - 120	103	80 - 120	<5.0	ug/L	0.012 (1)	20
B223187	Dissolved Zirconium (Zr)	2023/12/05	103	80 - 120	101	80 - 120	<0.10	ug/L	NC (1)	20
B223595	Total Ammonia (N)	2023/12/05	9.9 (15)	80 - 120	100	80 - 120	<0.015	mg/L	1.4 (1)	20



Bureau Veritas Job #: C397797  
 Report Date: 2023/12/07

**QUALITY ASSURANCE REPORT(CONT'D)**

GHD Limited  
 Client Project #: 11222680-15.1  
 Site Location: NEW LANDFILL-UPLAND LANDFILL  
 Your P.O. #: 735-002640-4  
 Sampler Initials: KH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B223930	Total Mercury (Hg)	2023/12/05	104	80 - 120	110	80 - 120	<0.0019	ug/L	NC (1)	20
B223962	Dissolved Mercury (Hg)	2023/12/05	100	80 - 120	105	80 - 120	<0.0019	ug/L	NC (1)	20
B224439	2,3,4,5-tetrachlorophenol	2023/12/06			100	60 - 130	<0.10	ug/L		
B224439	2,3,4,6-tetrachlorophenol	2023/12/06			83	60 - 130	<0.10	ug/L		
B224439	2,3,4-trichlorophenol	2023/12/06			82	60 - 130	<0.10	ug/L		
B224439	2,3,5,6-tetrachlorophenol	2023/12/06			84	60 - 130	<0.10	ug/L		
B224439	2,3,5-trichlorophenol	2023/12/06			84	60 - 130	<0.10	ug/L		
B224439	2,3,6-Trichlorophenol	2023/12/06			75	60 - 130	<0.10	ug/L		
B224439	2,3-Dichlorophenol	2023/12/06			76	60 - 130	<0.10	ug/L		
B224439	2,4 + 2,5-Dichlorophenol	2023/12/06			74	60 - 130	<0.10	ug/L		
B224439	2,4,5-trichlorophenol	2023/12/06			84	60 - 130	<0.10	ug/L		
B224439	2,4,6-trichlorophenol	2023/12/06			75	60 - 130	<0.10	ug/L		
B224439	2,6-dichlorophenol	2023/12/06			72	60 - 130	<0.10	ug/L		
B224439	2-chlorophenol	2023/12/06			62	60 - 130	<0.080	ug/L		
B224439	3 & 4-chlorophenol	2023/12/06			84	60 - 130	<0.080	ug/L		
B224439	3,4,5-Trichlorophenol	2023/12/06			88	60 - 130	<0.10	ug/L		
B224439	3,4-Dichlorophenol	2023/12/06			91	60 - 130	<0.10	ug/L		
B224439	3,5-Dichlorophenol	2023/12/06			95	60 - 130	<0.10	ug/L		
B224439	4-Chloro-3-Methylphenol	2023/12/06			80	60 - 130	<1.0	ug/L		
B224439	Pentachlorophenol	2023/12/06			89	60 - 130	<0.10	ug/L		
B224440	2,4-dimethylphenol	2023/12/06			128	60 - 130	<0.50	ug/L		
B224440	2,4-dinitrophenol	2023/12/06			96	30 - 130	<0.50	ug/L		
B224440	2,6-Dimethylphenol	2023/12/06			60	60 - 130	<0.50	ug/L		
B224440	2-Hydroxyphenol (Catechol)	2023/12/06			96	60 - 130	<10	ug/L		
B224440	2-methylphenol	2023/12/06			68	60 - 130	<0.50	ug/L		
B224440	2-nitrophenol	2023/12/06			53	30 - 130	<0.50	ug/L		
B224440	3 & 4-methylphenol	2023/12/06			70	60 - 130	<0.50	ug/L		
B224440	3,4-Dimethylphenol	2023/12/06			70	60 - 130	<0.50	ug/L		
B224440	3-Hydroxyphenol (Resorcinol)	2023/12/06			81	60 - 130	<10	ug/L		
B224440	4,6-dinitro-2-methylphenol	2023/12/06			85	30 - 130	<0.50	ug/L		
B224440	4-Hydroxyphenol (Hydroquinone)	2023/12/06			97	60 - 130	<1.0	ug/L		



**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B224440	4-nitrophenol	2023/12/06			102	30 - 130	<0.50	ug/L		
B224440	Phenol	2023/12/06			83	60 - 130	<0.50	ug/L		

N/A = Not Applicable

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

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

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

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Method blank exceeds 0.2 mg/L stipulated in Reference Method. No other Quality Control measures affected.

(3) Duplicate Parent ID [CFS925-01]

(4) Matrix Spike Parent ID [CFS922-01]

(5) Duplicate Parent ID [CFS921-01]

(6) Matrix Spike Parent ID [CFS921-01]

(7) Matrix Spike Parent ID [CFS920-01]

(8) Duplicate Parent ID [CFS920-01]

(9) Matrix Spike Parent ID [CFS933-01]

(10) Duplicate Parent ID [CFS932-01]

(11) Matrix Spike Parent ID [CFS926-01]

(12) Duplicate Parent ID [CFS926-01]

(13) Matrix Spike Parent ID [CFS932-06]

(14) Duplicate Parent ID [CFS932-06]

(15) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.





BUREAU  
VERITAS

Bureau Veritas Job #: C397797  
Report Date: 2023/12/07

GHD Limited  
Client Project #: 11222680-15.1  
Site Location: NEW LANDFILL-UPLAND LANDFILL  
Your P.O. #: 735-002640-4  
Sampler Initials: KH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

---

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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



Bureau Veritas  
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-free:800-563-6256 Fax:(604) 731 2386 www.bvna.com



C397797\_COC

Chain Of Custody Record  
Bottle Order #: 705547  
Project Manager: Brody Andersen

INVOICE TO:		Report Information		Project Information	
Company Name	#163 GHD Limited	Company Name		Quotation #	C30090
Contact Name	AP Invoices - 735	Contact Name	Stephanie Berton	P.O. #	735-002640-3
Address	455 PHILLIP STREET WATERLOO ON N2L 3X2	Address		Project #	11222680-15.1
Phone	(519) 884-0510 Fax: (519) 725-1394	Phone		Project Name	Upland Landfill
Email	APInvoices.735@ghd.com	Email	NationalEDDSupport@maxxam.ca, stephanie.berton@ghd.com	Site #	Groundwater
	invicing-canada@ghd.com			Requested By	K. Hasler, D. Tong

Regulatory Criteria:	Special Instructions	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required:			
<input type="checkbox"/> CSR	Bottles field filtered and preserved as indicated. Temp/pH field measurements will be sent via email.	Metals Field Filtered ? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, NH4, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness	Total Dissolved Solids (Filt. Residue)	LEPH/HEPH with subtracted PAHs	BOD, COD, TSS	Hardness	Regular (Standard) TAT: <input checked="" type="checkbox"/> Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
<input type="checkbox"/> CCME													Job Specific Rush TAT (if applies to entire submission) 1 DAY <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: _____		
<input type="checkbox"/> BC Water Quality														Rush Confirmation Number: _____ (call lab for #)	
<input type="checkbox"/> Other															

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, NH4, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Dissolved Metals with CV Hg, Hardness	Total Dissolved Solids (Filt. Residue)	LEPH/HEPH with subtracted PAHs	BOD, COD, TSS	Hardness	# of Bottles	Comments
1	WG-11222680-281123-KH-06	28/11/23	0930	W	Y	✓	✓	✓	✓	✓	✓	✓	✓			7	
2	WG-11222680-281123-KH-07	28/11/23	1445	W	Y	✓	✓	✓	✓	✓	✓	✓	✓			7	
3	WG-11222680-281123-KH-08	28/11/23	1500	W	Y	✓	✓	✓	✓	✓	✓	✓	✓			7	
4	WG-11222680-281123-KH-09	28/11/23	1630	W	Y	✓	✓	✓	✓	✓	✓	✓	✓			7	
5	WG-11222680-291123-KH-10	29/11/23	0945	W	Y	✓	✓	✓	✓	✓	✓	✓	✓			7	
6	WL-11222680-281123-KH-01	28/11/23	1445	W	Y	✓	✓	✓	✓	✓		✓	✓	✓			
7	TRIP BLANK (BTEX, VOC)																
8																	
9																	
10																	

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# Jars used and not submitted	Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Debra Tong	23/11/23	1130	Stephanie Berton	2023/11/30	1142		<input type="checkbox"/>	4.7.2	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.  
\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Ice packs: jfs



Bureau Veritas  
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-free:800-563-6266 Fax:(604) 731 2386 www.bvna.com

212



C397797\_COC

se Only

Bottle Order #:  
705548

Project Manager  
Brody Andersen

<b>INVOICE TO:</b> Company Name #163 GHD Limited Contact Name AP Invoices - 735 Address 455 PHILLIP STREET WATERLOO ON N2L 3X2 Phone: (519) 884-0510 Fax: (519) 725-1394 Email APInvoices-705@ghd.com		<b>Report Information</b> Company Name Contact Name <b>Stephanie Berton</b> Address Phone Fax:		<b>Project Information</b> Quotation # C30090 P.O. # 735-002640-3 Project # 11222680-15.1 Project Name <b>Upland Landfill</b> Site # Sampled by <b>K. Hasler, D. Tong</b>	
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<b>Regulatory Criteria:</b> <input type="checkbox"/> CSR <input type="checkbox"/> CCME <input type="checkbox"/> BC Water Quality <input type="checkbox"/> Other	<b>Special Instructions</b> Bottles were field filtered and preserved as indicated.	<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b> Conductivity, Cl, SO4, NO2, NO3, N-N, PO4 Speciated Alkalinity Sulphide + H2S Calc Sulphide, Un-ionized (as H2S) (Calc) Ammonia-N (Total) Total Suspended Solids (TSS) Total Metals with CV Hg Dissolved Hardness Field pH Field Temperature	<b>Turnaround Time (TAT) Required:</b> Please provide advance notice for rush projects <b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified). Standard TAT = 5-7 Working days for most tests. <input checked="" type="checkbox"/> Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. <b>Job Specific Rush TAT (if applies to entire submission)</b> 1 DAY <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> Date Required: <input type="checkbox"/> Rush Confirmation Number: _____ (call lab for it)
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SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

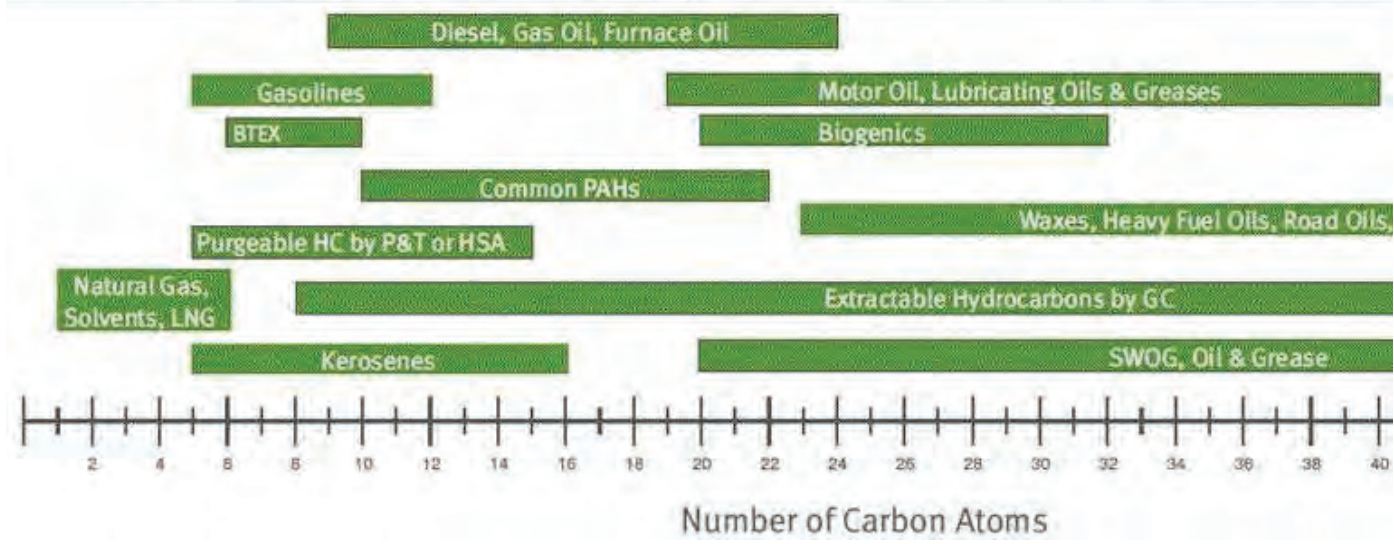
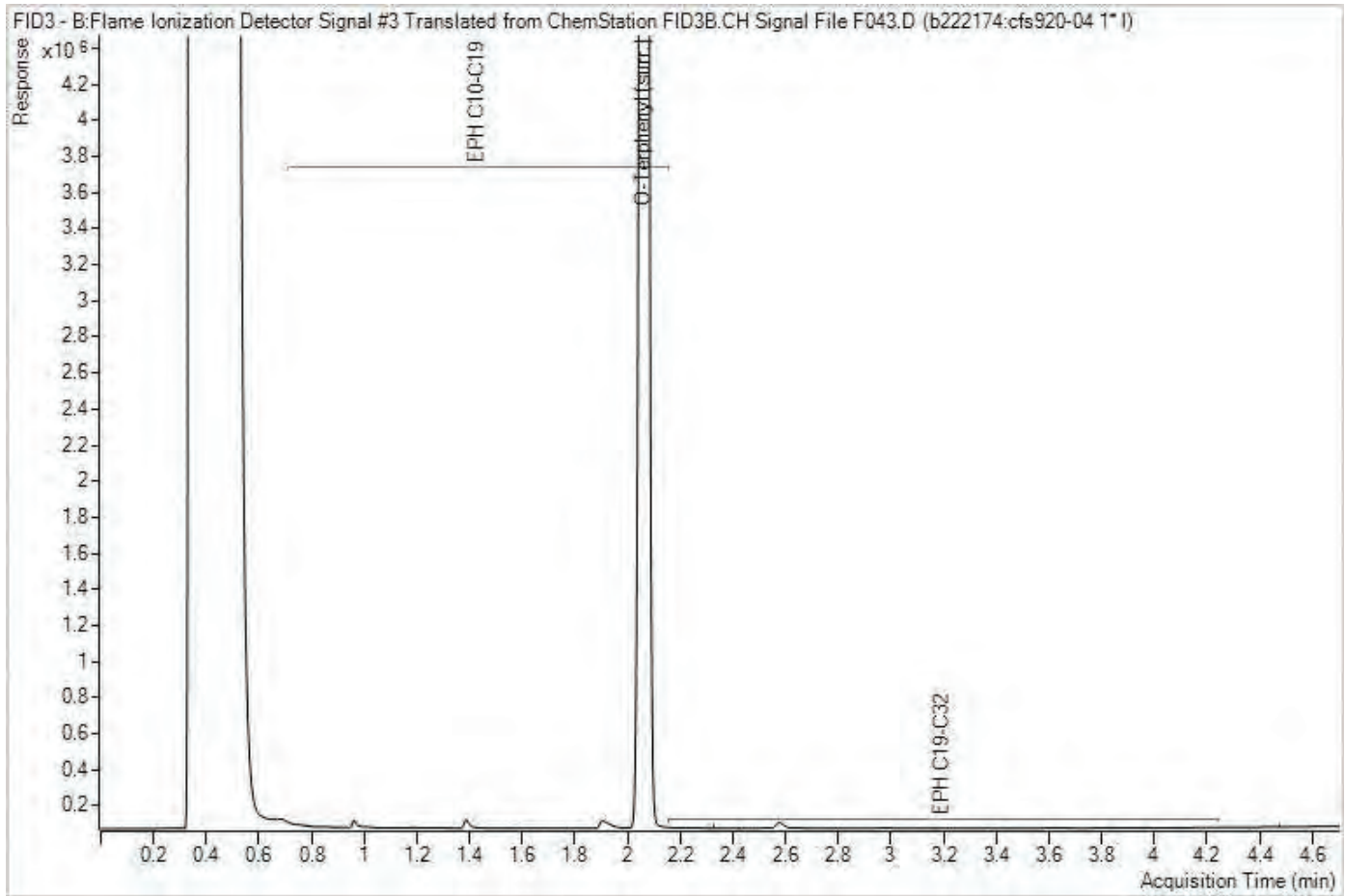
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Conductivity, Cl, SO4, NO2, NO3, N-N, PO4	Speciated Alkalinity	Sulphide + H2S Calc	Sulphide, Un-ionized (as H2S) (Calc)	Ammonia-N (Total)	Total Suspended Solids (TSS)	Total Metals with CV Hg	Dissolved Hardness	Field pH	Field Temperature	# of Bottles	Comments
1	WS-11222680-281123-KH-01	28/11/22	10 00	W	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2	LEPH/HEFH on hold
2	WS-11222680-281123-KH-02	28/11/22	10 30	W	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2	LEPH/HEFH on hold.
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

<b>RELINQUISHED BY: (Signature/Print)</b> Delora Tong	<b>Date: (YY/MM/DD)</b> 23/11/22	<b>Time</b> 11:30	<b>RECEIVED BY: (Signature/Print)</b> Ecolane Coiro	<b>Date: (YY/MM/DD)</b> 23/11/22	<b>Time</b> 11:42	<b># Jars used and not submitted</b> <input type="checkbox"/>	<b>Lab Use Only</b> Time Sensitive <input type="checkbox"/>	Temperature (°C) on Receipt 4.7, 2	Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	-------------------------------------	----------------------	--	-------------------------------------	----------------------	--	--	---------------------------------------	---

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.  
 \* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

ice packs: jfs

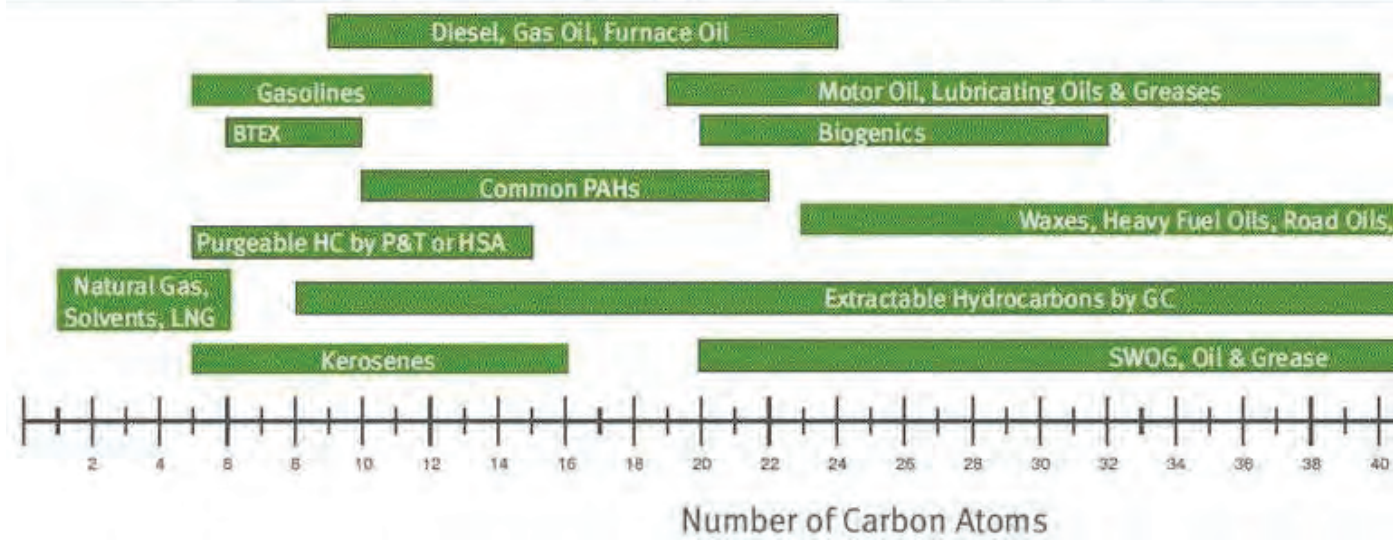
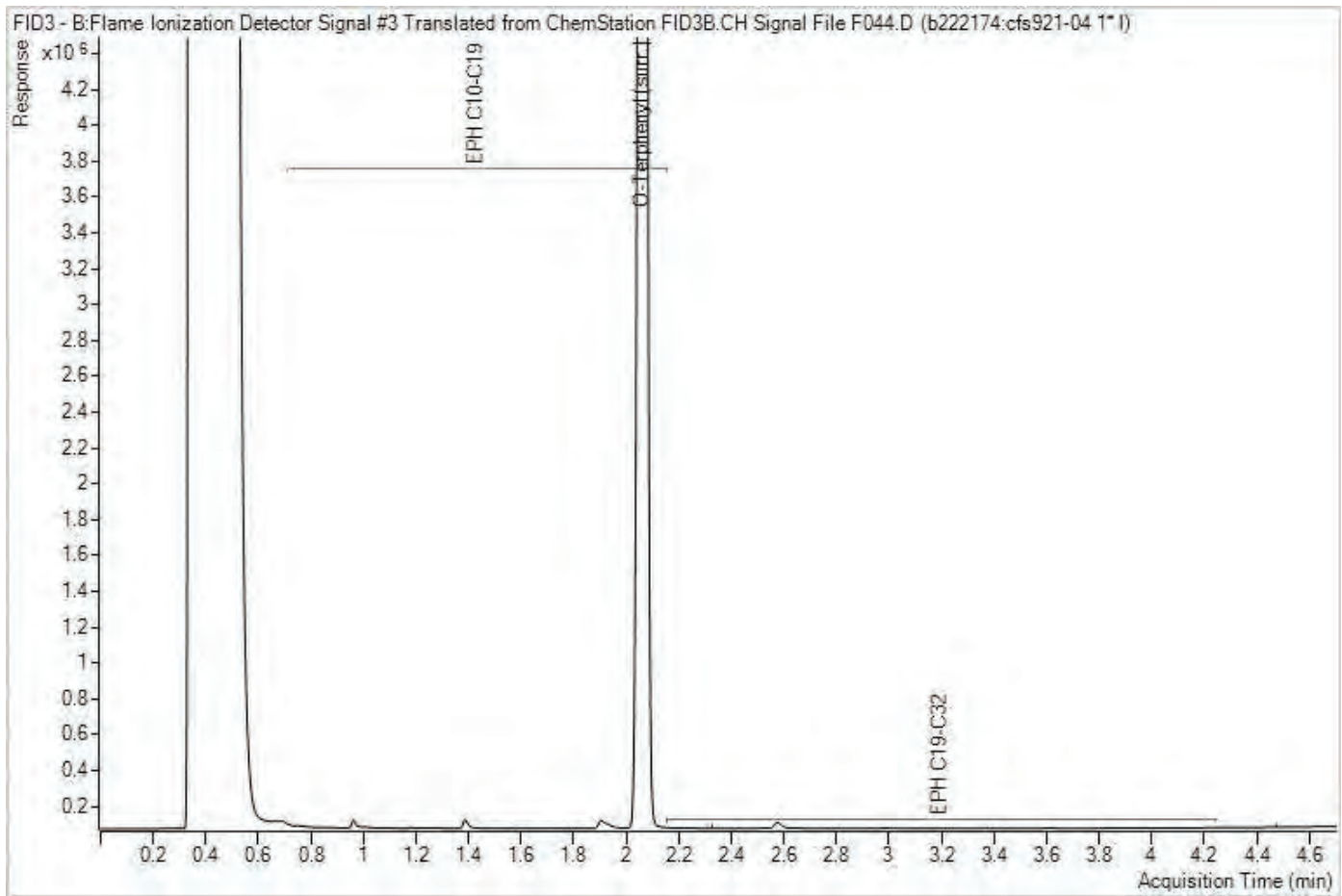
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

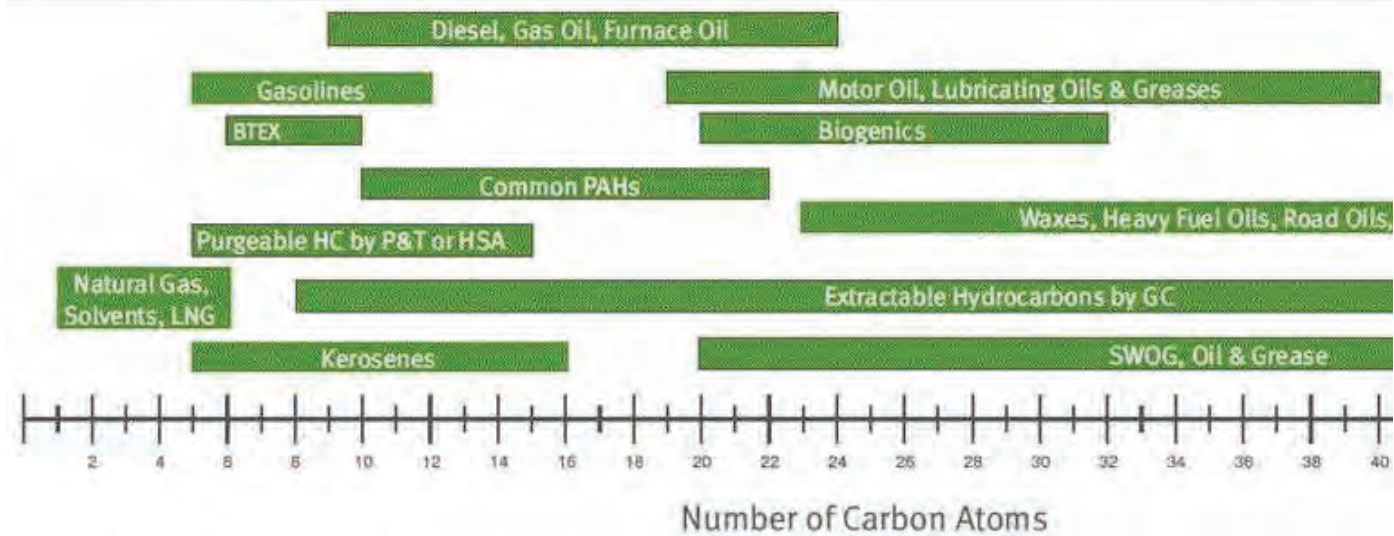
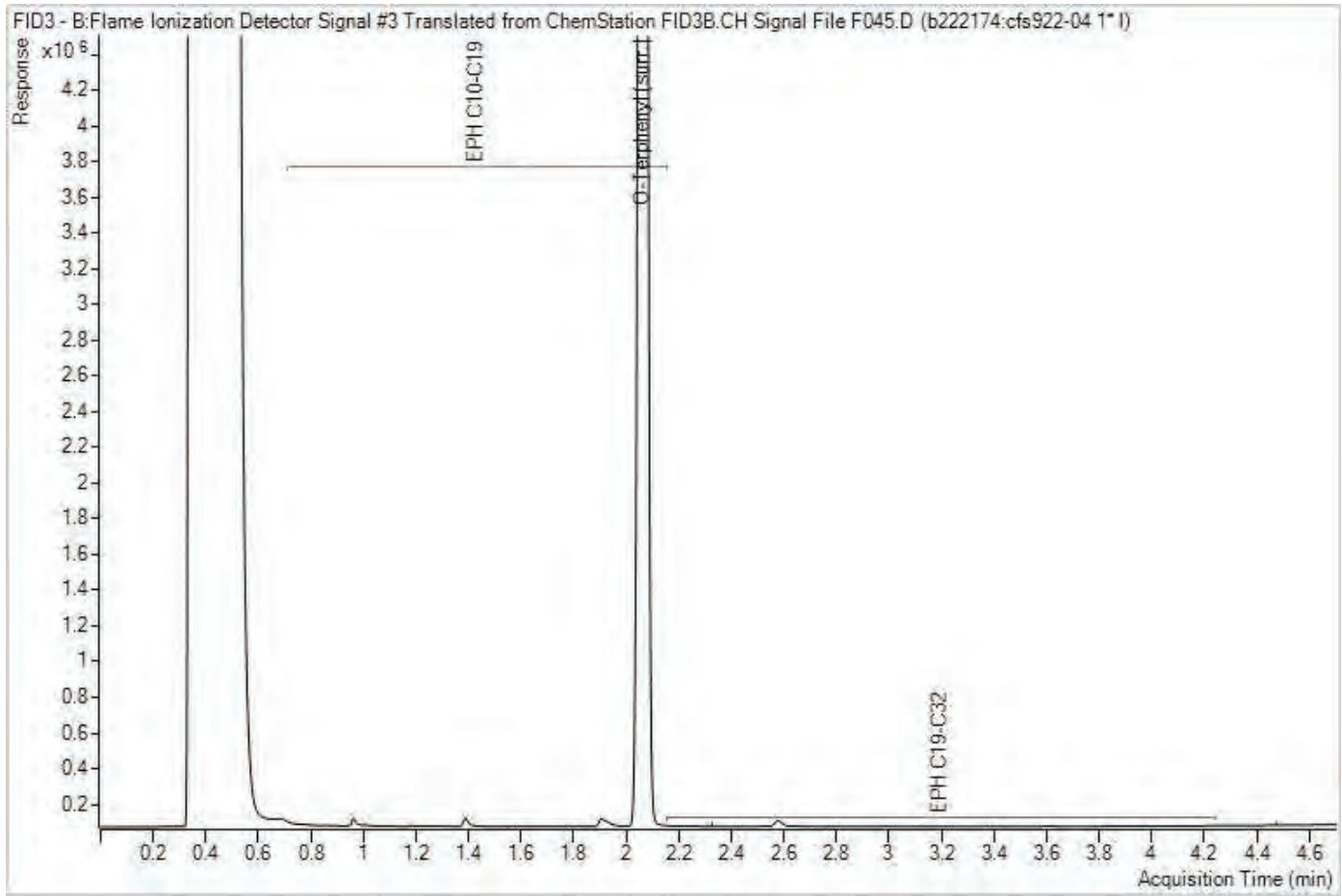


EPH in Water when PAH required Chromatogram



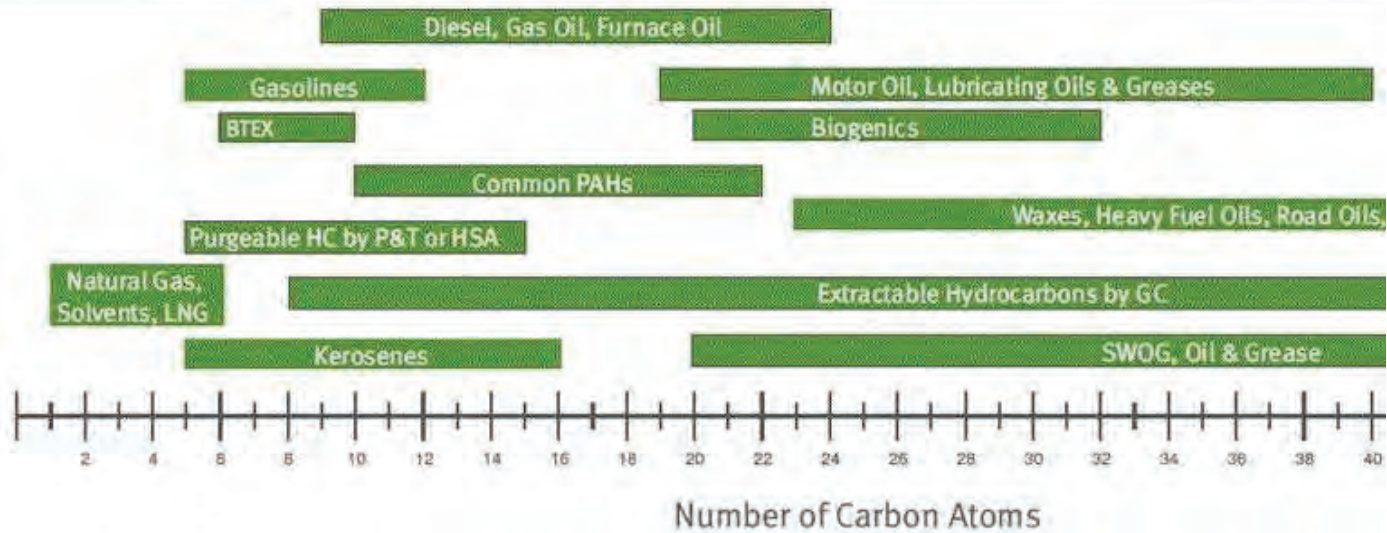
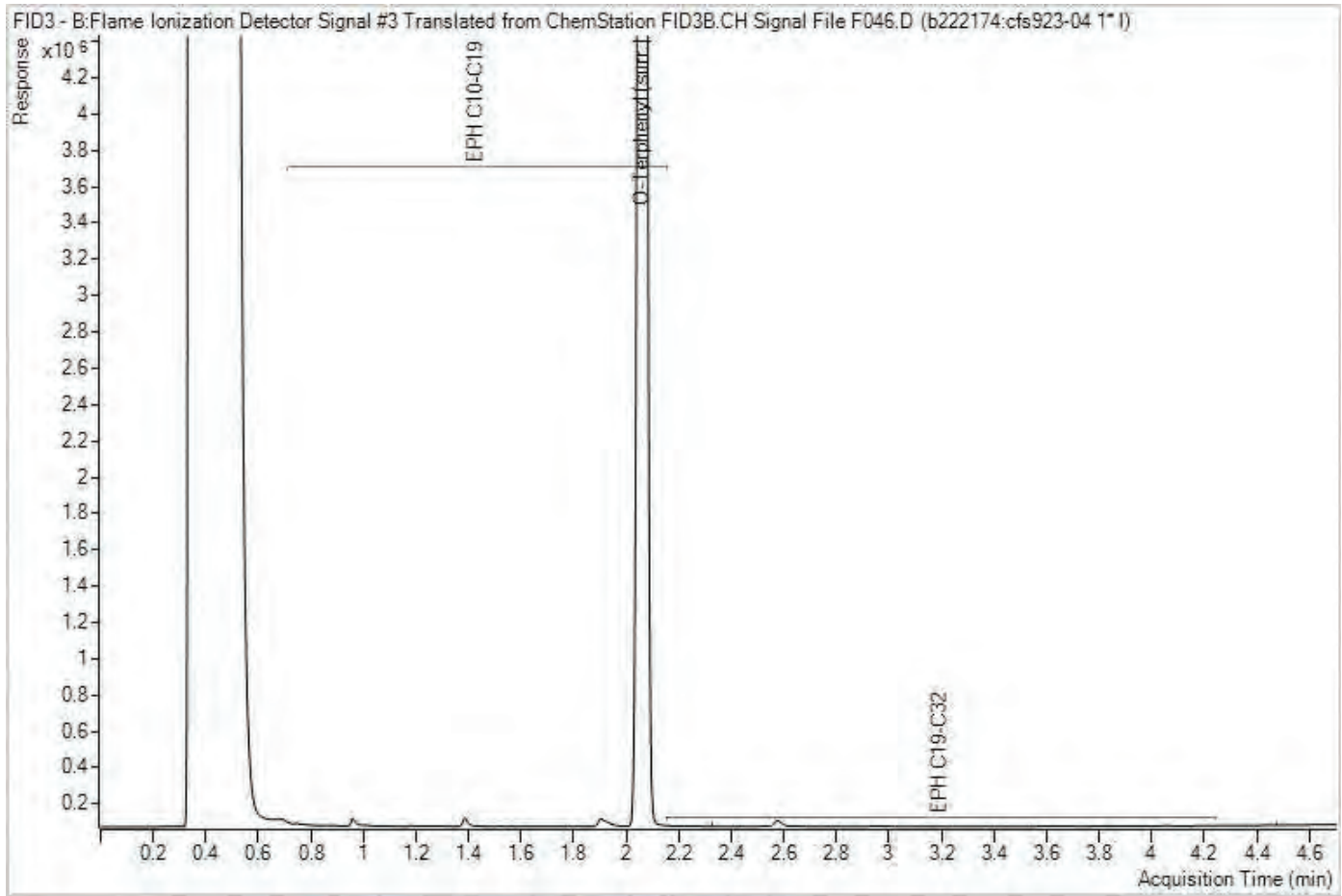
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

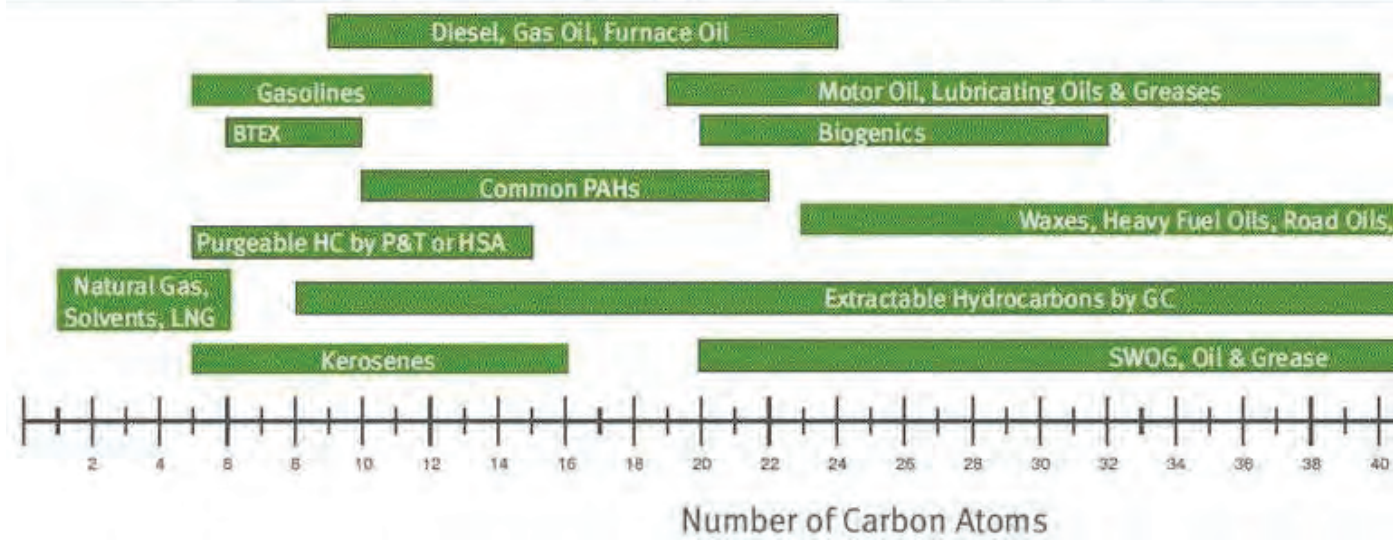
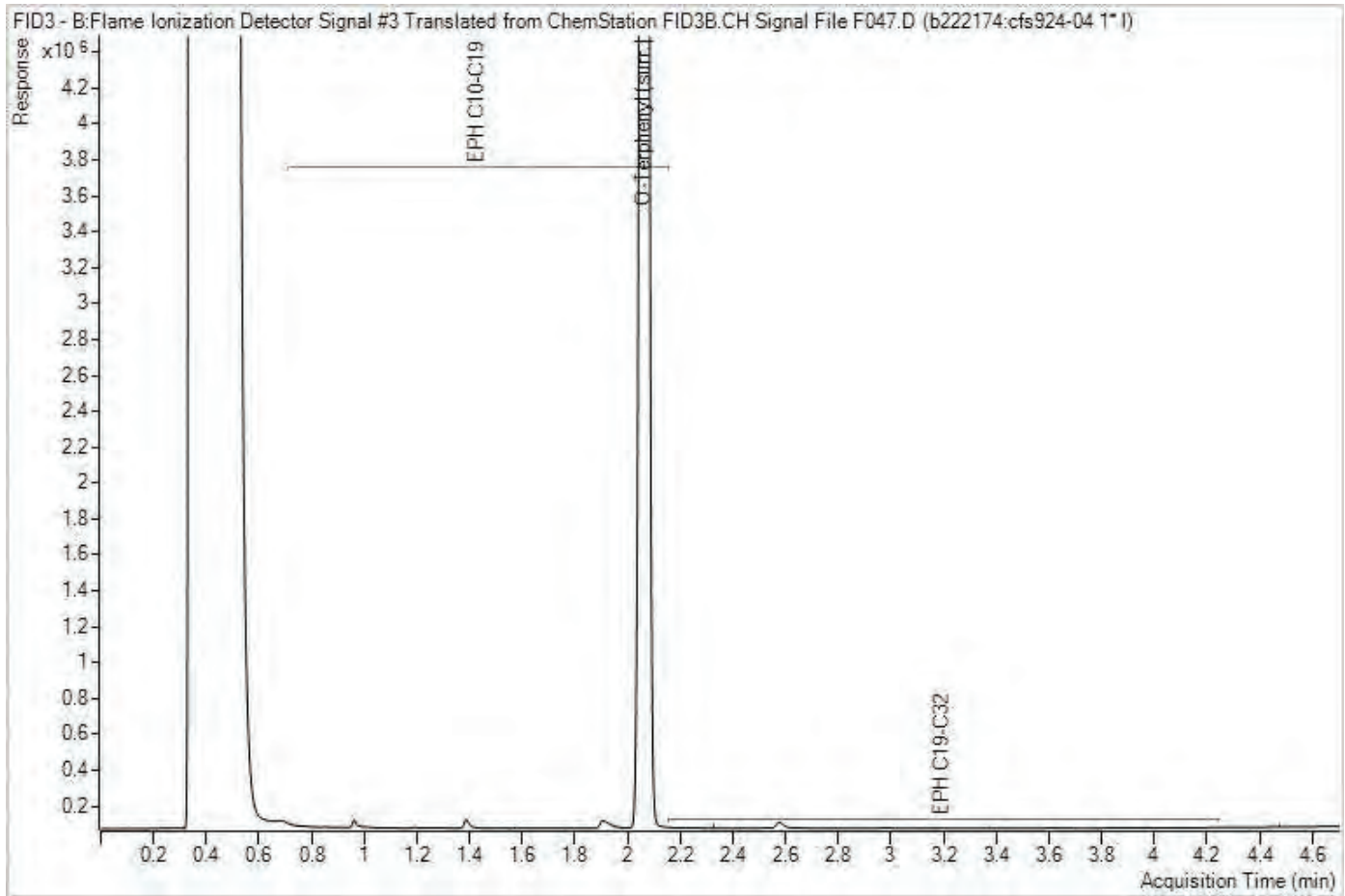
EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

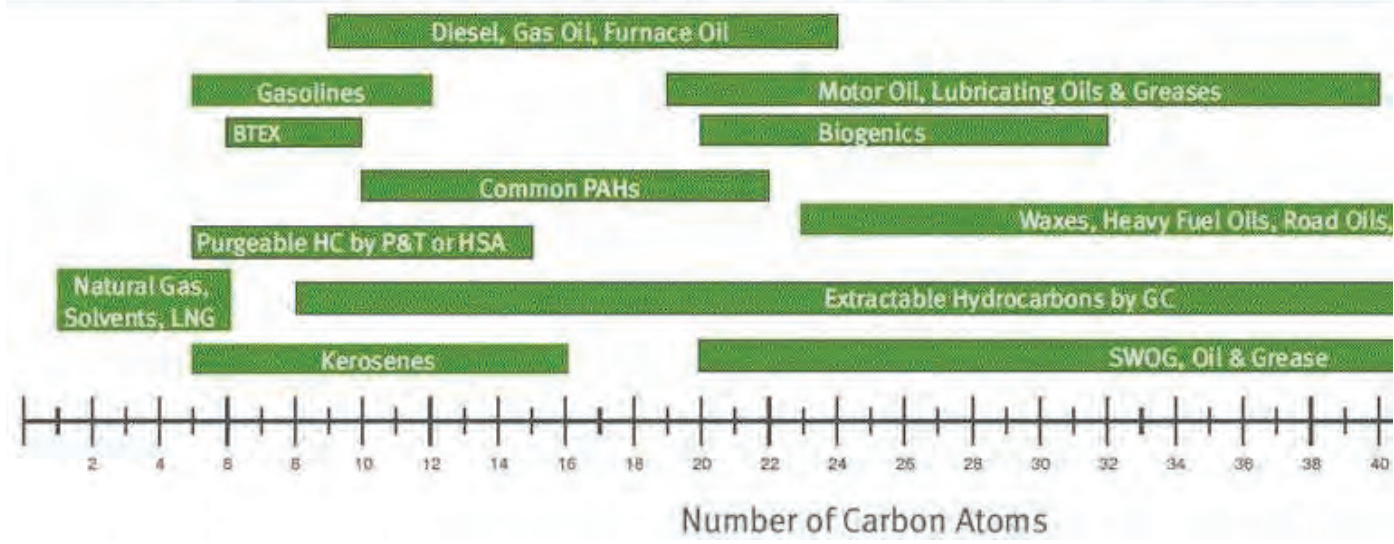
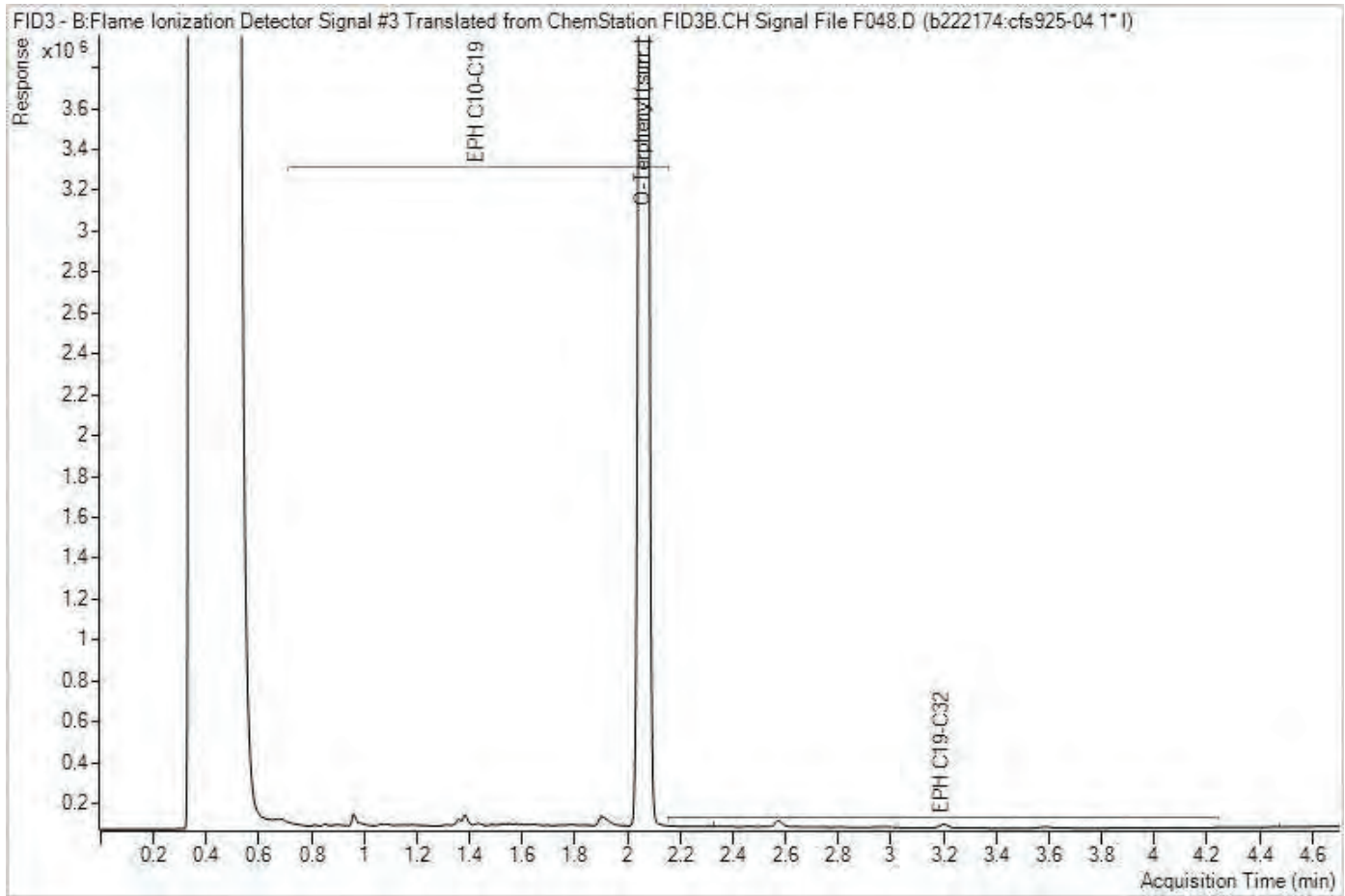


EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

# **Appendix H**

## **Data Quality Assessment and Verification Report**

# Data Verification Report

22 February 2024

<b>To</b>	Rose Marie Rocca, Kathleen Hasler, Melissa Jenkins, David R Barton, Caryn Wong, Bailey Bjarnason	<b>Project No.</b>	11222680
<b>Copy to</b>		<b>DVR No.</b>	01
<b>From</b>	Stephanie Berton	<b>Contact No.</b>	1-519-884-0510
<b>Project Name</b>	088877 Upland Landfill	<b>Email</b>	Stephanie.Berton@ghd.com
<b>Subject</b>	Data Quality Assessment and Verification Groundwater Surface Water and Leachate Events Campbell River, BC Northwin Environmental		

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.

<b>Laboratory:</b>	Bureau Veritas Canada (2019) Inc.				
<b>Lab Job No.:</b>	C322057, C322498, C354929, C354963, C354973, C371107, C397191, C397797				
<b>Date(s) Sampled:</b>	March – November 2023				
<b>Media Sampled:</b>	Groundwater, Surface Water, and Leachate Water				
<b>QA/QC</b>	<b>Criteria</b>	<b>Pass</b>	<b>Qualifiers</b>	<b>Fail</b>	<b>N/A</b>
<b>Holding Times</b>	Analyte specific	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Temperature</b>	<10°C at receipt	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sample Preservation</b>	Required container/preservatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Duplicate (blind)</b>	Within 20%/<1xRL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Blank (blind)</b>	Non detect	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Trip Blank</b>	Non detect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Lab QA/QC</b>	Within standard recoveries	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following results are qualified due to holding time exceedance:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354963	07/18/2023	WL-11222680-180723-KH-01	pH	5.82	J	s.u.
C354963	07/18/2023	WL-11222680-180723-KH-02	pH	5.96	J	s.u.
C354973	07/18/2023	WG-11222680-180723-KH-05	pH	7.76	J	s.u.
C354973	07/18/2023	WG-11222680-180723-KH-06	pH	7.15	J	s.u.

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354973	07/18/2023	WG-11222680-180723-KH-07	pH	7.54	J	s.u.
C354973	07/18/2023	WG-11222680-180723-KH-08	pH	7.61	J	s.u.
C354973	07/18/2023	WG-11222680-180723-KH-09	pH	7.14	J	s.u.
C354973	07/19/2023	WG-11222680-180723-KH-10	pH	7.49	J	s.u.
C397797	11/28/2023	WG-11222680-281123-KH-06	pH	7.40	J	s.u.
C397797	11/28/2023	WG-11222680-281123-KH-07	pH	7.32	J	s.u.
C397797	11/28/2023	WG-11222680-281123-KH-08	pH	7.25	J	s.u.
C397797	11/28/2023	WG-11222680-281123-KH-09	pH	7.12	J	s.u.
C397797	11/29/2023	WG-11222680-291123-KH-10	pH	6.91	J	s.u.
C397797	11/28/2023	WL-11222680-281123-KH-01	pH	7.35	J	s.u.
C397797	11/28/2023	WS-11222680-281123-KH-01	pH	6.85	J	s.u.
C397797	11/28/2023	WS-11222680-281123-KH-02	pH	6.47	J	s.u.
C354973	07/18/2023	WG-11222680-180723-KH-06	Nitrate (as N)	0.190	J	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-06	Nitrite (as N)	0.0055	J	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-06	Nitrite/Nitrate	0.195	J	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-06	Orthophosphate	0.0040	J	mg/L

The following results are qualified based on matrix spike recovery outlier:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354973	07/18/2023	WG-11222680-180723-KH-05	Sulfide	0.0018	UJ	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-06	Sulfide	0.0018	UJ	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-07	Sulfide	0.0018	UJ	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-08	Sulfide	0.0018	UJ	mg/L
C354973	07/18/2023	WG-11222680-180723-KH-09	Sulfide	0.0018	UJ	mg/L
C354973	07/19/2023	WG-11222680-180723-KH-10	Sulfide	0.0018	UJ	mg/L

The following results are qualified due to a tentatively identified result and may be potentially high due to matrix interference:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354973	07/19/2023	WG-11222680-180723-KH-10	Benzo(a)pyrene	0.013	J+	µg/L

The following results are qualified due to incomplete preservation (Sample pH <9). Due to volatility of analyte, a low bias in the results is likely:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354963	07/18/2023	WL-11222680-180723-KH-01	Sulfide	0.35	J-	mg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C354963	07/18/2023	WL-11222680-180723-KH-02	Sulfide	0.32	J-	mg/L

The following results are qualified due to field duplicate variability:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C322498	03/29/2023	WG-11222680-290323-KH-05	Aluminum (dissolved)	11.4	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Aluminum (dissolved)	3.0	UJ	µg/L
C354929	07/17/2023	WG-11222680-170723-KH-03	Aluminum (dissolved)	8.8	J	µg/L
C354929	07/17/2023	WG-11222680-170723-KH-04	Aluminum (dissolved)	3.0	UJ	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Arsenic (dissolved)	0.24	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Arsenic (dissolved)	0.10	UJ	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Cadmium (dissolved)	0.167	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Cadmium (dissolved)	0.010	UJ	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Copper (dissolved)	2.17	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Copper (dissolved)	0.20	UJ	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Phosphorus (dissolved)	31	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Phosphorus (dissolved)	10	UJ	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Thallium (dissolved)	0.032	J	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Thallium (dissolved)	0.010	UJ	µg/L
C354963	07/18/2023	WL-11222680-180723-KH-01	Total suspended solids (TSS)	140	J	mg/L
C354963	07/18/2023	WL-11222680-180723-KH-02	Total suspended solids (TSS)	180	J	mg/L

The following results are qualified based on field blank detections:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C322498	03/29/2023	WG-11222680-290323-KH-09	Cadmium (dissolved)	0.034	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-10	Cadmium (dissolved)	0.077	J+	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-05	Iron (dissolved)	24.1	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Iron (dissolved)	11.5	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-09	Iron (dissolved)	11.9	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-10	Iron (dissolved)	16.5	U	µg/L



Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
C322498	03/29/2023	WG-11222680-290323-KH-05	Selenium (dissolved)	0.28	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-06	Selenium (dissolved)	0.18	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-07	Selenium (dissolved)	0.20	U	µg/L
C322498	03/29/2023	WG-11222680-290323-KH-09	Selenium (dissolved)	0.23	U	µg/L

**Conclusion:**

Based on the assessment detailed in the foregoing, the data summarized are acceptable with the specific qualifications noted above.

**Notes:**

N/A - Not Applicable

QA/QC - Quality Assurance/Quality Control

RL - Reporting Limit

N - Nitrogen

s.u. - Standard pH Units

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

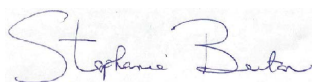
J+ - The result is an estimated quantity, but the result may be biased high.

J- - The result is an estimated quantity, but the result may be biased low.

**Data verification reference documents:**

1. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, September 2016.
2. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R-94-013, September 2016.
3. "British Columbia Environmental Laboratory Manual", Analysis, Reporting & Knowledge Services Knowledge Management Branch Ministry of Environment and Climate Change Strategy Province of British Columbia, April 2020.

Regards

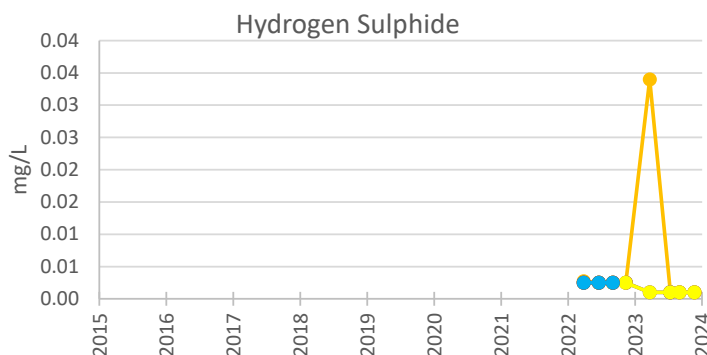
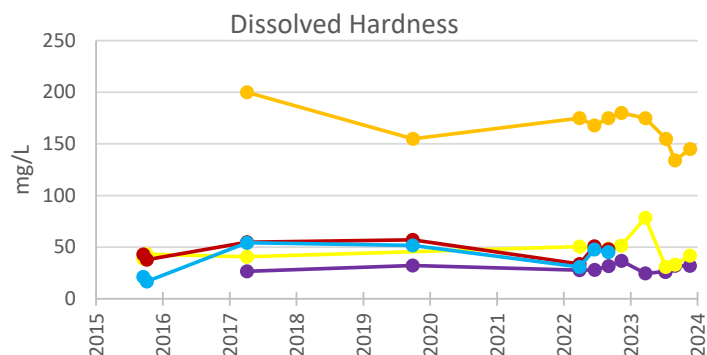
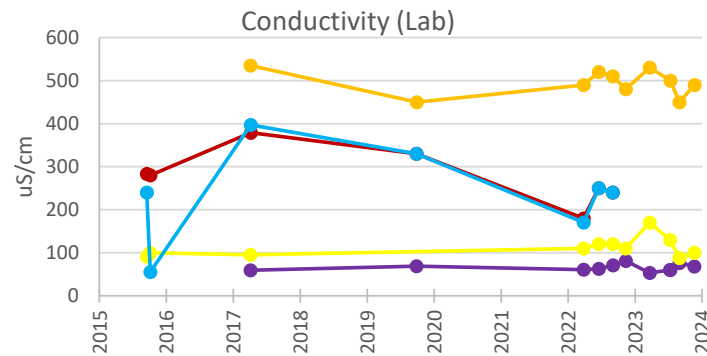
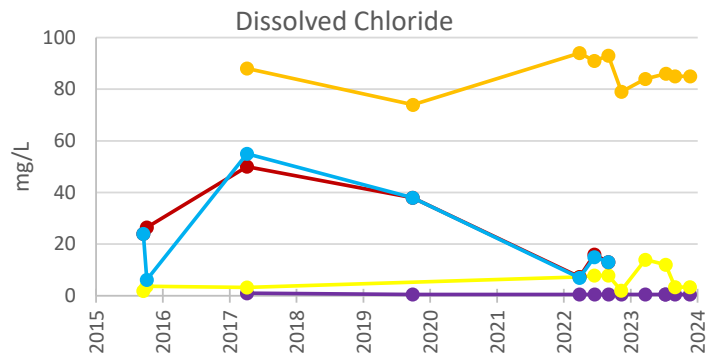
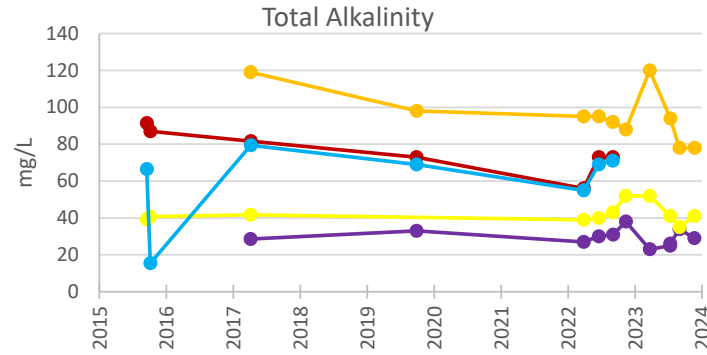
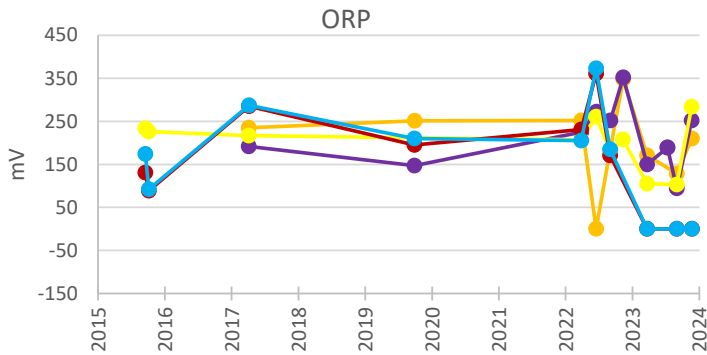


**Stephanie Berton**  
Data Management – Data Validator



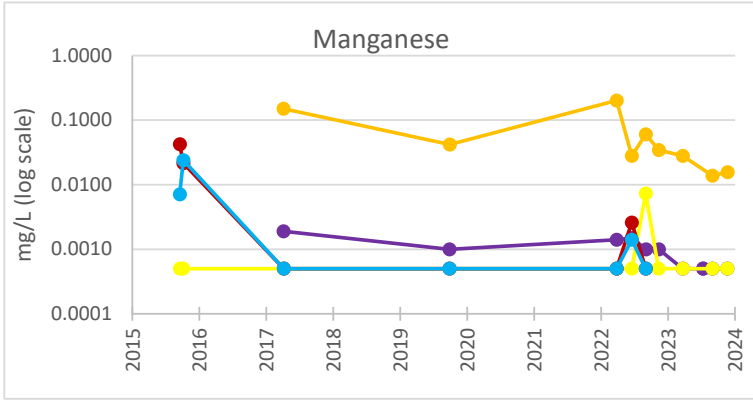
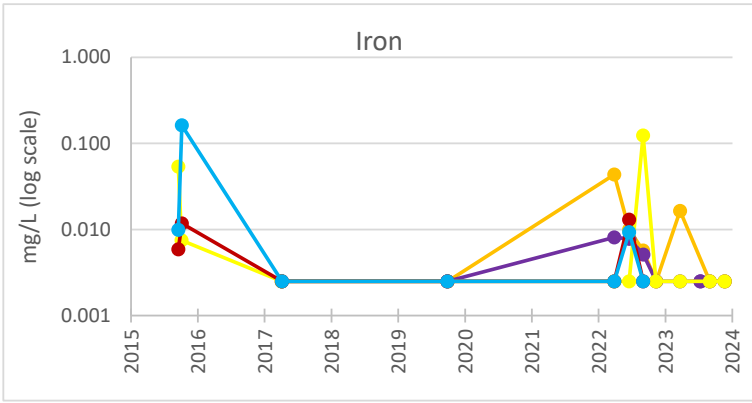
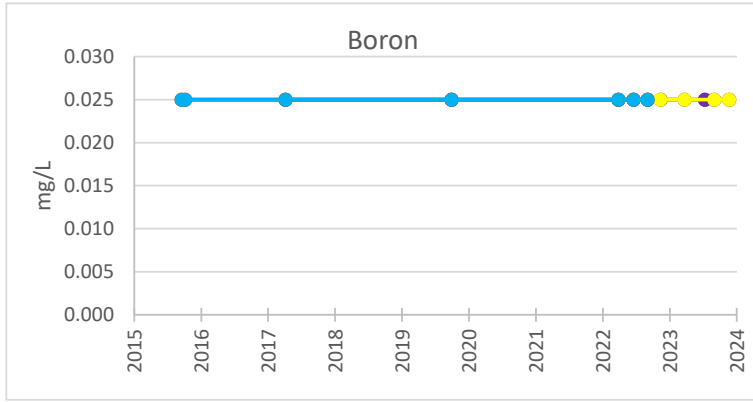
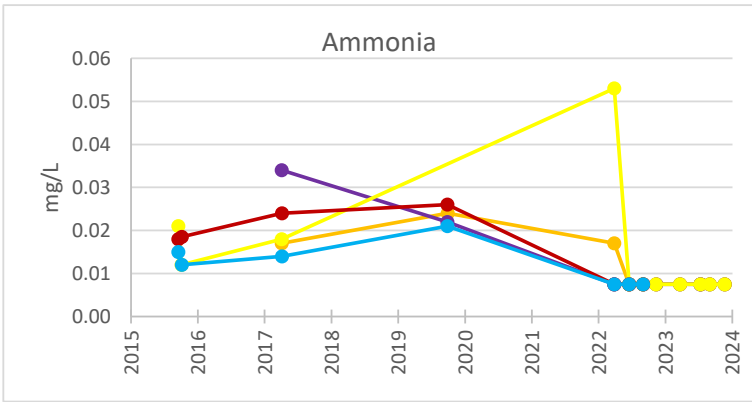
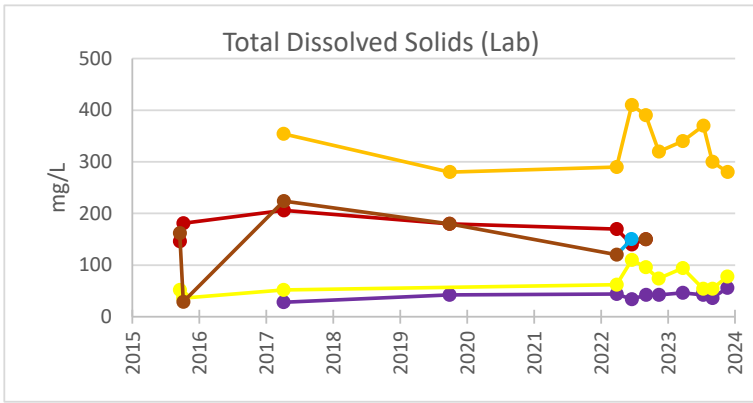
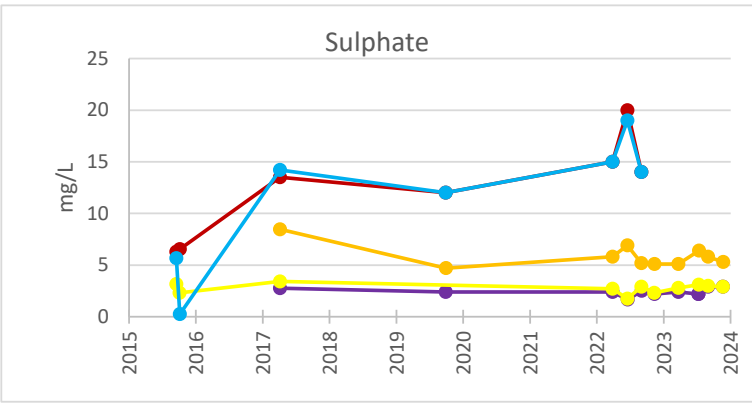
# **Appendix I**

## **Concentration Versus Time Plots**



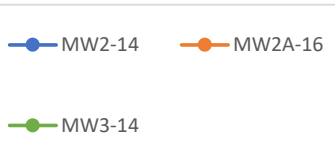
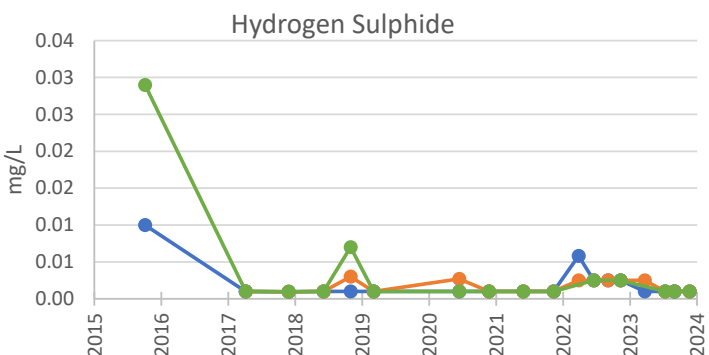
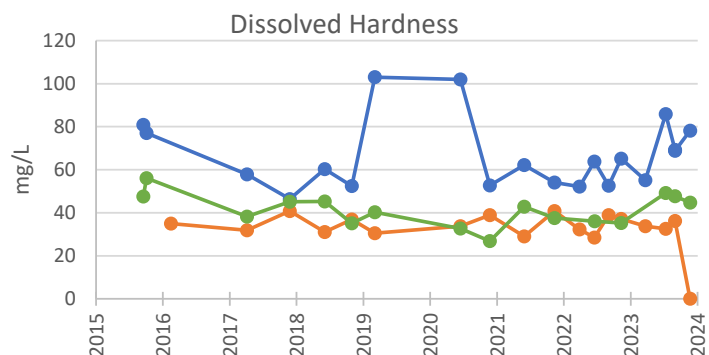
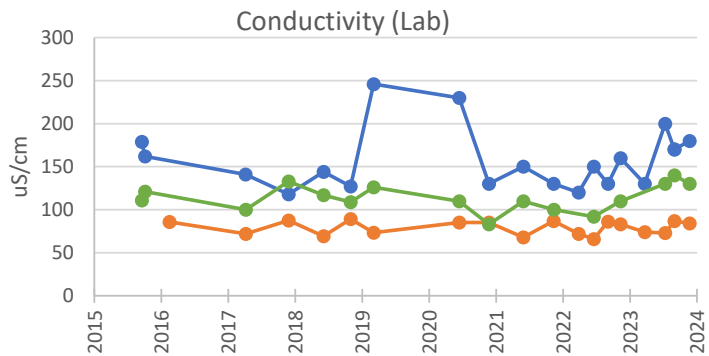
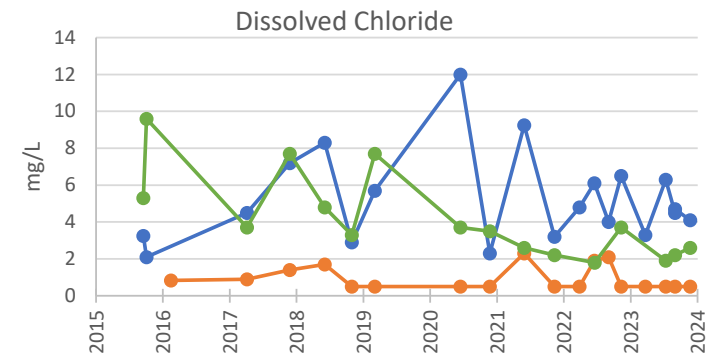
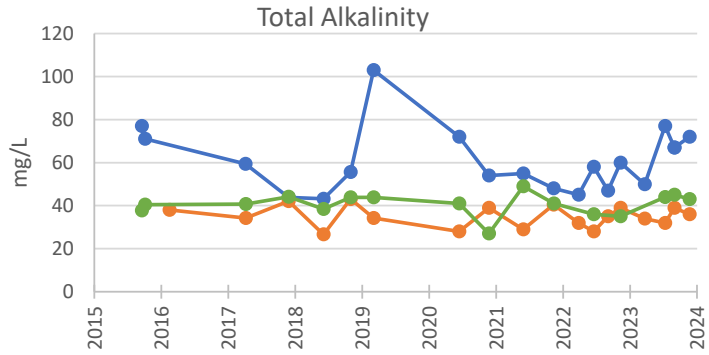
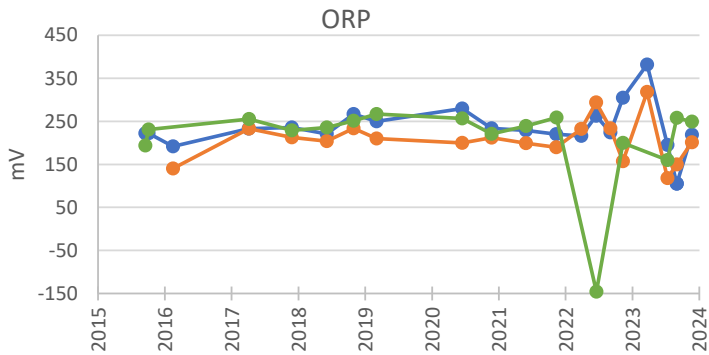
- MW2A-16    ● MW6-17
- MW9-17    ● MW1-14
- MW4A-15    ● MW4B-15

**APPENDIX I**  
**CONCENTRATION VERSUS TIME - UPGRADIENT**  
**2023 ANNUAL OPERATIONS AND MONITORING REPORT**  
**UPLAND NEW LANDFILL**

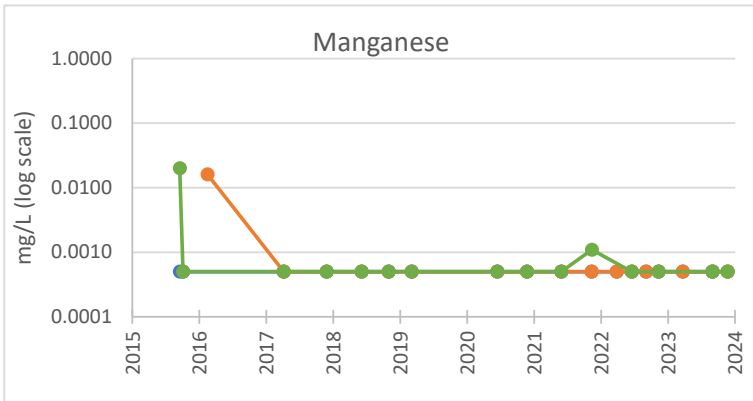
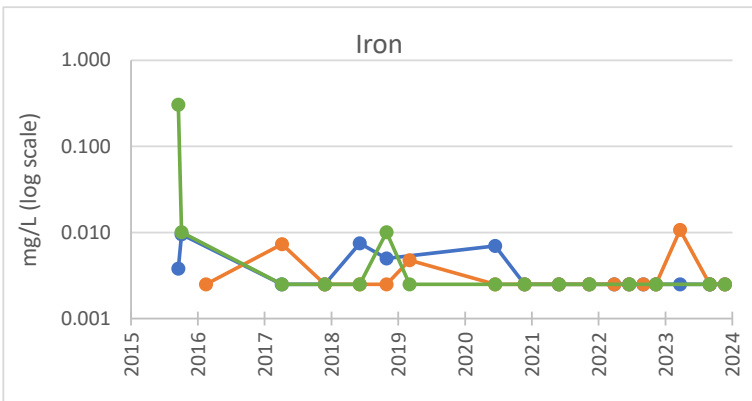
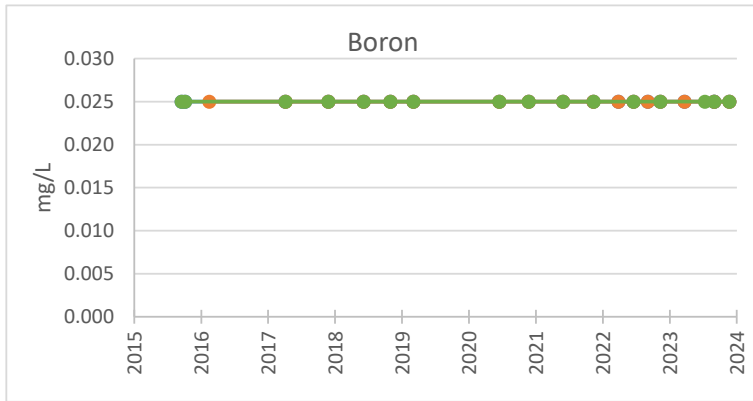
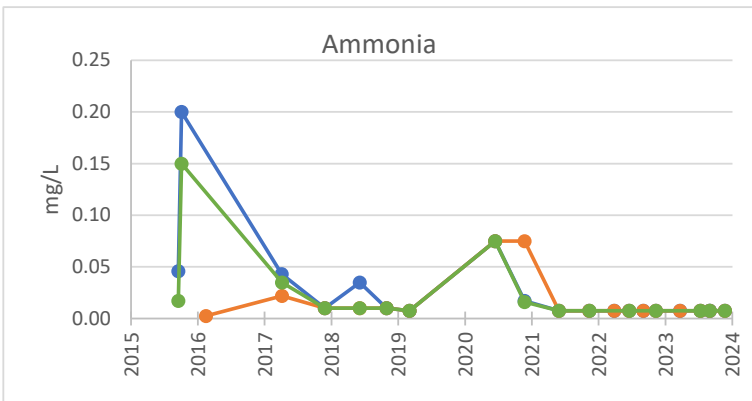
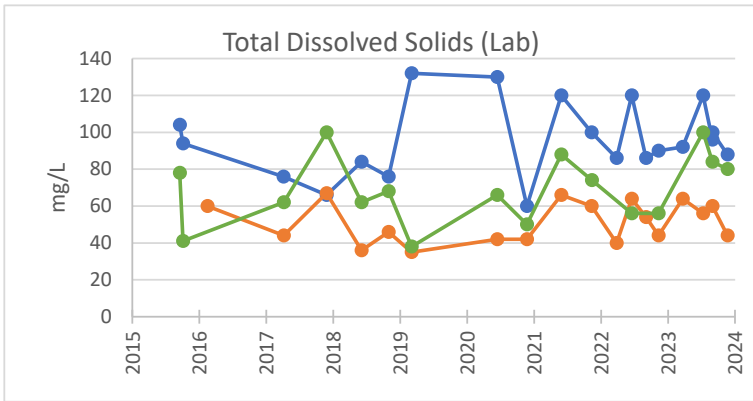
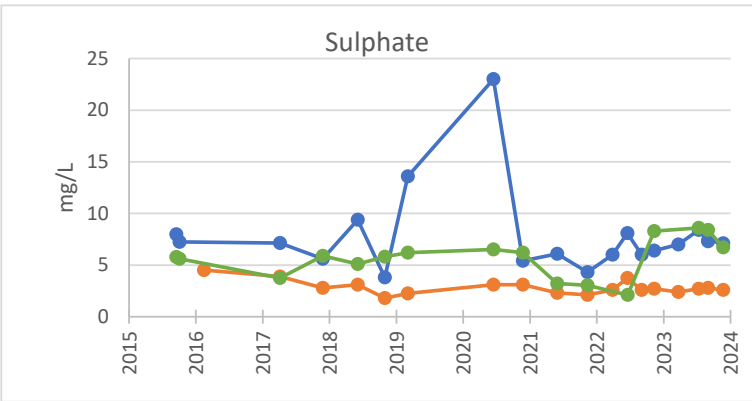


- MW2A-16
- MW9-17
- MW4A-15
- MW6-17
- MW1-14
- MW4B-15

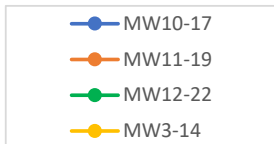
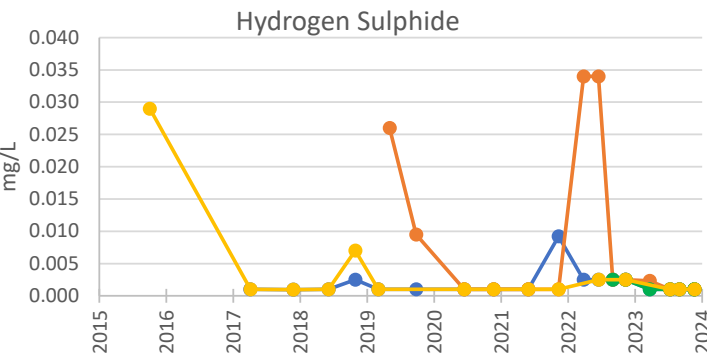
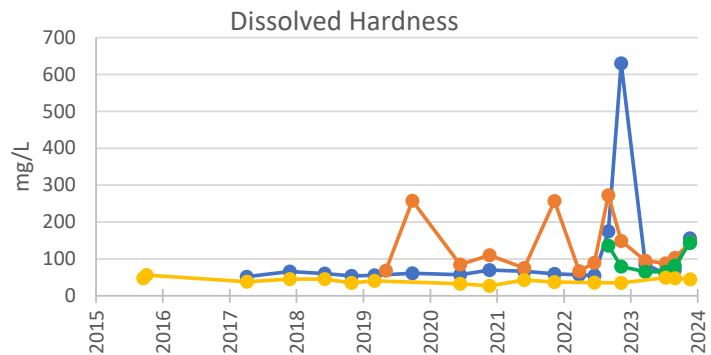
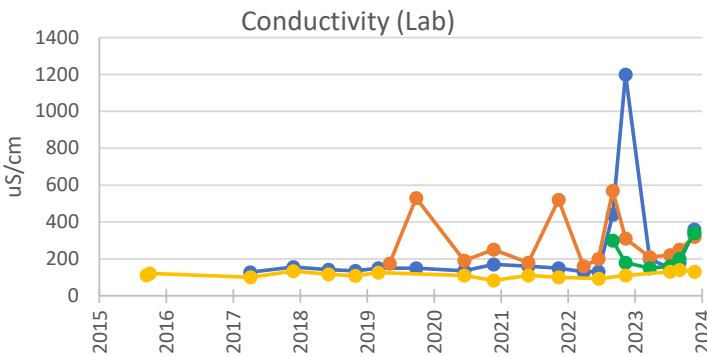
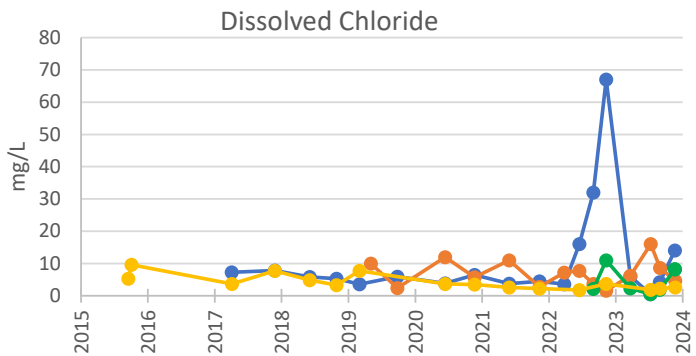
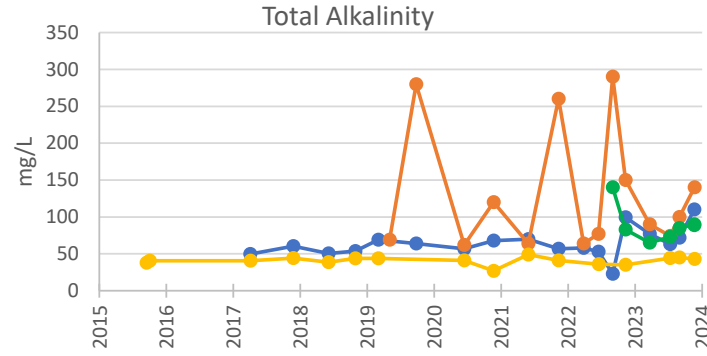
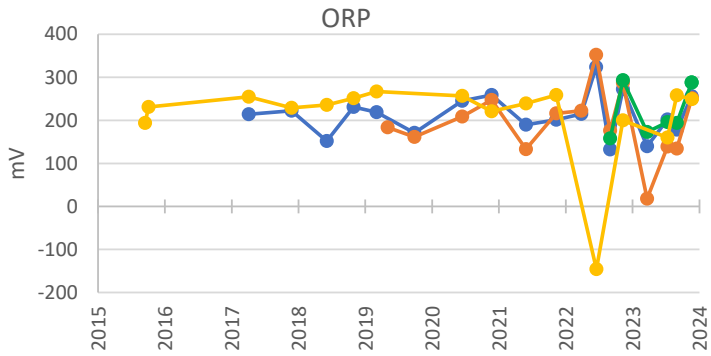
**APPENDIX I**  
**CONCENTRATION VERSUS TIME - UPGRADIENT**  
**2023 ANNUAL OPERATIONS AND MONITORING REPORT**  
**UPLAND NEW LANDFILL**



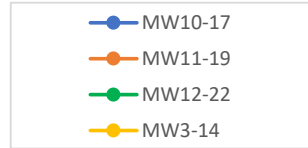
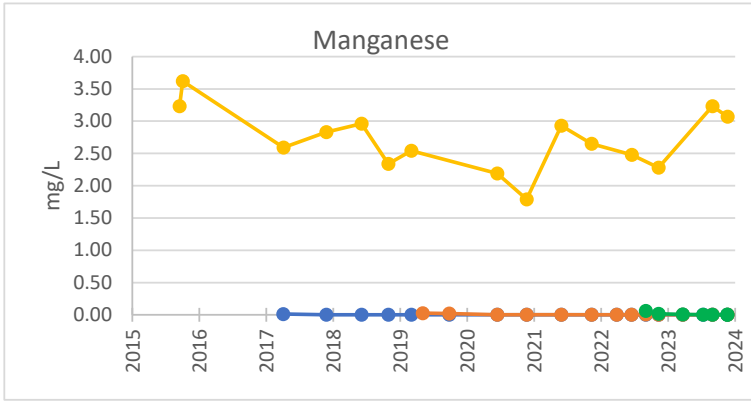
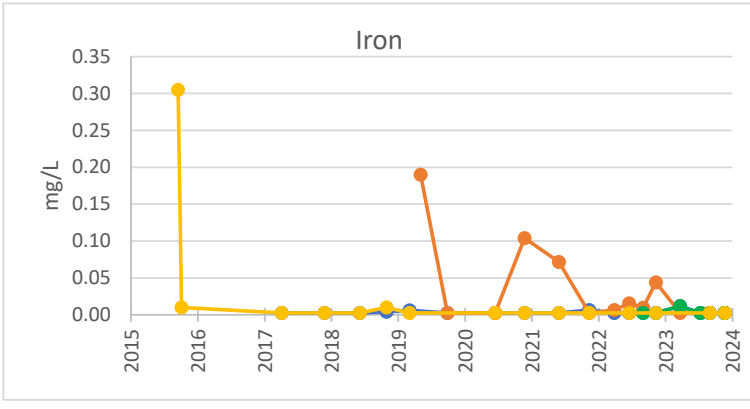
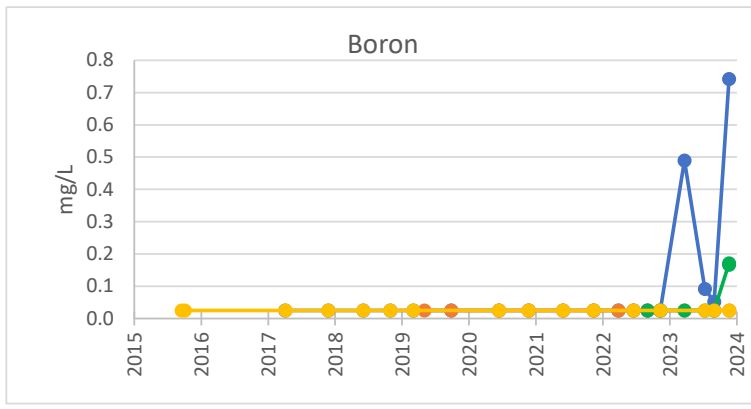
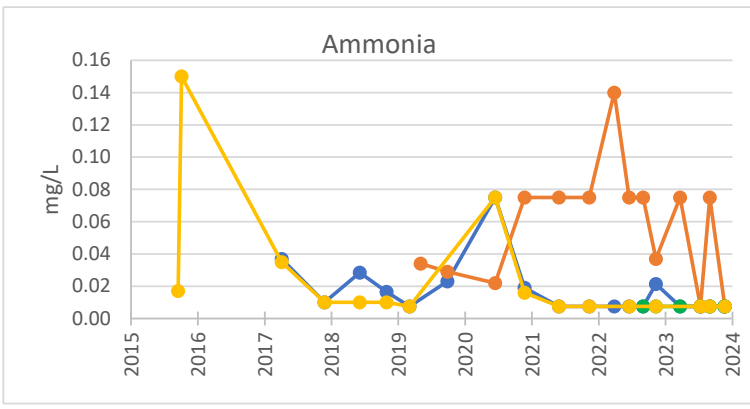
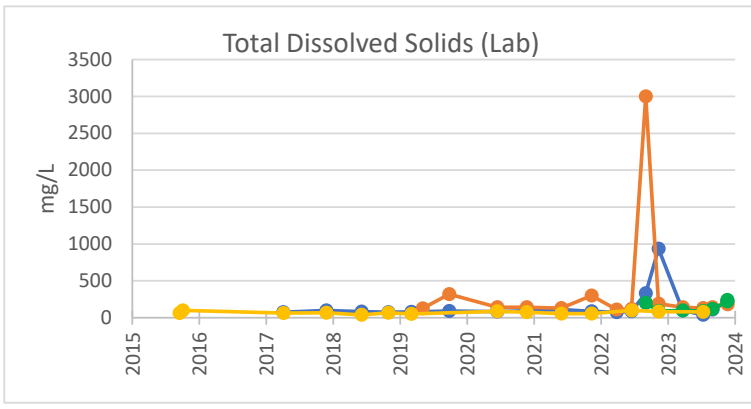
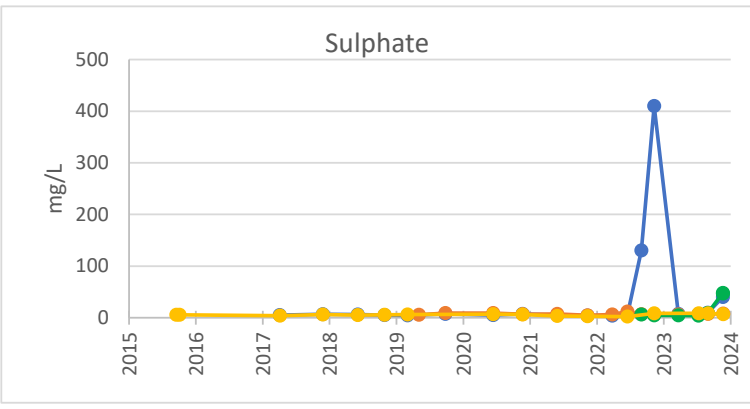
APPENDIX I  
 CONCENTRATION VERSUS TIME - CROSSGRADIENT  
 2023 ANNUAL OPERATIONS AND MONITORING REPORT  
 UPLAND NEW LANDFILL



**APPENDIX I**  
**CONCENTRATION VERSUS TIME - CROSSGRADIENT**  
**2023 ANNUAL OPERATIONS AND MONITORING REPORT**  
**UPLAND NEW LANDFILL**



**APPENDIX I**  
**CONCENTRATION VERSUS TIME - DOWNGRADIENT**  
**2023 ANNUAL OPERATIONS AND MONITORING REPORT**  
**UPLAND NEW LANDFILL**



**APPENDIX I**  
**CONCENTRATION VERSUS TIME - DOWNGRAIDENT**  
**2023 ANNUAL OPERATIONS AND MONITORING REPORT**  
**UPLAND NEW LANDFILL**



# **Appendix J**

## **2024 Environmental Monitoring Program Specification**

**Environmental Monitoring Program Specification - 2024**

**PROJECT:** New Landfill EMP  
**CLIENT:** Northwin Environmental  
**PROJECT NO.:** 11222680.15  
**PROJECT MANAGER:** Diana Nowak

<b>MONITORING STAFF:</b>	<b>RESPONSIBILITY</b>
Kathleen Hasler	Field Lead
Debra Tong	Field Secondary
Airesse MacPhee	Project Chemist
Tristan Habdass	Database Analyst

**LABORATORIES USED:** ALS Environmental, Burnaby, British Columbia

<b>AUTHORIZATION:</b>	<b>MONITORING EVENT(S)</b>	<b>PC/PM SIGNATURE</b>
	Mar/Apr, Jun, Aug/Sep, Nov	_____

Revision #	Date	Revision	GHD
1	January 2022	Specification was developed based on the DOCP, dated July 8, 2021	RMR
2	April 2022	Typo in 2022 EMP Spec was corrected, from MW12-17 to MW11-19.	RMR
3	August 2022	MW3-14 was added to the groundwater monitoring program as a downgradient compliance well, to be sampled quarterly.	RMR
4	August 2022	MW12-22 was added to the groundwater monitoring program as a downgradient compliance well following its installation, to be sampled quarterly.  Renamed LS1 to LDMP-1 and renamed LS2 to LDMP-2. Added LDS, LDMP-3, and LDMP-4. These changes were made to the leak detection monitoring program to account for as built conditions.  Added phenols to the leachate analytical parameter list, to be analyzed annually due to presence of wood waste.	RMR
5	September 2022	Updated QA/QC samples. Added LW-PFAS to field blank's analytical list in Q4.	KH
6	March 2023	Added semi-annual water level monitoring to the full groundwater well network.  Removed East and West surface water ditch from the EMP until final cover is placed on the New Landfill.  Added Cell 1 West leachate sump to the quarterly leachate monitoring program. Samples will be collected following the discharge of waste to the cell.	RMR

Revision #	Date	Revision	GHD
7	May 2023	Perfluorinated compounds has been discontinued from the leachate analytical list since standards only apply to sites set out in Schedule 2 as item A4, C3, E10 or G1.  For monitoring location TLIP, the sampler has been changed from GHD to Upland to reflect current field practices.	RMR
8	March 2024	Update project staffing, included S07-24 to the leachate monitoring program.	

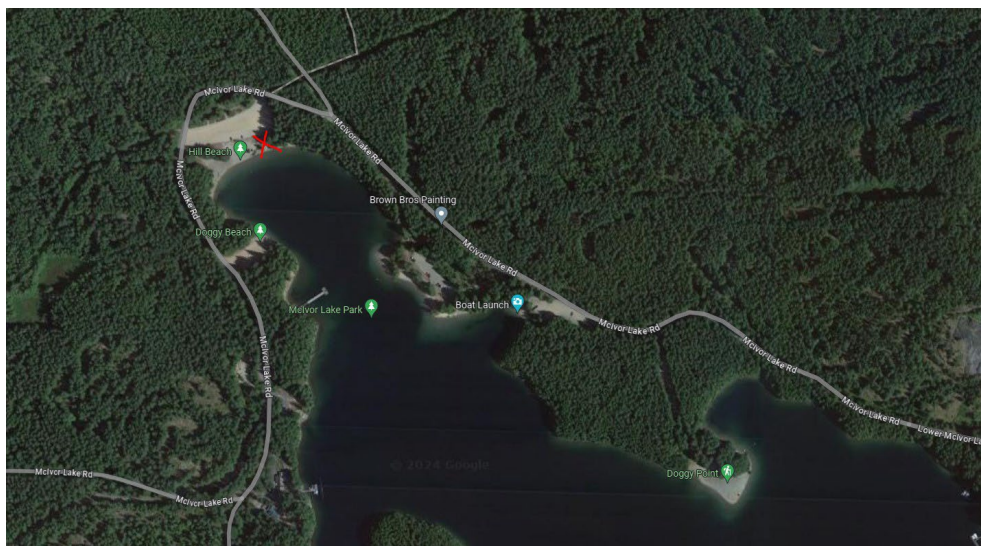
Monitoring Schedule: Table 1  
Groundwater Analytical Parameters: Table 2  
Surface Water Analytical Parameters: Table 3  
Leachate Analytical Parameters: Table 4  
Notes: Page 7

**Note for Staff – Labelling error on casing:**

LFG1-22 labelled as “SVP1-22” on casing.  
LFG2-22 labelled as “SVP2-22” on casing.



**McIvor Lake Sampling Location Reference Photo:**



**Environmental Monitoring Program Specification - 2024**  
**Monitoring Schedule**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Monitoring Location	Purpose	Sample Matrix	Quarterly Hydraulic Monitoring	March/ April	June	August/ September	November
<b>Groundwater Monitoring (19 WL Locations, 12 Sampling Locations)</b>							
<b>Upgradient Monitoring Wells (5 Locations)</b>							
MW6-17	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW9-17	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW1-14	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW4A-15	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
MW4B-15	To monitor upgradient groundwater quality.	WG	Q	√	√	√	√
<b>Cross-Gradient Monitoring Wells (2 Locations)</b>							
MW2-14	To monitor cross-gradient groundwater quality.	WG	Q	√	√	√	√
MW2A-16	To monitor cross-gradient groundwater quality.	WG	Q	√	√	√	√
<b>Downgradient Compliance Monitoring Wells (4 Locations, 1 Proposed Location)</b>							
MW10-17	To monitor downgradient groundwater quality near the east property boundary.	WG	Q	√	√	√	√
MW12-22	To monitor downgradient groundwater quality at the south property boundary.	WG	Q	√	√	√	√
MW11-19	To monitor downgradient groundwater quality at the south east corner of the site.	WG	Q	√	√	√	√
MW3-14	To monitor groundwater quality immediately downgradient of Phase 1 East Landfill Cell.	WG	Q	√	√	√	√
MW13 (proposed)	To monitor groundwater quality immediately downgradient of the landfill. <b>Sample once installed.</b>	WG	Q	√	√	√	√
MW5A-15, MW5B-15, MW7-17, MW8-17, MW15A-18, MW15B-18, PZ1-19		WG	Q	-	-	-	-
<b>Surface Water Monitoring (4 Monitoring Locations, 2 Sampling Locations)</b>							
Rico Gauge	To <b>monitor</b> the water level in Rico Lake via surface water gauge.	N/A	Q	-	-	-	-
SW15-02	To monitor surface water quality in Rico Lake	WS	N/A	-	-	-	√
Mclvor Lake	To monitor the water level in Mclvor Lake via BC Hydro Data Records - use link in notes below. <b>Look up and record on day of monitoring event</b> - data is only available for a limited period on BC Hydro website <sup>1</sup>	N/A	Q	-	-	-	-
SW15-01	To monitor surface water quality in Mclvor Lake	WS	N/A	-	-	-	√
<b>Leachate Monitoring (3 Locations)</b>							
S06-21	To characterize leachate quality collected from the Leachate Sump at northeast end of Cell 1 West. Sampling location is from the leachate collection system sump riser pipe.	WL	N/A	√	√	√	√
TLIP	To assess leachate treatment performance and determine if changes to the treatment process are required. Upland to collect samples prior to discharge to the treated leachate infiltration pond (TLIP) to assess if quality meets the CSR DW Standards.	WL	N/A	-	-	-	-
S07-24	To characterize leachate quality collected from the Leachate Sump in Cell 1 West.	WL	N/A	√	√	√	√
<b>Leak Detection Monitoring Program (5 Locations)</b>							
LDS	To monitor leakage at the primary liner of the landfill as part of the Trigger Level Response Plan. If water is present, collect a sample. Access to the leak detection sump is on the north side of the landfill.	W	Q	√	√	√	√
LDMP-1	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the north side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-2	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the north side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-3	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the east side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
LDMP-4	To monitor leakage at the primary liner of the landfill, as part of the Trigger Level Response Plan. Access to the Leak Detection Monitoring Pipe is on the east side of the landfill. <b>If water is present call PM</b>	W	Q	-	-	-	-
<b>Landfill Gas in Soil Monitoring (2 Locations)</b>							
LFG1-22	To monitor landfill gas migration.	n/a	Q <sup>2</sup>	-	-	-	√
LFG2-22	To monitor landfill gas migration.	n/a	Q <sup>2</sup>	-	-	-	√
<b>Field Quality Assurance/Quality Control (QA/QC)<sup>3</sup></b>							
Field Blank		WG	-	√	√	√	-
Trip Blank - BTEX/VPH Only		WL/W	-	-	-	-	√
Groundwater Duplicate		WG	-	√	√	√	√
Leachate Duplicate		WL	-	√	√	√	-

**Notes:**

<sup>1</sup> - Mclvor Lake water level. Look up current water level at the Ladore Dam: [https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver\\_island/ladore\\_ldr.html](https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver_island/ladore_ldr.html)

<sup>2</sup> - Collect water level only if screen is blocked and a landfill gas in soil cannot be measured.

<sup>3</sup> - The number of QC samples should be 20% of all samples collected within 48 hours of each other; and include duplicate, field blank, and trip blank samples for each parameter. Add QA/QC samples to the November event if 20% has not been reached.

Table 2

**Environmental Monitoring Program Specification - 2024**  
**Groundwater Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Groundwater (WG)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Dissolved CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√

Table 3

**Environmental Monitoring Program Specification - 2024**  
**Surface Water Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Surface Water (WS)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Water level at Rico Gauge	√	√	√	√
Record water level using BC Hydro Data Records - use link in Table 1.	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH) <sup>1</sup>	-	-	-	-

1 - If leachate concentrations for LEPH/HEPH are 80% within CSR 3.2 Aquatic Life Criteria, include LEPH/HEPH analysis in surface water during the next event

Table 4

**Environmental Monitoring Program Specification - 2024**  
**Leachate Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Leachate (WL)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Biological Oxygen Demand (Total) (BOD5)	√	√	√	√
Chemical Oxygen Demand (COD)	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√
BTEX/VPH	-	-	-	√
Chlorinated phenols + Non-chlorinated Phenols + Nitrophenols + Hydroxy Phenols	-	-	-	√



Table 5

**Environmental Monitoring Program Specification - 2024**  
**Leak Detection Water Analytical Parameters**  
**New Landfill**  
**Northwin Environmental, Campbell River, BC**

Leak Detection Water (W)	Quarterly			
	Mar/Apr	Jun	Aug/Sep	Nov
<b>Water Level Monitoring</b>				
Depth to Water	√	√	√	√
Depth to Bottom	√	√	√	√
<b>Field Parameters</b>				
Conductivity (uS/cm)	√	√	√	√
Oxidation reduction potential (mV)	√	√	√	√
pH (s.u.)	√	√	√	√
Temperature (deg C)	√	√	√	√
Total dissolved solids (mg/L)	√	√	√	√
Turbidity (ntu)	√	√	√	√
<b>General Chemistry</b>				
Alkalinity (Speciated)	√	√	√	√
Conductivity	√	√	√	√
Chloride	√	√	√	√
Sulphate	√	√	√	√
Total Sulphide (Low Level) + H <sub>2</sub> S Calc	√	√	√	√
Total Sulphide, Un-ionized (as H <sub>2</sub> S) (Calc)	√	√	√	√
Nitrate (as N)	√	√	√	√
Nitrite (as N)	√	√	√	√
Nitrite/Nitrate (N+N)	√	√	√	√
Orthophosphate	√	√	√	√
Biological Oxygen Demand (BOD)	√	√	√	√
Chemical Oxygen Demand (COD)	√	√	√	√
Total Dissolved Solids (TDS)	√	√	√	√
Total Suspended Solids (TSS)	√	√	√	√
<b>Nutrients</b>				
Ammonia Nitrogen	√	√	√	√
<b>Metals</b>				
Total CSR Metals (Incl. Hg)	√	√	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√	√	√
<b>Other</b>				
LEPH/HEPH (Incl. PAH/EPH)	√	√	√	√
BTEX/VPH	-	-	-	√
Phenols	-	-	-	√

