

# Levin Landfill July 2024

## Quarterly Groundwater, Surface Water and Leachate Monitoring Report

PREPARED FOR HOROWHENUA DISTRICT COUNCIL | AUGUST 2024

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# Revision Schedule

Rev No	Date	Description	Signature of Typed Name			
			Prepared by	Checked by	Reviewed by	Approved by
1	23/08/24	Final	P. Landmark	T. Brothersen	K. Halder	K. Halder



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## Quality Statement

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# Contents

Revision Schedule.....	ii
Quality Statement.....	iii
Abbreviations.....	1
Executive Summary.....	2
1 Introduction.....	4
2 Groundwater and Surface Water Monitoring.....	5
2.1 Sample Analyses.....	5
2.2 Background Groundwater Quality.....	6
2.3 Groundwater Quality Hydraulically Down-Gradient of the New Landfill.....	7
2.3.1 Shallow Aquifer.....	7
2.3.2 Deep Gravel Aquifer.....	10
2.4 Impact of Old Landfill on Groundwater Quality.....	12
2.5 Groundwater Quality Down-Gradient of the Irrigation Area.....	14
2.6 Leachate Effluent Results.....	14
2.7 Northern Farm Drain (Tatana Property).....	16
2.8 Hokio Stream.....	18
3 Landfill Gas Detection in Monitoring Wells.....	21
4 Sampling Quality Control and Assurance.....	21
5 Consent Compliance.....	21
6 Conclusions.....	23

## List of appendices

- Appendix A Site Plan
- Appendix B Analytical Results
- Appendix C Sampling Schedule
- Appendix D Historical Results Graphs
- Appendix E Landfill Gas Monitoring Results at GW Bores for July 2024

## List of tables

Table 2-1: Test Parameters.....	5
Table 2-2: Background Monitoring Results for July 2024.....	6
Table 2-3: D-Series and E1S Monitoring Bore Results for July 2024.....	8
Table 2-4: Results for Monitoring Bores within the Deep Aquifer for July 2024.....	11
Table 2-5: Monitoring Results for Shallow Boreholes Down-Gradient from the Old Landfill for July 2024.....	13
Table 2-6: Results from Monitoring Bores in the Irrigation Area for July 2024.....	14
Table 2-7: Results from Leachate Effluent Monitoring for May 2024, June 2024, and July 2024...	15
Table 2-8: Northern Farm Drain Monitoring Results for May 2024, June 2024, and July 2024.....	17
Table 2-9: Hokio Stream Monitoring Results for May 2024, June 2024, and July 2024.....	19



# Abbreviations

Abbreviation	Name
<b>ANZECC</b>	Australian and New Zealand Environment and Conservation Council
<b>ANZECC AE</b>	ANZECC Guidelines for Fresh and Marine Water Quality - Aquatic Ecosystems
<b>ANZECC LDW</b>	ANZECC 2000 Livestock Drinking Water
<b>cfu</b>	Colony-forming unit
<b>COD</b>	Chemical Oxygen Demand
<b>DGV</b>	Default guideline value
<b>DWSNZ</b>	Drinking Water Standards for New Zealand
<b>DWSNZ GVs</b>	Drinking Water Standards for New Zealand - Guideline Values for aesthetic determinants
<b>DWSNZ MAVs</b>	Drinking Water Standards for New Zealand – Maximum Acceptable Values
<b>EC</b>	Electrical Conductivity
<b>HDC</b>	Horowhenua District Council
<b>HRC</b>	Horizons Regional Council
<b>mbgl</b>	Metres below ground level
<b>ppm</b>	Parts per million
<b>scBOD<sub>5</sub></b>	Soluble carbonaceous Biochemical Oxygen Demand (5-day)



# Executive Summary

Horowhenua District Council (HDC) is required to carry out quarterly compliance monitoring of groundwater and monthly sampling at selected surface water monitoring locations at the Levin Landfill, as part of the conditions of Resource Consents ATH-2002003982.03 (formerly DP6009), ATH-2002003983.02 (formerly DP6010), ATH-2002003984.02 (formerly DP6011) and ATH-2002009801.02 (formerly DP102259). This report summarises the findings for the monitoring events from the first quarter (i.e., May 2024 to July 2024) sampling round and includes results for:

- Background (natural) groundwater (Bores G1S and G1D)
- Landfill leachate (manhole next to leachate pond)
- Groundwater bores, down-gradient of the new landfill (Bores D1, D2, D3rs, D4, D5, D6 and E1S)
- Groundwater bores within the old irrigation area (Bores F1, F2 and F3)
- Shallow aquifers, down-gradient of the old landfill (Bores B1, B2, B3s, C2, C2DS, E2S, G2s, Xs1 and Xs2)
- The deep aquifer (Bores C2DD, D3rd, E1D, E2D and Xd1)
- The Northern Farm Drain (TD1), and
- The Hokio Stream (HS1A, HS1, HS2 and HS3).

Stantec has reviewed the results of this first quarter monitoring round on behalf of HDC.

Monitoring results for other aspects of the landfill operations such as for air quality, odour, and stormwater quality are reported annually, as per resource consent requirements.

Samples were collected from 27 groundwater bores from around Levin Landfill during July 2024, and landfill leachate was sampled at a manhole next to the leachate pond. Additionally, five surface water sites were each sampled during May 2024, June 2024, and July 2024. All samples were analysed for the parameters set out in ATH-2002003983.02, and as listed in the results tables presented in this report.

All the groundwater samples taken in July 2024 were delivered to the laboratory within 24 hours, which is a significant improvement on previous years. Four groundwater samples had recorded sampling times that were nonsensical, being late at night, with two being recorded ostensibly after they were delivered to the laboratory.

The surface water samples taken in June 2024 were delivered to the laboratory within 24 hours, however, all the surface water samples taken in May 2024 and July 2024 were recorded as having been delivered to the laboratory more than 24 hours after having been sampled. These matters will need to be followed up with the sampling contractor and the laboratory.

The resource consent for the landfill (namely, ATH-2002003983.02) establishes compliance limits for the quality of deeper and shallow groundwater which are based upon the Drinking Water Standards for New Zealand – Maximum Acceptable Values (DWSNZ MAVs), Guideline Values for aesthetic determinants (DWSNZ GVs), and the ANZECC 2000 Livestock Drinking Water (ANZECC LDW) trigger values, respectively. Compliance limits for surface water are based on the ANZECC 2000<sup>1</sup> default guideline values (DGV) for 95<sup>th</sup> percentile species protection for toxicants in freshwater, as required by the revised Resource Consent condition approved in December 2019.

The May 2024 to July 2024 monitoring results have been assessed against these limits, where they are applicable.

Twenty-five non-compliances with resource consent conditions were recorded across nine monitoring locations, as follows:

- *E. coli* at E2D was detected at a level of 58 cfu/100mL which exceeds the DWSNZ MAV of NIL. This is quite an unusual occurrence for this bore and is the highest recorded level since 1998.
- *E. coli* at D3rd was tested with an incorrect detection limit of 100 cfu/100mL. Since *E. coli* was not detected, it is recorded as being 50 cfu/100mL and, as such, is it considered to be non-compliant.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.019 mg/L). This is characteristic of D3rd with the historical levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Hardness at bore D3rd (211 mg CaCO<sub>3</sub>/L) exceeded the DWSNZ MAV of 200 mg CaCO<sub>3</sub>/L. This is characteristic of D3rd with the historical levels varying between 186 and 223 mg CaCO<sub>3</sub>/L on all sampling occasions.

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<sup>1</sup> Now superseded by the Australian and New Zealand Water Quality Guidelines 2018 (ANZG 2018), however the ANZECC 2000 guideline values are applied in accordance with the resource consent.



- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2DD (0.702 mg/L), E2D (0.428 mg/L), Xd1 (0.478 mg/L) and D3rd (0.475 mg/L). The results for C2DD and E2D (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed.
- The concentration of nitrate-N at TD1 in May 2024 (0.59 mg/L), June 2024 (1.13 mg/L) and July 2024 (5.06 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.16 mg/L. This site has commonly presented elevated levels.
- The concentration of ammoniacal-N at TD1 in May 2024 (7.91 mg/L) and June 2024 (16.0 mg/L) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.
- Nitrate-N exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at all four Hokio Stream sites in all three months, with values ranging between 0.19 mg/L and 0.93 mg/L.

The May 2024 to July 2024 'background' monitoring results were also considered in the context of relevant guidelines, both within the groundwater aquifers (shallow and deep bores) and the surface water receiving environment. Low pH and elevated iron concentrations were observed in background bore G1S, indicating that groundwater could be being impacted by up-gradient activities unrelated to the landfill operations.

There were fifteen occasions where the leachate effluent quality (at the leachate pond manhole sampling location) was outside of the ranges for typical leachate composition, as recorded generally at Class 1 landfills in New Zealand. Six of these outliers were for parameters having less concentration than the typical minimal concentrations. Note that leachate effluent is not subject to any consent limits. Typical leachate concentrations are derived from data originating from seven New Zealand landfills, dating back to between 1998 and 1999, presented in the latest version of the WasteMINZ Guidelines<sup>2</sup>.

Methane was detected in one of the bores in July 2024, this being bore D6 (0.01%). This methane concentration was well below the explosive limit of 5%, and therefore represents a 'safe' level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites. Minor concentrations of carbon dioxide were recorded at all bores, with the highest being 1.11% at bore B2. Hydrogen sulphide was detected at bore Xs1 at 1 parts per million (ppm).

The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring.

The following recommendations are made, based on the results of this reporting period:

- Overall, monitoring results at G1S indicate that it is likely modified or impacted by anthropogenic activities, and therefore may not be suitable to use as reliable 'control' location for background water quality in the future. This matter should be reviewed as part of the Annual Report.
- Nitrate-N levels at D6 were the maximum value recorded to date, as was the value recorded for conductivity. Whilst all levels are below the ANZECC LDW trigger values, it is a matter to keep a check on and may merit an assessment in the future to try and identify the cause.
- *E. coli* at E2D was detected at a level of 58 cfu/100mL which exceeded the DWSNZ MAV of NIL. This is an unusual occurrence for this bore and is the highest *E. coli* level since 1998. If *E. coli* levels remain elevated next sampling round, then it is recommended that the site be inspected to determine if there is evidence of stock or other animals getting next to the bore.
- Consecutive monthly sampling has occurred at all Hokio Stream sites since October 2021. It is recommended that HDC assess the results of these 34 sampling events, as required by the conditions of the consent, to determine the significance of the results, and to ascertain, in conjunction with Horizons Regional Council (HRC), if a reduction in sampling frequency can be made.
- Gas sampling of the bores has been recorded on days different from when the groundwater samples were taken. It is recommended that in future the gas sampling be done when groundwater samples are taken.

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<sup>2</sup> "Technical Guidelines for Disposal to Land – Revision 3.1", Waste Management Institute of New Zealand, September 2023.



# 1 Introduction

Horowhenua District Council (HDC) first commissioned Stantec New Zealand (then Montgomery Watson) to carry out environmental reporting for the discharge consent monitoring undertaken at the Levin Landfill site in the early 2000s. Monitoring has been undertaken by contractors every three months at 33 locations, as required by the resource consent conditions (namely for discharge permit ATH-2002003983.02). These sampling locations consist of 27 boreholes penetrating the sand and gravel aquifers; four surface water sampling locations within Hokio Stream; one surface sampling location along the Northern Farm Drain (previously referenced as the Tatana Drain), and one leachate sampling point, as shown in the Site Plan in Appendix A.

The Levin Landfill site is comprised of two landfills: one old, closed, and unlined landfill and one new, lined landfill that has now been closed for the disposal of municipal solid waste. The new landfill footprint was developed in stages. The most recent stage was Stage 3C which was developed in 2017, though landfill operations have, until the end of October 2021, occurred over the top of Stages 1A, 2 and 3C. The current landfill has reached capacity and has been capped with a permanent clay capping (0.7 m thick) on all sides.

The Levin Landfill site is located above two identified aquifers, a shallow sand aquifer and a deeper gravel aquifer. The shallow aquifer is unconfined, has a low to moderate permeability, and flows in a northerly direction. The deeper gravel aquifer is a confined to semi-confined aquifer. Horizons Regional Council (HRC) hydrology staff advises that "*the general confined groundwater flow direction is towards the west*". Groundwater quality in the area is highly variable because of interaction with peat deposits that are prevalent in the area, localised effects such as from grazing activities, droppings from scavenging birds and from nitrogen-fixing plants such as gorse.

Since July 2010 groundwater has been tested for dissolved metals and nutrients, rather than for total concentrations of these parameters.

A review of the resource consent conditions was finalised in December 2019. Changes have been made to some of the surface water and groundwater monitoring conditions and HDC has acted on all the changes. Sampling since the January 2021 sampling round has been in line with previous monitoring, but different reference parameters have been applied to assess the surface water sampling results, as required by the current consent conditions.

This report presents the results for the May 2024 - July 2024 quarterly monitoring period.

Laboratory detection limits are provided for all test results which are attached in Appendix B.





# 2 Groundwater and Surface Water Monitoring

## 2.1 Sample Analyses

Surface water samples were collected by Downer (a contractor to HDC) on 15 May 2024, 20 June 2024, and 11 July 2024, with the samples being received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington. The recorded timeframe between sample collection and laboratory reception varied between 11 and 31 hours, with most of the samples being delivered to the laboratory longer than 24 hours after the samples were taken. The laboratory sheets show the June samples being taken at midnight, which is clearly incorrect and calls into question the recording of the sampling time on the custody sheets.

Groundwater samples were collected by Downer on 8, 9, and 10 July 2024, with the samples being received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington. All the laboratory sheets recorded a time of less than 24 hours between the sample being taken and it being accepted at the laboratory. However, four of the laboratory sheets (viz. for B3s, C2DD, D3rs and F1) recorded the sampling time at night, which is clearly incorrect. Looking at the sampling done around those bores, in most cases the time should have been recorded as “am”, rather than as “pm”, in other words, recorded as being 12 hours before.

The monitoring schedule for July 2023 - April 2026 is summarised in Appendix C. From July 2019, *E. coli* counts analyses have been included within the indicator and comprehensive analytical suites, as agreed by HDC with HRC. This means that *E. coli* counts will be assessed more frequently throughout each year, as compared to the past monitoring regime.

Groundwater samples taken at each of the boreholes were analysed for the indicator list of parameters which is outlined in Table 2-1. Surface water samples from Hokio Stream, the Northern Farm Drain and the manhole next to the leachate pond, were analysed for the comprehensive list of parameters.

Note that, following the revision of the resource consent conditions which were approved in December 2019, 5-day soluble carbonaceous Biochemical Oxygen Demand (scBOD<sub>5</sub>) and soluble mercury have each been added to the indicator and comprehensive suites of parameters, and *E. coli* added to the comprehensive suite of parameters. The scBOD<sub>5</sub> and *E. coli* parameters replace BOD<sub>5</sub> and faecal coliforms, respectively. Monitoring of these additional parameters began with the April 2020 sampling round.

**Table 2-1: Test Parameters**

Type	Indicator Parameters	Comprehensive Parameters
Physico-chemical characteristics	pH, Electrical Conductivity	pH, Electrical Conductivity, Alkalinity, Total Hardness, Suspended Solids
Oxygen demand	Chemical Oxygen Demand (COD), scBOD <sub>5</sub> **	COD, scBOD <sub>5</sub> **
Nutrients*	Nitrate nitrogen, Ammoniacal-nitrogen	Nitrate nitrogen, Ammoniacal-nitrogen, Dissolved Reactive Phosphorus, Sulphate
Metals*	Aluminium, Manganese, Nickel, Lead, Mercury**	Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron***, Magnesium, Manganese, Nickel, Lead, Zinc, Mercury**
Other elements	Boron, Chloride	Boron, Calcium, Chloride, Potassium, Sodium***
Biological+	<i>E. coli</i>	<i>E. coli</i>
Organics	Not required	Total organic carbon, total phenols, volatile acids

Note:

\*Analyses performed for nutrients and metals are for dissolved rather than total concentrations.

\*\* scBOD<sub>5</sub> and Soluble Mercury added as per revised consent conditions for Discharge Permit ATH-2002003983.02, December 2019.

\*\*\* Iron and sodium are tested at certain groundwater bores only.



+ Faecal coliforms added from July 2019 onwards (see Appendix C)

Those chemical constituents for which concentrations were below laboratory detection limits during the reporting period have had results set at 50% of the laboratory detection limit, which is then used to calculate a median value for annual reporting purposes. This is standard practice when dealing with chemical concentrations in water, where the constituent is not detected.

## 2.2 Background Groundwater Quality

The background (natural) quality of the groundwater up-gradient from the landfill site is not subject to any consent conditions. However, for comparison purposes, both the ANZECC LDW trigger values and the Drinking Water Standards for New Zealand (DWSNZ) guidelines are regularly used to benchmark the quality of water up-gradient from the landfill site.

Groundwater samples were collected from the two background bores situated hydraulically up-gradient from both the new and old landfills to the southeast of the site in July 2024 (bores G1S and G1D, see Site Plan, Appendix A). These two bores were constructed in late 2009 to sample background water quality from the two main hydrogeological units. Bore F3 is also included in the background table as it is near the southern boundary of the landfill site (and further west) and is unlikely to be impacted by landfill activities. A full laboratory report containing analytical results is presented in Appendix B and the historical graphs are presented in Appendix D.

The results for the July 2024 monitoring round are presented in Table 2-2.

For bore G1s the following results were outside the range of relevant guidelines:

- pH (6.7) was below the lower DWSNZ limit of 7.0.
- Dissolved aluminium (0.109 mg/L) exceeded the DWSNZ limit of 0.1 mg/L, which has occurred frequently in the past.
- Dissolved iron (2.26 mg/L) exceeded the DWSNZ limit of 0.2 mg/L, in line with historical reporting.

*E. coli* was 'not detected' at any of the background monitoring locations, but it is noted that the laboratory detection level changed between sites – 1 cfu/100mL at G1D and 100 cfu/100mL at G1S and F3. While the DWSNZ Maximum Acceptable Value (DWSNZ MAV) for *E. coli* is NIL, this guideline is only applicable to the deep aquifer bore G1D, whereas the ANZECC standard (100 cfu/100mL) is more appropriate for G1S and F3, given their shallow nature. Given this, the difference in laboratory detection limits between the bores are acceptable and compliant.

The monitoring results suggest that the quality of background groundwater may be being impacted by local ground conditions and/or activities up-gradient of the landfill. Background bore G1S consistently records elevated concentrations of a range of parameters. Elevated iron concentrations are likely to be related to hydrogeological conditions found at this site, and this phenomenon is common for groundwater in this area. Results dating to 2010 indicate that low pH values are representative of background water quality in the shallow sand aquifer, whereas the deep gravel aquifer frequently presents higher pH readings. Overall, monitoring results at G1S indicate that it is likely modified or impacted by anthropogenic activities, and therefore may not be suitable to use as reliable 'control' location for background water quality in the future. This matter should be reviewed as part of the Annual Report.

**Table 2-2: Background Monitoring Results for July 2024**

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Sampling date				08/07/24	08/07/24	08/07/24
Water Level	mbgl	-	-	14.45	15.00	5.73
pH	pH units	7 to 8.5*	6 to 9	<b>6.7</b>	7.3	7.4
Conductivity	mS/m	-	-	25.2	25.7	17.4
COD	mg/L	-	-	54	7.5	7.5
scBOD <sub>5</sub>	mg/L	-	-	0.5	1	0.5
<i>E. coli</i>	cfu/100ml	NIL	100	50	0.5	50
Chloride	mg/L	250*	-	34.2	28.8	13
Nitrate-N	mg/L	11.3	90.3	0.005	0.005	1.58
Ammoniacal-N	mg/L	1.17	-	0.05	0.1	0.005
Sodium	mg/L	200*	-	34.2	n/r	19.7



Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Dissolved Aluminium	mg/L	0.1*	5	<b>0.109</b>	<i>0.001</i>	<i>0.001</i>
Dissolved Boron	mg/L	1.4	5	<i>0.015</i>	0.03	<i>0.015</i>
Dissolved Iron	mg/L	0.2*	-	<b>2.26</b>	n/r	<i>0.005</i>
Dissolved Lead	mg/L	0.01	0.1	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Manganese	mg/L	0.4	-	0.0394	0.0613	<i>0.00025</i>
Dissolved Mercury	mg/L	-	0.002	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Nickel	mg/L	0.08	1	0.0011	<i>0.00025</i>	<i>0.00025</i>

Notes:

\*denotes guideline values for aesthetic determinants (G.V.)

All '<' values have been reported as half the detection limit for statistical purposes and are *expressed in italics*

Values which exceeded the DWSNZ MAV are shown in **bold**

n/r – not required

## 2.3 Groundwater Quality Hydraulically Down-Gradient of the New Landfill

Monitoring is carried out within the two main hydrogeological units for bores hydraulically up-gradient of the old landfill and hydraulically down-gradient of the new landfill.

### 2.3.1 Shallow Aquifer

Bores D1, D2, D3rs, D4, D6, and E1S (Refer to Site Plan, Appendix A) are located hydraulically up-gradient of the old landfill, but down-gradient of the new landfill. This means they are not influenced by potential leaching from the old landfill and can act as a warning system for any leaching from the new landfill.

Borehole D5 is located at the south-western corner of the site and is expected to provide an indication of shallow background groundwater quality because it is unlikely to be influenced by either landfill.

It is considered unlikely that leachate from the new landfill would significantly affect groundwater quality due to the leachate collection system which is in place at the new landfill; however, these bores would still provide early warning of any potential problems. It is noted that bore D3r was replaced in June 2021 with two bores; D3rs, which is a shallow bore and D3rd, which is a deep bore. Both have been sampled from October 2021 onwards. It is also noted that new bores D3rs and D3rd are required to be monitored for the comprehensive suite of parameters for the first two years following installation.

The results from the July 2024 monitoring round for these bores are presented in Table 2-3 and the results have been compared with the ANZECC LDW trigger values as per the consent conditions. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **no exceedances of the resource consent conditions during the quarterly (July 2024)** monitoring round in samples from the shallow aquifer.

However, it is noted that the nitrate-N levels at D6 were 54.1 mg/L, which is the maximum value recorded to date, and maximum values were also reached for conductivity (75.3 mS/m). This follows a trend seen last monitoring round. As noted in the last quarterly report, whilst all levels are below the ANZECC LDW trigger values, it is a matter to keep a check on and may merit an assessment in the future to try and identify the cause. In the past this was explained because of the presence of nitrogen fixing gorse plants. To reiterate what was reported last quarter, a website search indicated that it has been recorded that pine trees can also accumulate nitrogen in the soil, so it is possible that the groundwater around bore D6 has been affected by the nearby pine trees.



**Table 2-3: D-Series and E1S Monitoring Bore Results for July 2024**

Determinant	Units	ANZECC LDW	D1	D2	D3rs	D4	D5	D6	E1S
Sampling date			08/07/24	08/07/24	09/07/24	09/07/24	08/07/24	09/07/24	09/07/24
Water Level	mbgl	-	17.3	21.71	6.26	7.18	10.08	16.65	11.72
pH	pH units	6 to 9	6.9	6.3	6.4	7.1	7.2	6.9	7.2
Suspended Solids	mg/l	-	n/r	n/r	3	n/r	n/r	n/r	n/r
Phenol	mg/l	-	n/r	n/r	0.005	n/r	n/r	n/r	n/r
VFA	mg/l	-	n/r	n/r	2.5	n/r	n/r	n/r	n/r
TOC	mg/L	-	n/r	n/r	20.7	n/r	n/r	n/r	n/r
Alkalinity	mg CaCO <sub>3</sub> /L	-	n/r	n/r	86	n/r	n/r	n/r	n/r
Conductivity	mS/m	-	54.7	67.7	23.9	27.8	29.1	75.3	24.5
COD	mg/L	-	7.5	55	62	22	7.5	7.5	7.5
scBOD <sub>5</sub>	mg/L	-	0.5	1	3	0.5	0.5	0.5	0.5
<i>E. coli</i>	cfu/100ml	100	50	50	50	50	50	50	50
Chloride	mg/L	-	29.8	98.8	18	29.6	28.7	55.1	28.7
Nitrate-N	mg/L	90.3	6.34	0.005	0.005	0.005	1.34	54.1	0.005
Sulphate	mg/L	1000	n/r	n/r	0.27	n/r	n/r	n/r	n/r
Ammoniacal-N	mg/L	-	0.005	0.99	0.78	0.24	0.005	0.005	0.15
Hardness	mg CaCO <sub>3</sub> /L	-	n/r	n/r	50	n/r	n/r	n/r	n/r
Calcium	mg/L	1000	n/r	n/r	10.4	n/r	n/r	n/r	n/r
Magnesium	mg/L	-	n/r	n/r	5.86	n/r	n/r	n/r	n/r
Potassium	mg/L	-	n/r	n/r	4.89	n/r	n/r	n/r	n/r
Sodium	mg/L	-	n/r	46.9	21.6	28.1	n/r	n/r	23.9
D.R. Phosphorus	mg/L	-	n/r	n/r	0.093	n/r	n/r	n/r	n/r
Dissolved Aluminium	mg/L	5	0.001	0.005	0.06	0.001	0.001	0.001	0.005
Dissolved Arsenic	mg/L	0.5	n/r	n/r	0.001	n/r	n/r	n/r	n/r
Dissolved Boron	mg/L	5	0.06	0.04	0.05	0.04	0.04	0.07	0.03
Dissolved Cadmium	mg/L	0.01	n/r	n/r	0.0001	n/r	n/r	n/r	n/r
Dissolved Chromium (VI)	mg/L	1	n/r	n/r	0.004	n/r	n/r	n/r	n/r



Determinant	Units	ANZECC LDW	D1	D2	D3rs	D4	D5	D6	E1S
Dissolved Copper	mg/L	0.4	n/r	n/r	<i>0.00025</i>	n/r	n/r	n/r	n/r
Dissolved Iron	mg/L	-	n/r	29.5	18.3	1.99	n/r	n/r	3.6
Dissolved Lead	mg/L	0.1	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Manganese	mg/L	-	<i>0.00025</i>	0.707	0.381	0.201	0.0017	0.0011	0.166
Dissolved Mercury	mg/L	0.002	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Nickel	mg/L	1	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	0.0028	0.0008	<i>0.00025</i>
Dissolved Zinc	mg/L	20	n/r	n/r	<i>0.001</i>	n/r	n/r	n/r	n/r

Notes:

All '<' values have been reported as half the detection limit for statistical purposes and are expressed in italic.

n/r – not required



## 2.3.2 Deep Gravel Aquifer

Bores E1D, C2DD, E2D, Xd1, and the new replacement bore D3rd all penetrate the deeper gravel aquifer. Deep groundwater flow is assumed to be towards the northwest.

Boreholes E2D and C2DD are located to the north-northwest of both the landfills and are therefore considered to be hydraulically down-gradient of both landfills.

Borehole E1D is located to the southwest of the old landfill and it is therefore considered that this bore would be unlikely to be affected by either landfill.

Bore Xd1 was installed in late 2020 as a requirement of the reviewed resource consent conditions (December 2019). It is located on the western boundary of the site and slightly downstream of the old landfill.

Results for the quarterly (July 2024) compliance monitoring round are presented in Table 2-4. The results have been compared with the DWSNZ as per the requirements of discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **eight exceedances of the DWSNZ limits** in samples from the deep gravel aquifer during the July 2024 monitoring round, as follows:

- *E. coli* at E2D was detected at a level of 58 cfu/100mL which exceeds the DWSNZ MAV of NIL. This is quite an unusual occurrence for this bore and is the highest recorded level since 1998. If this occurs in the next sampling round, then it is recommended that the site be inspected to determine if there is evidence of stock or other animals getting next to the bore.
- *E. coli* at D3rd was tested with an incorrect detection limit of 100 cfu/100mL. Since *E. coli* was not detected, it is recorded as being 50 cfu/100mL. As such is it considered to be non-compliant.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.019 mg/L). This is characteristic of D3rd with the levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Hardness at bore D3rd (211 mg CaCO<sub>3</sub>/L) exceeded the DWSNZ MAV of 200 mg CaCO<sub>3</sub>/L. This is characteristic of D3rd with the levels varying between 186 and 223 mg CaCO<sub>3</sub>/L on all sampling occasions.
- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2DD (0.702 mg/L), E2D (0.428 mg/L), Xd1 (0.478 mg/L) and D3rd (0.475 mg/L). The results for C2DD and E2D (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed. Dissolved manganese is generally elevated in the deep aquifer bores.



**Table 2-4: Results for Monitoring Bores within the Deep Aquifer for July 2024**

Determinant	Units	DWSNZ MAV	E1D	C2DD	E2D	Xd1	D3rd
Sampling date			08/07/24	08/07/24*	08/07/24	10/07/24	09/07/24
Water Level	mbgl	-	11.67	2.89	4.98	3.18	6.57
pH	pH units	7 to 8.5*	7.7	7.7	7.6	7.7	7.6
Suspended Solids	mg/l	-	n/r	n/r	n/r	n/r	17
Phenol	mg/l	-	n/r	n/r	n/r	n/r	0.005
VFA	mg/l	-	n/r	n/r	n/r	n/r	2.5
TOC	mg/L	-	n/r	n/r	n/r	n/r	5.8
Alkalinity	mg CaCO <sub>3</sub> /L	-	n/r	236	n/r	n/r	228
Conductivity	mS/m	-	44.4	57.9	44.3	53.8	53.4
COD	mg/L	-	7.5	26	7.5	51	20
scBOD <sub>5</sub>	mg/L	-	0.5	0.5	0.5	0.5	0.5
<i>E. coli</i>	cfu/100ml	NIL	0.5	0.5	<b>58</b>	0.5	<b>50</b>
Chloride	mg/L	250*	40.1	42.2	44.6	60.1	33.2
Nitrate-N	mg/L	11.3	0.005	0.005	0.005	0.005	0.005
Sulphate	mg/L	250*	n/r	0.01	n/r	n/r	0.01
Ammoniacal-N	mg/L	1.17	0.19	0.33	0.26	0.41	0.4
Hardness	mg CaCO <sub>3</sub> /L	200*	n/r	n/r	n/r	n/r	<b>211</b>
Calcium	mg/L	-	n/r	n/r	n/r	n/r	59.8
Magnesium	mg/L	-	n/r	n/r	n/r	n/r	15
Potassium	mg/L	-	n/r	n/r	n/r	n/r	6.92
Sodium	mg/L	200*	33.7	n/r	n/r	n/r	19.9
D.R. Phosphorus	mg/L	-	n/r	n/r	n/r	n/r	1.18
Dissolved Aluminium	mg/L	0.1*	0.001	0.009	0.002	0.001	0.001
Dissolved Arsenic	mg/L	0.01	n/r	n/r	n/r	n/r	<b>0.019</b>
Dissolved Boron	mg/L	1.4	0.05	0.06	0.05	0.05	0.04
Dissolved Cadmium	mg/L	0.004	n/r	n/r	n/r	n/r	0.0001
Dissolved Chromium (VI)	mg/L	0.05	n/r	n/r	n/r	n/r	0.0005
Dissolved Copper	mg/L	2	n/r	n/r	n/r	n/r	0.00025
Dissolved Iron	mg/L	0.2*	0.03	n/r	n/r	n/r	0.03
Dissolved Lead	mg/L	0.01	0.00025	0.00025	0.0007	0.00025	0.00025
Dissolved Manganese	mg/L	0.4	0.245	<b>0.702</b>	<b>0.428</b>	<b>0.478</b>	<b>0.475</b>
Dissolved Mercury	mg/L	-	0.00025	0.00025	0.00025	0.00025	0.00025
Dissolved Nickel	mg/L	0.08	0.0028	0.00025	0.00025	0.00025	0.00025
Dissolved Zinc	mg/L	1.5*	n/r	n/r	n/r	n/r	0.001

Notes:

\*Denotes DWSNZ guideline values for aesthetic determinants (GV)

# Sampling date was recorded as 07/07/24, but it is assumed to be incorrect, and should be 08/07/24.

**Bold** – denotes an exceedance of the DWSNZ MAV

All '<' values have been reported as half the detection limit for statistical purposes and are expressed in italics

n/r – not required



## 2.4 Impact of Old Landfill on Groundwater Quality

Water sampling is carried out to characterise the groundwater quality in a series of shallow bores situated hydraulically down-gradient from the old unlined landfill.

The Series B boreholes are located within 50m of the old landfill in a line along its northern edge.

The Series C boreholes are located further down the hydraulic gradient from the old landfill towards Hokio Beach Road to detect whether leachate is moving off site.

Borehole E2S is located northwest of the old landfill to detect any leachate moving directly towards the nearest house down-stream of the site.

Bore G2S was installed in late 2009 and is located to the north of the landfill site, hydraulically down-gradient of the old landfill by Hokio Road and the entrance road to the landfill.

Bores Xs1 and Xs2 are located along Hokio Beach Road, within the road reserve. Bore Xs1 is adjacent to the Northern Farm property and bore Xs2 is next to the driveway leading to a Council-owned property. Bore Xs2 is hydraulically up-gradient of the old landfill (See Site Plan, Appendix A).

The results from the quarterly (July 2024) consent monitoring round for these bores are presented in Table 2-5 and have been compared with the ANZECC LDW trigger values as per the requirements of discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **no exceedances of the ANZECC LDW trigger values** during the July 2024 monitoring round.





**Table 2-5: Monitoring Results for Shallow Boreholes Down-Gradient from the Old Landfill for July 2024**

Determinant	Units	ANZECC LDW	E2S	B1	B2	B3s	C1	C2	C2DS	G2S	Xs1	Xs2
Sampling date			08/07/24	09/07/24	09/07/24	08/07/24	09/07/24	09/07/24	09/07/24	08/07/24	10/07/24	10/07/24
Water level	mbgl	-	5.87	1.3	1.56	0.2	1.18	0.49	2.9	2.36	0.47	2.53
pH	pH units	6 to 9	7.7	6.8	6.7	7.5	7.1	7.5	7.2	7.1	6.6	7.4
Alkalinity	mg CaCO <sub>3</sub> /L	-	n/r	n/r	1320	1230	n/r	1370	584	n/r	n/r	n/r
Conductivity	mS/m	-	34.3	205	278	271	120	312	134	89.5	91.7	27.2
COD	mg/L	-	7.5	194	126	142	57	522	70	7.5	74	17
scBOD5	mg/L	-	0.5	3	1	3	0.5	1.5	1.5	0.5	1.5	0.5
<i>E. coli</i>	cfu/100ml	100	50	50	50	50	50	50	50	50	50	50
Chloride	mg/L	-	38	246	162	120	154	209	101	106	56.7	41.3
Nitrate-N	mg/L	90.3	0.005	0.03	0.05	0.005	0.005	0.05	0.005	0.005	0.005	1.13
Sulphate	mg/L	1000	n/r	n/r	10.5	0.22	n/r	0.07	0.01	n/r	n/r	n/r
Ammoniacal-N	mg/L	-	0.3	35.1	99.7	170	18.1	181	1.52	0.04	6.34	0.02
Sodium	mg/L	-	24.8	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Dissolved Aluminium	mg/L	5	0.003	0.007	0.007	0.003	0.022	0.01	0.001	0.003	0.004	0.003
Dissolved Boron	mg/L	5	0.015	1.6	1.57	1.58	0.79	1.71	0.65	0.69	0.12	0.03
Dissolved Iron	mg/L	-	0.05	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Dissolved Lead	mg/L	0.1	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Dissolved Manganese	mg/L	-	0.252	5.77	4.5	4.17	0.289	0.273	2.36	0.164	0.76	0.0533
Dissolved Mercury	mg/L	0.002	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Dissolved Nickel	mg/L	1	0.00025	0.0077	0.0036	0.0073	0.0009	0.0059	0.0023	0.0024	0.0007	0.00025

Notes:

All '<' values represent a non-detection and have been reported as half the detection limit for statistical purposes and are expressed in italics

n/r – not required



## 2.5 Groundwater Quality Down-Gradient of the Irrigation Area

The F-series boreholes intersect the shallow aquifer down-gradient of the area that was used to irrigate leachate from 2004 to October 2008. All leachate is now pumped to the Levin Wastewater Treatment Plant. The F1 borehole is located within the area where leachate from the new landfill was irrigated. The F2 and F3 boreholes are in an area that was set aside for leachate irrigation but was never used for that purpose. It is expected that bores F2 and F3 would therefore be representative of background groundwater quality.

The results from the F series boreholes are presented in Table 2-6 and have been compared with the ANZECC LDW trigger values, as per discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **no exceedances of the resource consent conditions** in samples from these bores during the July 2024 (quarterly) monitoring round.

**Table 2-6: Results from Monitoring Bores in the Irrigation Area for July 2024**

Determinant	Units	ANZECC LDW	F1	F2	F3
Sampling Date			08/07/24	08/07/24	08/07/24
Water level	mbgl	-	8.38	3.23	5.73
pH	pH units	6 to 9	7.2	7.3	7.4
Conductivity	mS/m	-	51.3	22.3	17.4
COD	mg/L	-	7.5	7.5	7.5
scBOD5	mg/L	-	0.5	0.5	0.5
<i>E. coli</i>	cfu/100ml	100	50	50	50
Chloride	mg/L	-	78.8	23.1	13
Nitrate-N	mg/L	90.3	3.54	0.55	1.58
Ammoniacal-N	mg/L	-	0.02	0.005	0.005
Sodium	mg/L	-	n/r	n/r	19.7
Dissolved Aluminium	mg/L	5	0.001	0.001	0.001
Dissolved Boron	mg/L	5	0.015	0.04	0.015
Dissolved Iron	mg/L	-	n/r	n/r	0.005
Dissolved Lead	mg/L	0.1	0.00025	0.00025	0.00025
Dissolved Manganese	mg/L	-	0.0075	0.0035	0.00025
Dissolved Mercury	mg/L	0.002	0.00025	0.00025	0.00025
Dissolved Nickel	mg/L	1	0.00025	0.00025	0.00025

Notes:

All '<' values have been reported as half the detection limit for statistical purposes and are *expressed in italics*

n/r – not required

## 2.6 Leachate Effluent Results

Leachate effluent from the landfill is not subject to any water quality consent conditions and is sent to the Levin Wastewater Treatment Plant for treatment. However, for comparison purposes, typical leachate characteristics for landfills, as published by the Waste Management Institute New Zealand (*Technical Guidelines for Disposal to Land*, September 2023, WasteMINZ), have been compared against the leachate quality monitoring results (Table 2-7). The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D

As stated, typical leachate concentrations are derived from tables presented in the WasteMINZ *Technical Guidelines*. The data in those tables originate from seven landfills in New Zealand and date back to between 1998 and 1999. Whilst more updated data could be sought for comparison purposes, the WasteMINZ Guidelines are the latest version, and no updated information has been provided.

Table 2-7 presents the concentrations of monitored parameters for leachate effluent samples collected in May 2024, June 2024, and July 2024.



Up until April 2022, samples of leachate were tested monthly for the comprehensive suite of parameters, as stated in Table C under condition 3H of discharge permit ATH-2002003983.02. This requirement was for 2 years and condition 3P of discharge permit ATH-2002003983.02 allows the monitoring frequency to shift to a conditional sampling frequency (i.e., six monthly comprehensive, quarterly indicator) if water sample analysis results are consistent and there is no decline in water quality over a period of at least four consecutive sampling rounds. The quality of leachate is considered to have met these criteria and so the change in monitoring from April 2022 was justified. The resource consent conditions allowed this change to occur immediately after the four consecutive sampling rounds were completed. However, it was later decided to continue monthly sampling for the duration that monthly sampling at Hokio Stream was required.

There were **fifteen outliers** from the typical leachate characteristics in the May 2024, June 2024, and July 2024 results. Six of these were for parameters having **less** concentration than the typical minimal concentrations.

- TOC exceeded the maximum typical concentration in May 2024 and June 2024.
- Alkalinity exceeded the maximum typical concentration in all three months.
- Nitrate-N was less than the minimum typical concentration in May 2024.
- Ammonia-N exceeded the maximum typical concentration in June 2024.
- Dissolved arsenic exceeded the maximum typical concentration in all three months.
- Dissolved cadmium was not detected in all three months and was therefore less than the minimum typical concentrations.
- Dissolved copper was less than the minimum typical concentration in July 2024.
- Dissolved lead was less than the minimum typical concentration in July 2024.

While these results are not reflective of typical conditions at other, similar landfills around New Zealand, it is noted that they are generally consistent with the historical range of results observed at the Levin Landfill site.

**Table 2-7: Results from Leachate Effluent Monitoring for May 2024, June 2024, and July 2024**

Determinant	Units	Typical Leachate Characteristics* (range)	May 2024	June 2024	July 2024
Sampling Date			15/05/24	20/06/24	11/07/24
pH		5.9 - 8.5	7.7	7.7	7.7
Suspended Solids	mg/l	-	23	60	24
Phenol	mg/L	-	n/p	n/p	n/p
VFA	mg/L	-	2.5	2.5	2.5
TOC	mg/L	17.2 - 822	<b>862</b>	<b>921</b>	733
Alkalinity	mg CaCO <sub>3</sub> /L	264 – 6,820	<b>7,670</b>	<b>7,530</b>	<b>7,800</b>
Conductivity	mS/m	308 – 27,900	1,860	1,910	1,780
COD	mg/L	84 – 5,090	3,440	2,810	2,760
scBOD <sub>5</sub>	mg/L	12 – 3,867	103	147	122
E-Coli	cfu/100mL	-	50	100	50
Chloride	mg/L	45 – 2,584	1,120	1,220	986
Nitrate-N	mg/L	0.1 – 50**	<b>0.05</b>	0.5	0.13
Sulphate	mg/L	1 - 780	89.9	48.9	62.8
Ammonia-N	mg/L	3.4 – 1,440	19.3	<b>1,530</b>	1,250
Hardness	mg CaCO <sub>3</sub> /L	300 – 11,500**	395	485	397
Calcium	mg/L	20 – 600***	82.4	95.8	72.4
Magnesium	mg/L	40 – 350***	46	59.7	52.5
Potassium	mg/L	10 – 2,500**	680	834	622
Sodium	mg/L	50 – 4,000**	965	1,120	902
D.R. Phosphorus	mg/L	-	14.5	15.9	13
Dissolved Aluminium	mg/L	-	0.864	0.89	0.721
Dissolved Arsenic	mg/L	0.006 – 0.191	<b>0.267</b>	<b>0.296</b>	<b>0.226</b>
Dissolved Boron	mg/L	0.54 – 20	7.49	5.56	6.47
Dissolved Cadmium	mg/L	0.0005 – 0.140**	<b>0.0001</b>	<b>0.0001</b>	<b>0.0001</b>



Determinant	Units	Typical Leachate Characteristics* (range)	May 2024	June 2024	July 2024
Dissolved Chromium	mg/L	0.005 – 50.4	0.842	0.967	0.672
Dissolved Copper	mg/L	0.004 – 1.4**	0.0056	0.0071	<b>0.0028</b>
Dissolved Iron	mg/L	1.6 – 220	6.95	7.86	6.25
Dissolved Lead	mg/L	0.001 - 0.42	0.0017	0.0016	<b>0.0006</b>
Dissolved Manganese	mg/L	0.03 - 45***	1.15	1.29	1.1
Dissolved Mercury	mg/L	0.0002 – 0.05**	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Nickel	mg/L	0.02 – 2.05**	0.128	0.141	0.0977
Dissolved Zinc	mg/L	0.015 – 24.2	0.063	0.067	0.037

Notes:

\* For Class 1-type landfills, Table 5-5, p60, Technical Guidelines for Disposal to Land, WasteMINZ September 2023

\*\*Data taken from Table 5-4, p59 of the same guideline, for parameters for which no differences in concentrations between the phases of landfill development could be observed

\*\*\*Data taken from Table 5-4, p59 of the same guideline, for parameters during the methanogenic phase

**Bold** – denotes a deviation from the typical leachate characteristics range

All '<' values have been reported as half the detection limit for statistical purposes and are expressed in italics

n/p – not provided

## 2.7 Northern Farm Drain (Tatana Property)

A drain is located on the Northern Farm, previously known as the Tatana Property (see Site Plan in Appendix A). Since July 2015 HDC has agreed to sample surface water from this drain for a selection of parameters that were set by HRC. Four sampling points were selected to represent the top of the drain (SW1), middle of the drain (SW2 and SW3) and lower drain (SW4) respectively.

The revised consent conditions have since reduced the extent of sampling to a single location. This is known as 'TD1' and is the same sampling location as for the previously denoted 'SW3'. The resource consent conditions require six monthly comprehensive and quarterly indicator sampling at TD1. However, HDC has been conducting monthly sampling at TD1, in line with the surface water sampling of the Hoki Stream.

Results from the May 2024, June 2024 and July 2024 sampling rounds are presented in Table 2-8 and have been compared with the ANZECC AE<sup>3</sup> (95%ile) DGVs, as per the revised resource consent conditions.

There have been **five exceedances of the resource consent conditions** for two monitored parameters in samples from the Northern Farm property at the TD1 location during the May 2024, June 2024, and July 2024 sampling rounds.

- The concentration of nitrate-N in May 2024 (0.59 mg/L), June 2024 (1.13 mg/L) and July 2024 (5.06 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.16 mg/L. This site has commonly presented elevated levels.
- The concentration of ammoniacal-N in May 2024 (7.91 mg/L) and June 2024 (16.0 mg/L) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.

Whilst relatively high, these results are not uncharacteristic of results within the last two years. Localised conditions, such as having stock in the paddock next to Northern Farm Drain and the slow flow of water in the drain, may contribute to some of the elevated parameters.

<sup>3</sup>Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Aquatic Ecosystems (AE), Australian and New Zealand Environment and Conservation Council (ANZECC), Canberra, Australia, 2000



**Table 2-8: Northern Farm Drain Monitoring Results for May 2024, June 2024, and July 2024.**

Determinant	Units	ANZECC AE DGV (95%ile species protection)	TD1 (formerly SW3)		
			May 2024	June 2024	July 2024
Sampling date			15/05/24	20/06/24	11/07/24
pH	pH units	-	7.3	7.4	7.2
Suspended Solids	mg/L	-	119	229	518
Phenol	mg/L	-	<i>0.005</i>	<i>0.005</i>	<i>0.005</i>
VFA	mg/L	-	2.5	2.5	2.5
TOC	mg/L	-	27.4	26	48.5
Alkalinity	mg CaCO <sub>3</sub> /L	-	221	337	187
Conductivity	mS/m	-	74.2	97.6	65.7
COD	mg/L	-	125	147	389
scBOD5	mg/L	2	<i>0.5</i>	<i>1.5</i>	<i>0.5</i>
<i>E-Coli</i>	cfu/100ml	-	50	50	100
Chloride	mg/L	-	85.9	85.8	77
Nitrate-N	mg/L	0.16	<b>0.59</b>	<b>1.13</b>	<b>5.06</b>
Sulphate	mg/L	-	6.54	3.14	4.52
Ammoniacal-N	mg/L	2.1	<b>7.91</b>	<b>16.0</b>	1.49
Hardness	mg CaCO <sub>3</sub> /L	-	155	262	149
Calcium	mg/L	-	33.5	63.3	24.8
Magnesium	mg/L	-	17.2	25.2	21.2
Potassium	mg/L	-	20.6	28.3	21.6
Sodium	mg/L	-	55.6	71.5	58.9
D.R. Phosphorus	mg/L	-	0.027	0.038	0.028
Dissolved Aluminium	mg/L	0.055	0.01	0.008	0.011
Dissolved Arsenic	mg/L	0.024	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>
Dissolved Boron	mg/L	-	0.34	0.27	0.31
Dissolved Cadmium	mg/L	0.0002	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>
Dissolved Chromium	mg/L	-	0.001	<i>0.0005</i>	<i>0.0005</i>
Dissolved Copper	mg/L	0.0014	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Iron	mg/L	-	0.36	0.2	0.25
Dissolved Lead	mg/L	0.0034	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Manganese	mg/L	1.9	0.0513	0.433	0.0127
Dissolved Mercury	mg/L	0.0006	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Nickel	mg/L	0.011	0.0015	0.0017	0.0012
Dissolved Zinc	mg/L	0.008	<i>0.001</i>	0.004	<i>0.001</i>

Notes:

**Bold** – denotes an exceedance of the ANZECC AE DGV for 95%ile species protection

All '<' values have been reported as half the detection limit for statistical purposes and are expressed in italics



## 2.8 Hokio Stream

Surface water grab samples are obtained monthly from Hokio Stream at sites HS1A, HS1, HS2 and HS3 (refer to Appendix A) to investigate whether groundwater containing leachate is having an adverse environmental effect on the stream. Sites HS1A and HS1 are situated up-stream of the old landfill, HS2 is situated alongside the old landfill and up-stream of the Northern Farm Drain discharge, and HS3 is located approximately 50 m down-stream of the landfill site property boundary and the Northern Farm Drain discharge. Samples from these monitoring locations on Hokio Stream are analysed for a comprehensive suite of parameters every month (as shown in Appendix C).

Results from the May 2024, June 2024, and July 2024 monitoring rounds are presented in Table 2-9 and have been compared with the ANZECC AE (95%ile) DGVs, as per the revised resource consent conditions (2019). Sampling of HS1A commenced in April 2020.

There were **twelve exceedances** of the resource consent conditions in samples from the Hokio Stream during the May 2024, June 2024, and July 2024 sampling rounds. All exceedances were for nitrate-N which exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at all sites in all three months, with values ranging between 0.19 mg/L and 0.93 mg/L.

For this monitoring period overall, the differences in monitoring results between the sites are generally marginal and for most determinants there is little to no change in concentrations between upstream and downstream sites on the Hokio Stream. *E. coli* counts have shown some significant differences between sites and sampling rounds. However, the *E. coli* counts noted in this report are within the historical range since sampling began in 1994.

Consecutive monthly sampling and testing for the comprehensive suite of parameters has occurred at all Hokio Stream sites since October 2021. It is recommended that HDC assess the results of these 34 sampling events, as required by the conditions of the consent, to determine the significance of the results, and to ascertain, in conjunction with HRC, if a reduction in sampling frequency can be made.



Table 2-9: Hokia Stream Monitoring Results for May 2024, June 2024, and July 2024.

Determinant	Units	ANZECC AE DGV (95%ile species protection)	Consent Trigger Values (Table C1)	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3
				May 2024				June 2024				July 2024			
Sampling date				15/05/24	15/05/24	15/05/24	15/05/24	20/06/24	20/06/24	20/06/24	20/06/24	11/07/24	11/07/24	11/07/24	11/07/24
pH	pH units	-	-	7.7	7.6	7.6	7.4	7.7	7.6	7.7	7.5	7.5	7.8	7.7	7.4
Suspended Solids	mg/l	-	-	13	6	2.5	34	41	1.5	1.5	21	3	3	3	49
Phenol	mg/l			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
VFA	mg/l			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TOC	mg/L	-	-	6.2	5.1	5.2	5.4	4.0	3.8	3.9	4.2	3.9	3.8	4.1	4.6
Alkalinity	mg CaCO <sub>3</sub> /L	-	-	62	62	65	66	51	52	55	57	53	53	56	57
Conductivity	mS/m	-	-	25.3	25.3	26.1	26.7	24.6	24.7	25.4	26	24.2	24.3	25.2	25.7
COD	mg/L	-	-	33	18	7.5	17	31	7.5	21	30	16	7.5	7.5	24
scBOD <sub>5</sub>	mg/L	2	Monthly Avg. 2	0.5	0.5	0.5	0.5	2	0.5	0.5	1	1	0.5	0.5	0.5
<i>E. coli</i>	cfu/100ml	-	-	50	50	50	50	800	200	400	200	50	50	50	100
Chloride	mg/L	-	-	28.5	25.9	27.1	27.7	24.5	24.6	26	26.7	24.9	26.2	26.8	27
Nitrate-N	mg/L	0.16	0.16	<b>0.22</b>	<b>0.19</b>	<b>0.25</b>	<b>0.30</b>	<b>0.89</b>	<b>0.89</b>	<b>0.92</b>	<b>0.93</b>	<b>0.28</b>	<b>0.28</b>	<b>0.34</b>	<b>0.39</b>
Sulphate	mg/L	-	-	18.5	16.7	16.6	16.5	19.8	19.7	20	19.6	21.2	22.5	21.8	21.5
Ammoniacal-N	mg/L	2.1	Max. 2.1 Avg. 0.400	0.005	0.05	0.05	0.15	0.05	0.04	0.09	0.14	0.1	0.16	0.15	0.1
Hardness	mg CaCO <sub>3</sub> /L	-	-	62	63	66	68	59	61	65	66	71	69	74	74
Calcium	mg/L	-	-	13.3	13.7	14.3	14.6	12.6	13.1	14.1	14.4	14.4	14	15.1	15.3
Magnesium	mg/L	-	-	7.08	7.12	7.33	7.64	6.6	6.88	7.36	7.36	8.47	8.27	8.77	8.77
Potassium	mg/L	-	-	2.92	2.64	2.68	2.83	2.72	2.73	2.98	3.26	2.81	2.5	2.83	2.92
Sodium	mg/L	-	-	19.4	20.3	17.9	19.2	20	20.9	22.2	22.7	23.8	23.6	25	25
D.R. Phosphorus	mg/L	-	-	0.009	0.114	0.04	0.047	0.043	0.039	0.039	0.041	0.013	0.014	0.033	0.02
Dissolved Aluminium	mg/L	0.055	Med. 0.055	0.011	0.006	0.006	0.006	0.004	0.004	0.005	0.004	0.005	0.005	0.004	0.004
Dissolved Arsenic	mg/L	0.024	Med. 0.024	0.0005	0.0005	0.0005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005



Determinant	Units	ANZECC AE DGV (95%ile species protection)	Consent Trigger Values (Table C1)	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3
				May 2024				June 2024				July 2024			
Dissolved Boron	mg/L	0.370	-	0.07	0.08	0.06	0.06	0.04	0.04	0.04	0.04	0.06	0.07	0.07	0.07
Dissolved Cadmium	mg/L	0.0002	Med. 0.0002	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>
Dissolved Chromium (VI)	mg/L	0.001	-	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>	<i>0.0005</i>
Dissolved Copper	mg/L	0.0014	Med. 0.0014	0.0008	0.0006	0.0008	0.0008	0.0007	0.0006	0.0007	0.0011	0.001	0.0007	0.0009	0.0011
Dissolved Iron	mg/L	-	-	0.08	0.07	0.09	0.09	0.03	0.03	0.05	0.03	0.05	0.05	0.06	0.06
Dissolved Lead	mg/L	0.0034	Med. 0.0034	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Manganese	mg/L	1.9	-	0.0053	0.0091	0.0123	0.0066	0.0083	0.0118	0.0176	0.0103	0.008	0.0107	0.0133	0.0138
Dissolved Mercury	mg/L	0.0006	Med. 0.0006	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>
Dissolved Nickel	mg/L	0.011	Med. 0.011	0.0006	<i>0.00025</i>	0.0006	0.0007	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	0.0006	<i>0.00025</i>	<i>0.00025</i>	<i>0.00025</i>	0.0005
Dissolved Zinc	mg/L	0.008	Med. 0.008	0.006	<i>0.001</i>	0.003	0.002	0.003	<i>0.001</i>	0.002	0.006	0.003	0.002	0.004	0.005

Notes:

**Bold** – denotes an exceedance of the ANZECC AE 95% protection level trigger values

Underlined – denotes exceedance of the Consent Trigger Value.

All '<' values have been reported as half the detection limit for statistical purposes and are expressed in italics





## 3 Landfill Gas Detection in Monitoring Wells

Condition 4 of Discharge Permit ATH-2002003984.02 requires that: “...*groundwater monitoring wells shall be sampled for landfill gas when groundwater samples are taken from the wells. As a minimum, sampling shall be undertaken for methane, carbon dioxide and oxygen...*”

In the past, landfill gas monitoring results were only reported in the Annual Report. A recommendation of the 2019 - 2020 Annual Report was that these results should be included in every quarterly monitoring report so that if any results are unusually high, appropriate action can be promptly undertaken, including putting safeguards in place at the monitoring bores.

Appendix E summarises the results of landfill gas monitoring undertaken on 4 and 11 July 2024. As noted last report, this is not the date of sampling of the groundwater bores, which somewhat nullifies part of the reason for doing the gas monitoring when the groundwater sampling is done.

Out of the 27 groundwater monitoring bores:

- Methane was recorded at one bore – D6 (concentration of 0.01%). This concentration is well below the explosive limit of 5%, and therefore represents a ‘safe’ level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites.
- Carbon dioxide was recorded at all bores, but at relatively minor concentrations – the highest being 1.11% at bore B2. Historically, fluctuations have been seen across the bores, and July concentrations are within historical ranges.
- Hydrogen sulphide was detected at one bore (Xs1) – at 1 ppm.
- The landfill gas levels in July 2024 appear to reinforce the previous three sampling rounds’ observed reduction in measured gases in comparison to previous quarters. Gas results may be due to season variations (e.g., different ground temperatures and/or groundwater levels), or may be related to prevailing weather conditions (e.g., different air pressures).

The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring. No smoking should be permitted when personnel undertake groundwater sampling and when in the vicinity of the groundwater monitoring wells, or in fact anywhere else on the Levin Landfill site. For sake of safety a personal gas detector should be worn by all staff when working in the vicinity of the landfill.

## 4 Sampling Quality Control and Assurance

The landfill extends over a significant area and there are many sampling locations. However, it is important that the time span of the sampling period is kept as short as possible because more infrequent (or erratic) sampling can make it difficult to compare results between rounds and determine trends at individual monitoring locations.

The surface water and groundwater samples were collected within a 7-day period, though most of the surface water samples were received by the laboratory outside the normally accepted 24-hour timeframe between sampling and reception. This could affect the reliability of the results, which reduces the confidence in comparing the results with historical data.

The laboratory reports for four of the groundwater bores and for the June 2024 surface water samples showed the recorded “Sampled Time” as being at night, which is assumed to be incorrect. For two of the groundwater samples the recorded date and time of receipt of the sample at the laboratory was before the recorded date and time of sampling, which is nonsensical.

## 5 Consent Compliance

Discharge permit ATH-2002003983.02 states that quarterly and annual monitoring results for the shallow groundwater aquifer (sand aquifer) shall comply with the ANZECC LDW trigger values, and samples from the deep groundwater (gravel aquifer) shall comply with the applicable DWSNZ values. Furthermore, samples taken from surface water bodies shall comply with ANZECC AE (95%ile) DGVs. Should any parameters exceed these standards, the permit holder shall report to the Regional Council as soon as practicable on the significance of the results and, where the change can be



attributed to the influence of landfill leachate, consult with the Regional Council to determine if further investigations or remedial measures are required.

#### Background Groundwater Quality

The quality of the natural background groundwater up-gradient from the landfill site is not subject to any consent conditions.

#### Shallow Aquifer and Irrigation Area

There were **no exceedances** of consent conditions hydraulically up-gradient of the old landfill and down-gradient of the new landfill during this quarterly (July 2024) monitoring period.

There were **no exceedances** of consent conditions hydraulically down-gradient of the old landfill during this quarterly (July 2024) monitoring period.

There were **no exceedances** of the resource consent conditions during this quarterly (July 2024) sampling round for samples obtained from bores within the old irrigation area.

#### Deeper Gravel Aquifer

There were **eight exceedances of the DWSNZ limits** in samples from the deep gravel aquifer during the July 2024 monitoring round, as follows:

- *E. coli* at E2D was detected at a level of 58 cfu/100mL which exceeds the DWSNZ MAV of NIL. This is quite an unusual occurrence for this bore and is the highest recorded level since 1998.
- *E. coli* at D3rd was tested with an incorrect detection limit of 100 cfu/100mL. Since *E. coli* was not detected, it is recorded as being 50 cfu/100mL and, as such, is it considered to be non-compliant.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.019 mg/L). This is characteristic of D3rd with the levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Hardness at bore D3rd (211 mg CaCO<sub>3</sub>/L) exceeded the DWSNZ MAV of 200 mg CaCO<sub>3</sub>/L. This is characteristic of D3rd with the levels varying between 186 and 223 mg CaCO<sub>3</sub>/L on all sampling occasions.
- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2DD (0.702 mg/L), E2D (0.428 mg/L), Xd1 (0.478 mg/L) and D3rd (0.475 mg/L). The results for C2DD and E2D (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed.

#### Leachate Effluent

Leachate effluent from the Levin Landfill is not subject to any water quality consent conditions and is sent to the Levin Wastewater Treatment Plant for treatment.

There were fifteen outliers from the typical leachate characteristics in the May 2024, June 2024, and July 2024 results. Six of these were for parameters having less concentration than the typical minimal concentrations.

#### Northern Farm Drain

There were **five exceedances** of the resource consent conditions for samples from the Northern Farm property at the TD1 location during the May 2024, June 2024, and July 2024 sampling rounds.

- The concentration of nitrate-N in May 2024 (0.59 mg/L), June 2024 (1.13 mg/L) and July 2024 (5.06 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.16 mg/L. This site has commonly presented elevated levels.
- The concentration of ammoniacal-N in May 2024 (7.91 mg/L) and June 2024 (16.0 mg/L) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.

#### Hokio Stream

There were **twelve exceedances** of the resource consent conditions in samples from the Hokio Stream during the May 2024, June 2024, and July 2024 sampling rounds.

- All exceedances were for nitrate-N which exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at all sites in all three months, with values ranging between 0.19 mg/L and 0.93 mg/L.



## 6 Conclusions

Monitoring results obtained in the May 2024 to July 2024 sampling rounds suggest that the groundwater at the background monitoring sites at the Levin Landfill is being impacted by local ground conditions and/or activities up-gradient of the landfill.

During the May 2024 to July 2024 monitoring period, there were twenty-five exceedances of resource consent conditions: eight from the deep gravel aquifer, five in the samples from the Northern Farm Drain (formerly known as Tatana Property Drain), and the remaining twelve from surface water monitoring locations along the Hokio Stream.

Methane was detected in one of the bores in July 2024, D6, with a reading of 0.01%. The methane concentration was well below the explosive limit of 5%, and therefore represents a 'safe' level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites. Minor concentrations of carbon dioxide were recorded at all bores, with the highest being 1.11% at bore B2. Hydrogen sulphide was detected at bore Xs1 at 1 ppm.

The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring.

The following recommendations are made, based on the results of this reporting period:

- Overall, monitoring results at G1S indicate that it is likely modified or impacted by anthropogenic activities, and therefore may not be suitable to use as reliable 'control' location for background water quality in the future. This matter should be reviewed as part of the Annual Report.
- Nitrate-N levels at D6 were the maximum value recorded to date, as was the value recorded for conductivity. Whilst all levels are below the ANZECC LDW trigger values, it is a matter to keep a check on and may merit an assessment in the future to try and identify the cause.
- *E. coli* at E2D was detected at a level of 58 cfu/100mL which exceeded the DWSNZ MAV of NIL. This is an unusual occurrence for this bore and is the highest *E. coli* level since 1998. If *E. coli* levels remain elevated next sampling round, then it is recommended that the site be inspected to determine if there is evidence of stock or other animals getting next to the bore.
- Consecutive monthly sampling has occurred at all Hokio Stream sites for since October 2021. It is recommended that HDC assess the results of these 34 sampling events, as required by the conditions of the consent, to determine the significance of the results, and to ascertain, in conjunction with HRC, if a reduction in sampling frequency can be made.
- Gas sampling of the bores has been recorded on days different from when the groundwater samples were taken. It is recommended that in future the gas sampling be done when groundwater samples are taken.





# Appendices

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# Appendix A Site Plan



PT	NORTHING mN	EASTING mE	RL
ORM 1	659 498.38	276 412.21	38.94
ORM 2	659 510.09	276 422.72	34.98
ORM 3	659 505.14	276 612.86	21.10
ORM 4(OP/W)	659 380.16	276 511.94	30.92
MWH NAIL 1	659 272.67	276 656.87	27.61
MWH NAIL 2	659 278.98	276 695.22	28.40
MWH IT 1	659 267.33	276 576.02	30.03
MWH IT 2	659 361.94	276 627.00	33.70
MWH IT 3	659 428.24	276 593.00	32.74
MWH PEG 1	659 160.94	276 548.30	32.99
MWH PEG 2	659 227.86	276 479.35	30.49
IRII	659 075.85	276 698.70	30.04
OIR	658 903.62	276 579.37	30.35
IRI	659 121.09	276 679.47	40.00
IR	276 625.10	658 981.29	21.30

COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 1949: WANGANUI CIRCUIT

SOIL MONITORING LOCATIONS	CO-ORDINATES		LEVEL (m)
	NORTHING mN	EASTING mE	
PEG A	658 938.80	276 882.30	39.2
PEG B	658 917.00	276 932.10	39.5
PEG C	658 862.70	276 899.00	46.1
PEG D	658 822.90	276 930.40	40.4
PEG E	658 965.50	276 294.00	36.6
PEG F	659 046.20	276 169.10	32.9
PEG G	658 878.00	276 520.20	32.6
PEG H	658 827.40	276 667.60	23.5

BORROW AREA 1 SET-OUT COORDINATES		
POINT NO.	NORTHINGS mN	EASTINGS mE
1	659 230.38	276 453.28
2	659 247.32	276 413.49
3	659 257.33	276 349.62
4	659 280.93	276 269.42
5	659 233.27	276 243.39
6	659 201.34	276 302.68

BORE LOCATIONS AND DETAILS						
BORE HOLE NO	NORTHING mN	EASTING mE	R.L. (m)	DEPTH OF WELL (m)	PIEZOMETER DIAMETER (mm)	FUNCTION
A1	659 060.15	276 944.89	12.95			SHALLOW AQUIFER
A2 (DESTROYED)						SHALLOW AQUIFER
A3 (DESTROYED)						SHALLOW AQUIFER
A4	659 271.67	276 354.72	10.10			SHALLOW AQUIFER
A5	659 530.47	276 185.91	9.62			SHALLOW AQUIFER
B1	659 561.81	276 797.35	9.04	4.3	40	SHALLOW AQUIFER
B1B (STOCK BORE)	659 530.08	276 799.91	9.28	10		
B2	659 576.32	276 683.50	9.42	3.5	50	SHALLOW AQUIFER
B3(s)	659 651.19	276 519.52	7.76	2.83	50	SHALLOW AQUIFER
B3(n)	659 654.26	276 524.38	7.49	2.33	32	DEEP AQUIFER
C1	659 649.64	276 777.83	7.47	3.60	50	SHALLOW AQUIFER
C2	659 680.80	276 631.22	7.50	2.81	32	SHALLOW AQUIFER
C2D(s)	659 671.19	276 641.63	10.13	12.88	32	SHALLOW AQUIFER
C2D(d)	659 671.19	276 641.63	10.11	18.85	32	DEEP AQUIFER
C3	659 704.29	276 246.89	7.22	2.8	32	SHALLOW AQUIFER
D1	659 134.97	276 771.65	27.46	23.69	50	EARLY DETECTION
D2	659 101.02	276 642.06	32.12	29.46	50	EARLY DETECTION
D4	659 293.20	276 356.60	17.97	17.0		SHALLOW AQUIFER
D5	659 020.80	276 022.40	20.65	18		SHALLOW AQUIFER BACKGROUND
D6	659 200.31	276 761.08	26.41	16.07	50	EARLY DETECTION
E1(d)	659 349.54	276 329.48	20.91	37.80	32	SHALLOW AQUIFER
E1(s)	659 349.54	276 329.48	20.91	20.05	32	DEEP AQUIFER
E2(s)	659 667.30	276 354.69	13.15	15.24	32	SHALLOW AQUIFER
E2(d)	659 667.30	276 354.69	13.15	28.66	32	DEEP AQUIFER
F1	659 037.10	276 925.50	18.90	15.0	50	SHALLOW AQUIFER LEACHATE IRRIGATION
F2	659 105.00	276 218.00	13.50	10.2	50	SHALLOW AQUIFER LEACHATE IRRIGATION
F3	658 951.70	276 434.00	16.70	10.5	50	SHALLOW AQUIFER LEACHATE IRRIGATION
G1(s)	658 786.00	277 046.00	24	15	50	SHALLOW AQUIFER BACKGROUND
G1(d)	658 786.00	277 046.00	24	31.5	50	DEEP AQUIFER BACKGROUND
G2	659 673.00	276 835.00	8	4	50	SHALLOW AQUIFER
COORDINATES FOR BORE HOLES BELOW ARE APPROXIMATE ONLY						
D3(r) s	659 089.60	276 585.30	18	10	50	EARLY DETECTION
D3(r) d	659 089.60	276 585.30	18	32	50	EARLY DETECTION
BHXS1	659 797.20	276 617.30	-	4	50	SHALLOW AQUIFER
BHXS2	659 620.80	276 984.30	-	4	50	SHALLOW AQUIFER
BHxD1	659 741.00	276 262.60	-	35	50	DEEP AQUIFER
COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 1949: WANGANUI CIRCUIT						

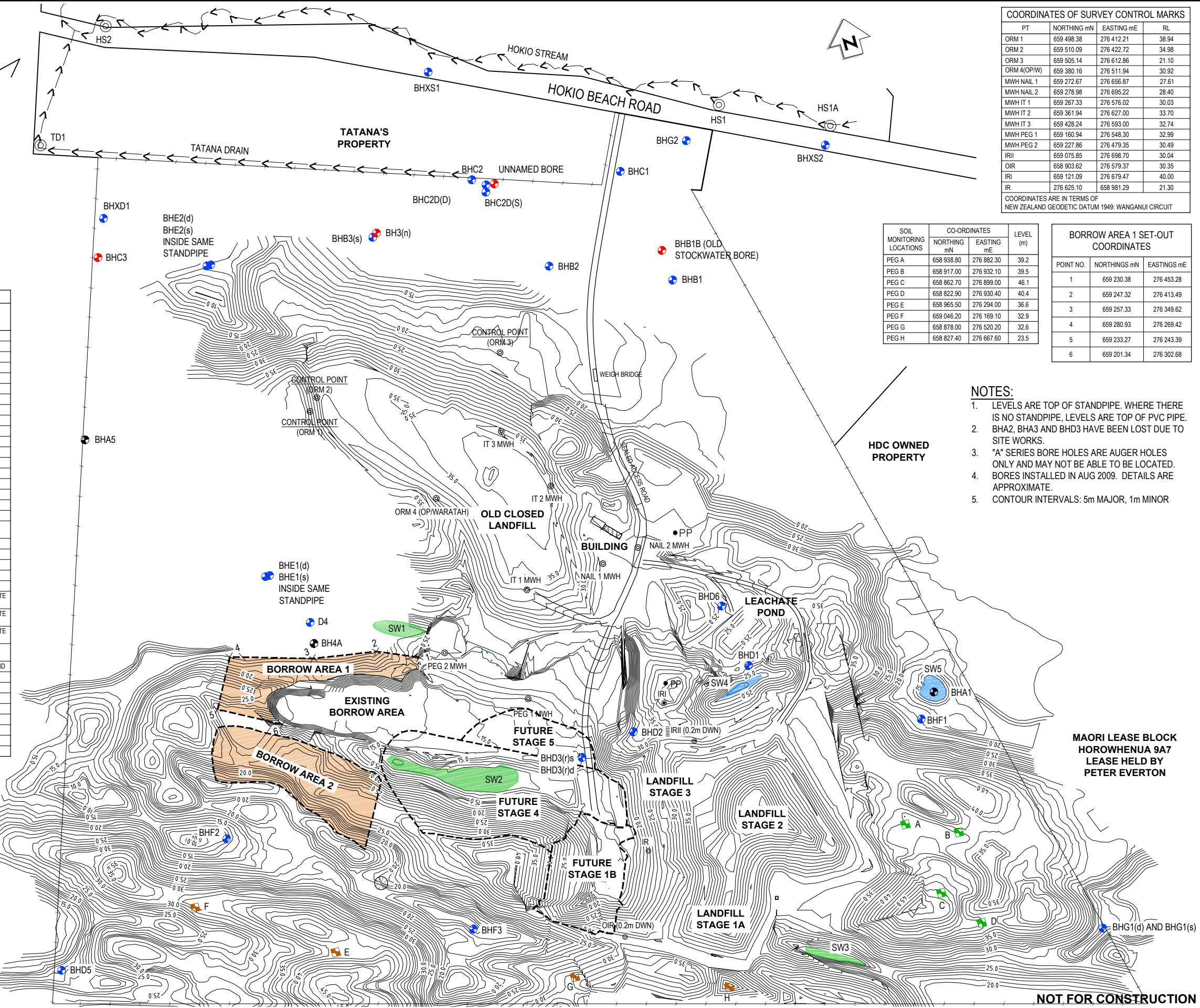
DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

26/08/2019 9:35 a.m.

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- LEGEND**
- ⊙ MONITORING SAMPLING LOCATION
  - ⊕ MONITOR BORES CURRENTLY SAMPLED (FROM JAN 2010)
  - ⊖ BORES NOT SAMPLED
  - ⊙ SHALLOW HANDAUGER STANDPIPES NOT ABLE TO BE LOCATED
  - ⊕ SOIL SAMPLING LOCATION PEG - MONITORED
  - ⊖ SOIL SAMPLING LOCATION PEG - NOT MONITORED
  - 🟢 EXISTING STORMWATER SOAKAGE AREA
  - 🟡 PROPOSED STORMWATER SOAKAGE AREA
  - 🟠 PROPOSED BORROW AREAS



- NOTES:**
- LEVELS ARE TOP OF STANDPIPE. WHERE THERE IS NO STANDPIPE, LEVELS ARE TOP OF PVC PIPE.
  - BHA2, BHA3 AND BHD3 HAVE BEEN LOST DUE TO SITE WORKS.
  - "A" SERIES BORE HOLES ARE AUGER HOLES ONLY AND MAY NOT BE ABLE TO BE LOCATED.
  - BORES INSTALLED IN AUG 2009. DETAILS ARE APPROXIMATE.
  - CONTOUR INTERVALS: 5m MAJOR, 1m MINOR

**NOT FOR CONSTRUCTION**

REV	DESCRIPTION	DATE	BY	CHK	APP	DATE
A	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES	26.08.19	BCJ	PSL	PSL	
B	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES	26.08.19	BCJ	PSL	PSL	
C	HOKIO STREAM AND TATANA DRAIN	23.09.21	BCJ	PSL	PSL	
D	FOR INFORMATION - BORROW AREA 2 RELOCATED, DEFINED AREAS OF FUTURE STAGES 1B, 4 AND 5	01.06.21	BCJ	PSL	PSL	
E	FOR INFORMATION - BHD3(r)s AND BHD3(d)s ADDED, AND CONTOURS UPDATED FROM JULY 2021 SURVEY	24.09.21	BCJ	PSL	PSL	

SURVEYED	MWH
DESIGNED	N/A
DRAWN	Brent James 08.2019
CAD REVIEW	Brent James 23.09.21
APPROVED	Phil Landmark 23.09.21
PROF REGISTRATION:	

**HOROWHENUA DISTRICT COUNCIL**  
**LEVIN LANDFILL**

**MONITORING BORES, SOIL SAMPLING LOCATIONS & BORROW AREAS**  
**SITE PLAN, LOCATION AND DETAILS**

**FOR INFORMATION ONLY**

Date Stamp: **24.09.21**

Scales: 1:2000 (A1) 1:4000 (A3)

Drawing No: **310101088-19-001-G001**

Rev: **E**

# Appendix B Analytical Results





## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042432-01	REPORT DATE	17/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00099186

**Sample Name** 354892-0

**Product:** Ground water

**Sampling Point code:** WIL-B1

**Sampling Point name:** Levin B1

**Reception Date & Time:** 09/07/2024 16:22

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 11:14

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179</b>	<b>Ammonia Nitrogen</b>			
	Ammoniacal nitrogen (N)	35.1	(± 3.51) mg/l	0.01
<b>NW341</b>	<b>BOD5 - Soluble Carbonaceous</b>			
	BOD5	<6	mg/l	1
<b>NW020</b>	<b>Chemical Oxygen Demand</b>			
	Chemical oxygen demand (COD)	194	mg/l	15
<b>NW007</b>	<b>Chloride</b>			
	Chloride (Cl)	246	(± 24.6) mg/l	0.02
<b>NW023</b>	<b>Conductivity</b>			
	Conductivity	205	(± 4.1) mS/m	0.1
<b>NW098</b>	<b>Dissolved Aluminium</b>			
	Aluminium	0.007	mg/l	0.002
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	1.60	mg/l	0.03
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	5.77	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0077	mg/l	0.0005
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.03	(± 0.00) mg/l	0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>	6.8	(± 0.2)	0.1
	pH			

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

### EXPLANATORY NOTE

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- ② Test is subcontracted within Eurofins group and is accredited
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- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

## Food & Water Testing

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

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**END OF REPORT**

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-043222-01	REPORT DATE	20/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099183</b>
--------------------	--------------------------

**Sample Name** 354893-0

**Product:** Ground water

**Sampling Point code:** WIL-B2

**Sampling Point name:** Levin B2

**Reception Date & Time:** 09/07/2024 16:14

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 20/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 11:29

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	99.7	(± 9.97) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	126	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	162	(± 16.2) mg/l	0.02
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**NW023 Conductivity**

Conductivity	278	(± 5.6) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.007	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	1.57	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	4.50	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	0.0036	mg/l	0.0005
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**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<100	cfu/100 ml	100
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**NW010 Nitrate-N**

Nitrate-N	<0.1	mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	6.7 (± 0.2)	0.1
<b>NW011 Sulphate</b>		
Sulphate	10.5 (± 1.05) mg/l	0.02
<b>NW003 Total Alkalinity</b>		
Alkalinity total	1320 mg CaCO3/l	1

LIST OF METHODS	
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011 <b>Sulphate:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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✔ (Satisfactory) means meets the specification

## Food & Water Testing

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**END OF REPORT**

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042431-01	REPORT DATE	17/07/2024
-------------	--------------------	-------------	------------

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099185</b>
--------------------	--------------------------

**Sample Name** 354894-0

**Product:** Ground water

**Sampling Point code:** WIL-B3

**Sampling Point name:** Levin B3s

**Reception Date & Time:** 09/07/2024 16:22

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 23:51

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	170	(± 17.0) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<6	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	142	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	120	(± 12.0) mg/l	0.02
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**NW023 Conductivity**

Conductivity	271	(± 5.4) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.003	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	1.58	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	4.17	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	0.0073	mg/l	0.0005
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**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<100	cfu/100 ml	100
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**NW010 Nitrate-N**

Nitrate-N	<0.01	mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.5 (± 0.2)	0.1
<b>NW011 Sulphate</b>		
Sulphate	0.22 (± 0.02) mg/l	0.02
<b>NW003 Total Alkalinity</b>		
Alkalinity total	1230 mg CaCO3/l	1

LIST OF METHODS	
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011 <b>Sulphate:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

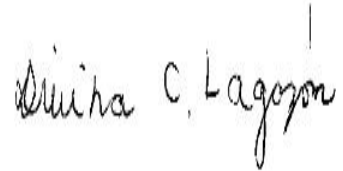
**Signature**



**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited




**Jennifer Mont** Supervisor Eurofins ELS Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited



**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited



**Sunita Raju** Business Unit Manager



**Gabriela Carvalhaes** Manager Chemistry



**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

**EXPLANATORY NOTE**



## Food & Water Testing

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### END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042103-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099188</b>
--------------------	--------------------------

**Sample Name** 354888-0

**Product:** Ground water

**Sampling Point code:** WIL-C1

**Sampling Point name:** Levin C1

**Reception Date & Time:** 09/07/2024 16:27

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 09:08

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	18.1	(± 1.81) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	57	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	154	(± 15.4) mg/l	0.02
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**NW023 Conductivity**

Conductivity	120	(± 2.4) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.022	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.79	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.289	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	0.0009	mg/l	0.0005
-------------	--------	------	--------

**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<100	cfu/100 ml	100
------------------	------	------------	-----

**NW010 Nitrate-N**

Nitrate-N	<0.01	(± 0.00) mg/l	0.01
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## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>	7.1	(± 0.2)	0.1
	pH			

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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## Food & Water Testing

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042433-01	REPORT DATE	17/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00099193

**Sample Name** 354889-0

**Product:** Ground water

**Sampling Point code:** WIL-C2

**Sampling Point name:** Levin C2

**Reception Date & Time:** 09/07/2024 16:32

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 09:28

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
Ammoniacal nitrogen (N)	181	(± 18.1) mg/l	0.01	
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
BOD5	<3	mg/l	1	
<b>NW020 Chemical Oxygen Demand</b>				
Chemical oxygen demand (COD)	522	mg/l	15	
<b>NW007 Chloride</b>				
Chloride (Cl)	209	(± 20.9) mg/l	0.02	
<b>NW023 Conductivity</b>				
Conductivity	312	(± 6.2) mS/m	0.1	
<b>NW098 Dissolved Aluminium</b>				
Aluminium	0.010	mg/l	0.002	
<b>NW103 Dissolved Boron</b>				
Boron (B)	1.71	mg/l	0.03	
<b>NW110 Dissolved Lead</b>				
Lead (Pb)	<0.0005	mg/l	0.0005	
<b>NW113 Dissolved Manganese</b>				
Manganese (Mn)	0.273	mg/l	0.0005	
<b>NW114 Dissolved Mercury</b>				
Mercury (Hg)	<0.0005	mg/l	0.0005	
<b>NW116 Dissolved Nickel</b>				
Nickel (Ni)	0.0059	mg/l	0.0005	
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
Escherichia coli	<100	cfu/100 ml	100	
<b>NW010 Nitrate-N</b>				
Nitrate-N	<0.1	mg/l	0.01	

## Food & Water Testing

RESULTS (UNCERTAINTY)			LOQ
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.5 (± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>		
	Sulphate	0.07 (± 0.01) mg/l	0.02
<b>NW003</b>	<b>Total Alkalinity</b>		
	Alkalinity total	1370 mg CaCO3/l	1

LIST OF METHODS	
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011 <b>Sulphate:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

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**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042090-01	REPORT DATE	16/07/2024
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 PO Box 642  
 4741 Levin  
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**Phone** +64272491292

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**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00098406</b>
--------------------	--------------------------

**Sample Name** 354883-0

**Product:** Ground water

**Sampling Point code:** WIL-C2dd

**Sampling Point name:** Levin C2dd

**Reception Date & Time:** 08/07/2024 17:38

**Analysis Started on:** 08/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 07/07/2024 22:25

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.33	(± 0.03) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <sup>26</sup>		mg/l	15
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**NW007 Chloride**

Chloride (Cl)	42.2	(± 4.22) mg/l	0.02
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**NW023 Conductivity**

Conductivity	57.9	(± 1.2) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.009	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.06	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.702	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**①ZMF1E Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<1	cfu/100 ml	1
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**NW010 Nitrate-N**

Nitrate-N	<0.01	(± 0.00) mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.7 (± 0.2)	0.1
<b>NW011 Sulphate</b>		
Sulphate	<0.02 (± 0.01) mg/l	0.02
<b>NW003 Total Alkalinity</b>		
Alkalinity total	236 mg CaCO3/l	1

LIST OF METHODS	
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011 <b>Sulphate:</b> APHA Online Edition 4110 B
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NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZMF1E <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222K; APHA 24th Edition

**Signature**

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Vineel Chandra** Supervisor Eurofins ELS Limited

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042102-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099187</b>
--------------------	--------------------------

**Sample Name** 354890-0

**Product:** Ground water

**Sampling Point code:** WIL-C2ds

**Sampling Point name:** Levin C2ds

**Reception Date & Time:** 09/07/2024 16:22

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 09:43

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	1.52	(± 0.15) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<3	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 70	mg/l		15
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**NW007 Chloride**

Chloride (Cl)	101	(± 10.1) mg/l	0.02
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**NW023 Conductivity**

Conductivity	134	(± 2.7) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	<0.002	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.65	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	2.36	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	0.0023	mg/l	0.0005
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**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<100	cfu/100 ml	100
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**NW010 Nitrate-N**

Nitrate-N	<0.01	(± 0.00) mg/l	0.01
-----------	-------	---------------	------

## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.2 (± 0.2)	0.1
<b>NW011 Sulphate</b>		
Sulphate	<0.02 (± 0.01) mg/l	0.02
<b>NW003 Total Alkalinity</b>		
Alkalinity total	584 mg CaCO3/l	1

LIST OF METHODS	
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011 <b>Sulphate:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

**EXPLANATORY NOTE**

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**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

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✔ (Satisfactory) means meets the specification

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042092-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
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**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00098410

**Sample Name** 354897-0

**Product:** Ground water

**Sampling Point code:** WIL-D1

**Sampling Point name:** Levin D1

**Reception Date & Time:** 08/07/2024 17:46

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 12:11

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	<0.01	(± 0.00) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	29.8	(± 2.98) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	54.7	(± 1.1) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	<0.002	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	0.06	mg/l	0.03
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	<0.0005	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>				
	Nitrate-N	6.34	(± 0.63) mg/l	0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>	6.9	(± 0.2)	0.1
	pH			

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

**Cody Forbes** Laboratory Analyst Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042123-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
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**Phone** +64272491292

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**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00098407</b>
--------------------	--------------------------

**Sample Name** 354898-0

**Product:** Ground water

**Sampling Point code:** WIL-D2

**Sampling Point name:** Levin D2

**Reception Date & Time:** 08/07/2024 17:40

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 12:36

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.99	(± 0.10) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	55	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	98.8	(± 9.88) mg/l	0.02
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**NW023 Conductivity**

Conductivity	67.7	(± 1.4) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.005	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.04	mg/l	0.03
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**NW109 Dissolved Iron**

Iron (Fe)	29.5	mg/l	0.01
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.707	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**NW120 Dissolved Sodium**

Sodium (Na)	46.9	mg/l	0.01
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## Food & Water Testing

RESULTS (UNCERTAINTY)			LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>			
Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>			
Nitrate-N	<0.01	(± 0.00) mg/l	0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>			
pH	6.3	(± 0.2)	0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

**Gabriela Carvalhaes** Manager Chemistry

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-043122-01** REPORT DATE **20/07/2024**

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**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00099184**

**Sample Name** 355057-0

**Product:** Ground water

**Sampling Point code:** WIL-D3rd

**Sampling Point name:** Levin D3rd

**Reception Date & Time:** 09/07/2024 16:14

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 20/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 06:44

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.40 (± 0.04) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 20 mg/l 15

**NW007 Chloride**

Chloride (Cl) 33.2 (± 3.32) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6-Trichlorophenol <0.02 mg/l 0.02

**NW023 Conductivity**

Conductivity 53.4 (± 1.1) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium <0.002 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) 0.019 mg/l 0.001

**NW103 Dissolved Boron**

## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.04	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	59.8	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	<0.0005	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.03	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	15.0	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.475	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	6.92	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	1.18	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	19.9	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.6	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	<0.02	(± 0.01) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	17	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	228	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	211	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	5.8	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

#### ① NWWG6 Volatile Fatty Acids (VFA)

Compound	Uncertainty	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

#### LIST OF METHODS

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Sunita Raju** Business Unit Manager

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing



**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

### EXPLANATORY NOTE

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- ② Test is subcontracted within Eurofins group and is accredited
- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

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The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

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All samples become the property of Eurofins to the extent necessary for the performance of the Services.

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Eurofins shall have no liability for any indirect or consequential loss including, without limitation, loss of production, loss of contracts, loss of profits, loss of business or costs incurred from business interruption, loss of opportunity, loss of goodwill or damage to reputation and cost of product recall (including any losses suffered as a result of distribution of the Customer's products subject of the Services prior to the report being released by Eurofins). It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Customer.

Eurofins General Terms and Conditions apply.

**END OF REPORT**

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-043123-01	REPORT DATE	20/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00099194

**Sample Name** 355058-0

**Product:** Ground water

**Sampling Point code:** WIL-D3rs

**Sampling Point name:** Levin D3rs

**Reception Date & Time:** 09/07/2024 16:35

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 20/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 18:59

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.78	(± 0.08) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<6	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	62	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	18.0	(± 1.80) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.2	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6-Trichlorophenol	<0.02	mg/l	0.02
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**NW023 Conductivity**

Conductivity	23.9	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.060	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	0.001	mg/l	0.001
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**NW103 Dissolved Boron**



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.05	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	10.4	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	0.004	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	<0.0005	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	18.3	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	5.86	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.381	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	4.89	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.093	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	21.6	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	6.4	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	0.27	(± 0.03) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<6	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	86	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	50	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	20.7	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing



**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

### EXPLANATORY NOTE

- ① Test is not accredited
- ② Test is subcontracted within Eurofins group and is accredited
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- ⑤ Test is subcontracted outside Eurofins group and is not accredited
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- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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**END OF REPORT**

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042104-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099189</b>
--------------------	--------------------------

**Sample Name** 354891-0

**Product:** Ground water

**Sampling Point code:** WIL-D4

**Sampling Point name:** Levin D4

**Reception Date & Time:** 09/07/2024 16:27

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 08:55

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.24	(± 0.02) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
------	----	------	---

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 22		mg/l	15
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**NW007 Chloride**

Chloride (Cl)	29.6	(± 2.96) mg/l	0.02
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**NW023 Conductivity**

Conductivity	27.8	(± 0.6) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	<0.002	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.04	mg/l	0.03
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**NW109 Dissolved Iron**

Iron (Fe)	1.99	mg/l	0.01
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.201	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**NW120 Dissolved Sodium**

Sodium (Na)	28.1	mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<100	cfu/100 ml 100
<b>NW010 Nitrate-N</b>		
Nitrate-N	<0.01	(± 0.00) mg/l 0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.1	(± 0.2) 0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

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**END OF REPORT**

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042096-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00098415

**Sample Name** 354902-0

**Product:** Ground water

**Sampling Point code:** WIL-D5

**Sampling Point name:** Levin D5

**Reception Date & Time:** 08/07/2024 17:50

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 07:57

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	<0.01	(± 0.00) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	28.7	(± 2.87) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	29.1	(± 0.6) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	<0.002	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	0.04	mg/l	0.03
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	0.0017	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	0.0028	mg/l	0.0005
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>				
	Nitrate-N	1.34	(± 0.13) mg/l	0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.2	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst Laboratory Analyst

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✔ (Satisfactory) means meets the specification



## Food & Water Testing

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**END OF REPORT**

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042107-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00099192

**Sample Name** 354899-0

**Product:** Ground water

**Sampling Point code:** WIL-D6

**Sampling Point name:** Levin D6

**Reception Date & Time:** 09/07/2024 16:32

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 07:13

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	<0.01	(± 0.00) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	55.1	(± 5.51) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	75.3	(± 1.5) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	<0.002	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	0.07	mg/l	0.03
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	0.0011	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	0.0008	mg/l	0.0005
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>				
	Nitrate-N	54.1	(± 5.41) mg/l	0.01

## Food & Water Testing

RESULTS (UNCERTAINTY)	LOQ
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<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>	
pH	
6.9 (± 0.2)	0.1

### LIST OF METHODS

NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-042089-01** REPORT DATE **16/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00098403**

**Sample Name** 354884-0

**Product:** Ground water

**Sampling Point code:** WIL-E1d

**Sampling Point name:** Levin E1d

**Reception Date & Time:** 08/07/2024 17:37

**Analysis Started on:** 08/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 11:09

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.19 (± 0.02) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <15 mg/l 15

**NW007 Chloride**

Chloride (Cl) 40.1 (± 4.01) mg/l 0.02

**NW023 Conductivity**

Conductivity 44.4 (± 0.9) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium <0.002 mg/l 0.002

**NW103 Dissolved Boron**

Boron (B) 0.05 mg/l 0.03

**NW109 Dissolved Iron**

Iron (Fe) 0.03 mg/l 0.01

**NW110 Dissolved Lead**

Lead (Pb) <0.0005 mg/l 0.0005

**NW113 Dissolved Manganese**

Manganese (Mn) 0.245 mg/l 0.0005

**NW114 Dissolved Mercury**

Mercury (Hg) <0.0005 mg/l 0.0005

**NW116 Dissolved Nickel**

Nickel (Ni) 0.0028 mg/l 0.0005

**NW120 Dissolved Sodium**

Sodium (Na) 33.7 mg/l 0.01

## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>① ZMF1E Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<1	cfu/100 ml
		1
<b>NW010 Nitrate-N</b>		
Nitrate-N	<0.01	(± 0.00) mg/l
		0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.7	(± 0.2)
		0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZMF1E <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222K; APHA 24th Edition

**Signature**

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Vineel Chandra** Supervisor Eurofins ELS Limited

**Cody Forbes** Laboratory Analyst

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**✔** (Satisfactory) means meets the specification



## Food & Water Testing

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**END OF REPORT**

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042105-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099190</b>
--------------------	--------------------------

**Sample Name** 354895-0

**Product:** Ground water

**Sampling Point code:** WIL-E1s

**Sampling Point name:** Levin E1s

**Reception Date & Time:** 09/07/2024 16:27

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 07:33

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	<15	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	28.7	(± 2.87) mg/l	0.02
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**NW023 Conductivity**

Conductivity	24.5	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.005	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.03	mg/l	0.03
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**NW109 Dissolved Iron**

Iron (Fe)	3.60	mg/l	0.01
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.166	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**NW120 Dissolved Sodium**

Sodium (Na)	23.9	mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<100	cfu/100 ml 100
<b>NW010 Nitrate-N</b>		
Nitrate-N	<0.01	(± 0.00) mg/l 0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.2	(± 0.2) 0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
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NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Sunita Raju** Business Unit Manager

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042091-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00098408</b>
--------------------	--------------------------

**Sample Name** 354885-0

**Product:** Ground water

**Sampling Point code:** WIL-E2d

**Sampling Point name:** Levin E2d

**Reception Date & Time:** 08/07/2024 17:42

**Analysis Started on:** 08/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 11:42

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.26	(± 0.03) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	<15	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	44.6	(± 4.46) mg/l	0.02
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**NW023 Conductivity**

Conductivity	44.3	(± 0.9) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.002	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.05	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	0.0007	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.428	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**①ZMF1E Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	58	cfu/100 ml	1
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**NW010 Nitrate-N**

Nitrate-N	<0.01	mg/l	0.01
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## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>	7.6	(± 0.2)	0.1
pH			

#### LIST OF METHODS

NW007 <b>Chloride:</b> APHA Online Edition 4110 B NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod. NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod. NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod. NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod. NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod. NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod. NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B ZMF1E <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222K; APHA 24th Edition
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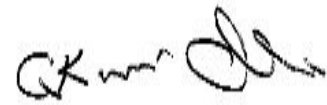
#### Signature



**Jennifer Mont** Supervisor Eurofins ELS Limited



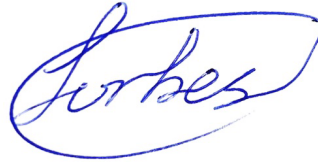
**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited



**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited



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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042106-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
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**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193386

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00099191</b>
--------------------	--------------------------

**Sample Name** 354896-0

**Product:** Ground water

**Sampling Point code:** WIL-E2s

**Sampling Point name:** Levin E2s

**Reception Date & Time:** 09/07/2024 16:32

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 09/07/2024 08:04

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.30	(± 0.03) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	<15	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	38.0	(± 3.80) mg/l	0.02
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**NW023 Conductivity**

Conductivity	34.3	(± 0.7) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.003	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	<0.03	mg/l	0.03
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**NW109 Dissolved Iron**

Iron (Fe)	0.05	mg/l	0.01
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.252	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**NW120 Dissolved Sodium**

Sodium (Na)	24.8	mg/l	0.01
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## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<100	cfu/100 ml 100
<b>NW010 Nitrate-N</b>		
Nitrate-N	<0.01	(± 0.00) mg/l 0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.7	(± 0.2) 0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
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**Signature**

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Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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**✔** (Satisfactory) means meets the specification



## Food & Water Testing

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**END OF REPORT**



## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042292-01	REPORT DATE	17/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00098409

**Sample Name** 354903-0

**Product:** Ground water

**Sampling Point code:** WIL-F1

**Sampling Point name:** Levin F1

**Reception Date & Time:** 08/07/2024 17:43

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 20:45

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	0.02	(± 0.00) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	78.8	(± 7.88) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	51.3	(± 1.0) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	<0.002	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	<0.03	mg/l	0.03
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	0.0075	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>				
	Nitrate-N	3.54	(± 0.35) mg/l	0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.2	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

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**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-042093-01** REPORT DATE **16/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00098411**

**Sample Name** 354904-0

**Product:** Ground water

**Sampling Point code:** WIL-F2

**Sampling Point name:** Levin F2

**Reception Date & Time:** 08/07/2024 17:46

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 09:09

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) <0.01 (± 0.00) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <15 mg/l 15

**NW007 Chloride**

Chloride (Cl) 23.1 (± 2.31) mg/l 0.02

**NW023 Conductivity**

Conductivity 22.3 (± 0.4) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium <0.002 mg/l 0.002

**NW103 Dissolved Boron**

Boron (B) 0.04 mg/l 0.03

**NW110 Dissolved Lead**

Lead (Pb) <0.0005 mg/l 0.0005

**NW113 Dissolved Manganese**

Manganese (Mn) 0.0035 mg/l 0.0005

**NW114 Dissolved Mercury**

Mercury (Hg) <0.0005 mg/l 0.0005

**NW116 Dissolved Nickel**

Nickel (Ni) <0.0005 mg/l 0.0005

**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli <100 cfu/100 ml 100

**NW010 Nitrate-N**

Nitrate-N 0.55 (± 0.06) mg/l 0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.3	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

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**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst Laboratory Analyst

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042094-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team  
 (waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00098412

**Sample Name** 354905-0

**Product:** Ground water

**Sampling Point code:** WIL-F3

**Sampling Point name:** Levin F3

**Reception Date & Time:** 08/07/2024 17:46

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 09:21

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	<0.01	mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	13.0	(± 1.30) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	17.4	(± 0.3) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	<0.002	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	<0.03	mg/l	0.03
<b>NW109 Dissolved Iron</b>				
	Iron (Fe)	<0.01	mg/l	0.01
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	<0.0005	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW120 Dissolved Sodium</b>				
	Sodium (Na)	19.7	mg/l	0.01

## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<100 cfu/100 ml	100
<b>NW010 Nitrate-N</b>		
Nitrate-N	1.58 (± 0.16) mg/l	0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	7.4 (± 0.2)	0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

**Signature**

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**END OF REPORT**

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-042095-01** REPORT DATE **16/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00098414**

**Sample Name** 354886-0

**Product:** Ground water

**Sampling Point code:** WIL-G1D

**Sampling Point name:** Levin G1D

**Reception Date & Time:** 08/07/2024 17:50

**Analysis Started on:** 08/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 13:04

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.10 (± 0.01) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <15 mg/l 15

**NW007 Chloride**

Chloride (Cl) 28.8 (± 2.88) mg/l 0.02

**NW023 Conductivity**

Conductivity 25.7 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium <0.002 mg/l 0.002

**NW103 Dissolved Boron**

Boron (B) 0.03 mg/l 0.03

**NW110 Dissolved Lead**

Lead (Pb) <0.0005 mg/l 0.0005

**NW113 Dissolved Manganese**

Manganese (Mn) 0.0613 mg/l 0.0005

**NW114 Dissolved Mercury**

Mercury (Hg) <0.0005 mg/l 0.0005

**NW116 Dissolved Nickel**

Nickel (Ni) <0.0005 mg/l 0.0005

**①ZMF1E Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli <1 cfu/100 ml 1

**NW010 Nitrate-N**

Nitrate-N <0.01 (± 0.00) mg/l 0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.3	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZMF1E	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222K; APHA 24th Edition

### Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Vineel Chandra** Supervisor Eurofins ELS Limited

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**x** (Unsatisfactory) means does not meet the specification

**✓** (Satisfactory) means meets the specification

## Food & Water Testing

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042124-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
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**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00098413

**Sample Name** 354900-0

**Product:** Ground water

**Sampling Point code:** WIL-G1S

**Sampling Point name:** Levin G1S

**Reception Date & Time:** 08/07/2024 17:50

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 06:49

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	0.05	(± 0.01) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	54	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	34.2	(± 3.42) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	25.2	(± 0.5) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	0.109	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	<0.03	mg/l	0.03
<b>NW109 Dissolved Iron</b>				
	Iron (Fe)	2.26	mg/l	0.01
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	0.0394	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	0.0011	mg/l	0.0005
<b>NW120 Dissolved Sodium</b>				
	Sodium (Na)	34.2	mg/l	0.01

## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>		
Escherichia coli	<100	cfu/100 ml 100
<b>NW010 Nitrate-N</b>		
Nitrate-N	<0.01	(± 0.00) mg/l 0.01
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	6.7	(± 0.2) 0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst Laboratory Analyst

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-042097-01	REPORT DATE	16/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193190

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00098416</b>
--------------------	--------------------------

**Sample Name** 354901-0

**Product:** Ground water

**Sampling Point code:** WIL-G2

**Sampling Point name:** Levin G2s

**Reception Date & Time:** 08/07/2024 17:51

**Analysis Started on:** 09/07/2024

**Analysis Ending Date:** 16/07/2024

**Product Type** Ground water

**Sampled Date & Time** 08/07/2024 07:22

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
	Ammoniacal nitrogen (N)	0.04	(± 0.01) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
	BOD5	<1	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>				
	Chemical oxygen demand (COD)	<15	mg/l	15
<b>NW007 Chloride</b>				
	Chloride (Cl)	106	(± 10.6) mg/l	0.02
<b>NW023 Conductivity</b>				
	Conductivity	89.5	(± 1.8) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>				
	Aluminium	0.003	mg/l	0.002
<b>NW103 Dissolved Boron</b>				
	Boron (B)	0.69	mg/l	0.03
<b>NW110 Dissolved Lead</b>				
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW113 Dissolved Manganese</b>				
	Manganese (Mn)	0.164	mg/l	0.0005
<b>NW114 Dissolved Mercury</b>				
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116 Dissolved Nickel</b>				
	Nickel (Ni)	0.0024	mg/l	0.0005
<b>ZM2GA Enumeration of Escherichia coli by Membrane Filtration</b>				
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010 Nitrate-N</b>				
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01



## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>	7.1	(± 0.2)	0.1
	pH			

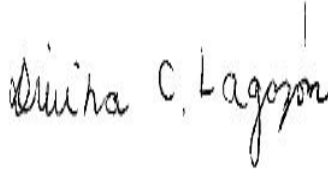
### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

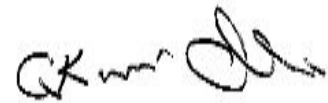
### Signature



**Jennifer Mont** Supervisor Eurofins ELS Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited



**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited



**Arvinder Singh** Laboratory Supervisor Microbiology



**Gabriela Carvalhaes** Manager Chemistry



**Cody Forbes** Laboratory Analyst Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-042436-01	REPORT DATE	17/07/2024
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**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:** EUNZWE-00193668

**Purchase Order Number:** Landfill

<b>SAMPLE CODE</b>	<b>812-2024-00100012</b>
--------------------	--------------------------

**Sample Name** 354887-0

**Product:** Ground water

**Sampling Point code:** WIL-Xd1

**Sampling Point name:** Levin Xd1

**Reception Date & Time:** 11/07/2024 7:30

**Analysis Started on:** 11/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 10/07/2024 08:21

**Sampler(s)** customer

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.41	(± 0.04) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 51		mg/l	15
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**NW007 Chloride**

Chloride (Cl)	60.1	(± 6.01) mg/l	0.02
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**NW023 Conductivity**

Conductivity	53.8	(± 1.1) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	<0.002	mg/l	0.002
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**NW103 Dissolved Boron**

Boron (B)	0.05	mg/l	0.03
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**NW110 Dissolved Lead**

Lead (Pb)	<0.0005	mg/l	0.0005
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**NW113 Dissolved Manganese**

Manganese (Mn)	0.478	mg/l	0.0005
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**NW114 Dissolved Mercury**

Mercury (Hg)	<0.0005	mg/l	0.0005
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**NW116 Dissolved Nickel**

Nickel (Ni)	<0.0005	mg/l	0.0005
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**①ZMF1E Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli	<1	cfu/100 ml	1
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**NW010 Nitrate-N**

Nitrate-N	<0.01	mg/l	0.01
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## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.7	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZMF1E	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222K; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Leo Cleave** Senior Analyst Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
Laboratory Analyst

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-042437-01** REPORT DATE **17/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193668

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00100013**

**Sample Name** 354906-0

**Product:** Ground water

**Sampling Point code:** WIL-Xs1

**Sampling Point name:** Levin Xs1

**Reception Date & Time:** 11/07/2024 7:30

**Analysis Started on:** 11/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 10/07/2024 07:08

**Sampler(s)** customer

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 6.34 (± 0.63) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <3 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 74 mg/l 15

**NW007 Chloride**

Chloride (Cl) 56.7 (± 5.67) mg/l 0.02

**NW023 Conductivity**

Conductivity 91.7 (± 1.8) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.004 mg/l 0.002

**NW103 Dissolved Boron**

Boron (B) 0.12 mg/l 0.03

**NW110 Dissolved Lead**

Lead (Pb) <0.0005 mg/l 0.0005

**NW113 Dissolved Manganese**

Manganese (Mn) 0.760 mg/l 0.0005

**NW114 Dissolved Mercury**

Mercury (Hg) <0.0005 mg/l 0.0005

**NW116 Dissolved Nickel**

Nickel (Ni) 0.0007 mg/l 0.0005

**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli <100 cfu/100 ml 100

**NW010 Nitrate-N**

Nitrate-N <0.01 mg/l 0.01

## Food & Water Testing

	RESULTS (UNCERTAINTY)	LOQ
<b>NW195 pH (Tested beyond 15 minute APHA holding time)</b>		
pH	6.6 (± 0.2)	0.1

LIST OF METHODS	
NW007 <b>Chloride:</b> APHA Online Edition 4110 B	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Leo Cleave** Senior Analyst Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst  
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**END OF REPORT**



## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-042438-01** REPORT DATE **17/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00193668

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00100017**

**Sample Name** 354907-0

**Product:** Ground water

**Sampling Point code:** WIL-Xs2

**Sampling Point name:** Levin Xs2

**Reception Date & Time:** 11/07/2024 7:30

**Analysis Started on:** 11/07/2024

**Analysis Ending Date:** 17/07/2024

**Product Type** Ground water

**Sampled Date & Time** 10/07/2024 07:30

**Sampler(s)** customer

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.02 (± 0.00) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 17 mg/l 15

**NW007 Chloride**

Chloride (Cl) 41.3 (± 4.13) mg/l 0.02

**NW023 Conductivity**

Conductivity 27.2 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.003 mg/l 0.002

**NW103 Dissolved Boron**

Boron (B) 0.03 mg/l 0.03

**NW110 Dissolved Lead**

Lead (Pb) <0.0005 mg/l 0.0005

**NW113 Dissolved Manganese**

Manganese (Mn) 0.0533 mg/l 0.0005

**NW114 Dissolved Mercury**

Mercury (Hg) <0.0005 mg/l 0.0005

**NW116 Dissolved Nickel**

Nickel (Ni) <0.0005 mg/l 0.0005

**ZM2GA Enumeration of Escherichia coli by Membrane Filtration**

Escherichia coli <100 cfu/100 ml 100

**NW010 Nitrate-N**

Nitrate-N 1.13 (± 0.11) mg/l 0.01

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>		
	pH	7.4	(± 0.2)
			0.1

### LIST OF METHODS

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

### Signature

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst Eurofins ELS Limited

**Leo Cleave** Senior Analyst Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**Cody Forbes** Laboratory Analyst Laboratory Analyst

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## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031271-01	REPORT DATE	23/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072169

**Sample Name** 349830-0

**Product:** Ground water

**Sampling Point code:** WIL-HS1

**Sampling Point name:** Levin HS1

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 23/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 08:15

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.05	(± 0.01) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 18	(± 6) mg/l		15
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**NW007 Chloride**

Chloride (Cl)	25.9	(± 2.59) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.02	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6	<0.02	mg/l	0.02
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-Trichlorophenol			
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**NW023 Conductivity**

Conductivity	25.3	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.006	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.08	mg/l	0.03
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	13.7	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0006	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.07	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.12	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0091	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.64	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.114	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	20.3	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.19	(± 0.02) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.6	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	16.7	(± 1.67) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	6	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	62	(± 6) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	63	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	5.1	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Heptanoic acid	<math>\leq 5</math>	mg/l	5
Hexanoic acid	<math>\leq 5</math>	mg/l	5
Isobutyric acid	<math>\leq 5</math>	mg/l	5
Isocaproic acid	<math>\leq 5</math>	mg/l	5
Isovaleric acid	<math>\leq 5</math>	mg/l	5
Propionic acid	<math>\leq 5</math>	mg/l	5
Valeric acid	<math>\leq 5</math>	mg/l	5
Volatile fatty acids as acetic acid	<math>\leq 5</math>	mg/l	5

**LIST OF METHODS**

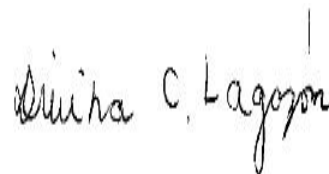
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;math&gt;&lt;100 &gt;6\ 000\ 000 /100\ ml&lt;/math&gt; (0-3) m-FC Agar-F:</b> SMEWW 9222I; APHA 24th Edition

**Signature**


**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited



**Jennifer Mont** Supervisor Eurofins ELS  
Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
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**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited



**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited



**Arvinder Singh** Laboratory Supervisor  
Microbiology

## Food & Water Testing



**Gabriela Carvalho** Manager Food and Water Testing Chemistry

### EXPLANATORY NOTE

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- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

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If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice.

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-038611-01** REPORT DATE **27/06/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:**

EUNZWE-00190253

**SAMPLE CODE** **812-2024-00089997**

**Product:**

**Sampling Point code:** WIL-HS1

**Sampling Point name:** Levin HS1

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:** 27/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)** customer

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.04 (± 0.00) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <15 mg/l 15

**NW007 Chloride**

Chloride (Cl) 24.6 (± 2.46) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6- <0.02 mg/l 0.02

Trichlorophenol

**NW023 Conductivity**

Conductivity 24.7 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.004 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) <0.001 mg/l 0.001

**NW103 Dissolved Boron**

Boron (B) 0.04 mg/l 0.03

**NW104 Dissolved Cadmium**

Cadmium (Cd) <0.0002 mg/l 0.0002



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	13.1	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0006	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.03	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	6.88	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0118	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.73	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.039	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	20.9	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	200	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.89	(± 0.09) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.6	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	19.7	(± 1.97) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<3	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	52	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	61	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	3.8	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

① NWWG6 Volatile Fatty Acids (VFA)

Compound	Uncertainty	Unit	LOQ
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

### LIST OF METHODS

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

### EXPLANATORY NOTE

## Food & Water Testing

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- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

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**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

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## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-043450-01** REPORT DATE **22/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00101059**

**Sample Name** 354910-0

**Product:** Ground water

**Sampling Point code:** WIL-HS1

**Sampling Point name:** Levin HS1

**Reception Date & Time:** 12/07/2024 13:52

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 07:50

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.16 (± 0.02) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <15 mg/l 15

**NW007 Chloride**

Chloride (Cl) 26.2 (± 2.62) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6-Trichlorophenol <0.02 mg/l 0.02

**NW023 Conductivity**

Conductivity 24.3 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.005 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) <0.001 mg/l 0.001

**NW103 Dissolved Boron**

## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.07	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.0	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0007	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.05	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	8.27	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0107	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.50	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.014	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	23.6	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.28	(± 0.03) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.8	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	22.5	(± 2.25) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<6	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	53	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	69	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	3.8	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Result	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing

### EXPLANATORY NOTE

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- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

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If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice.

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### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031272-01	REPORT DATE	23/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072172

**Sample Name** 349850-0

**Product:** Ground water

**Sampling Point code:** WIL-HS1A

**Sampling Point name:** Levin HS1A

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 23/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 07:55

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	<0.01	(± 0.00) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 33	(± 7) mg/l		15
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**NW007 Chloride**

Chloride (Cl)	28.5	(± 2.85) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.02	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6-Trichlorophenol	<0.02	mg/l	0.02
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**NW023 Conductivity**

Conductivity	25.3	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.011	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.07	mg/l	0.03
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	13.3	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0008	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.08	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.08	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0053	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0006	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.92	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.009	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	19.4	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.006	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.22	(± 0.02) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	18.5	(± 1.85) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	13	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	62	(± 6) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	62	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	6.2	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Heptanoic acid	<math>\leq 5</math>	mg/l	5
Hexanoic acid	<math>\leq 5</math>	mg/l	5
Isobutyric acid	<math>\leq 5</math>	mg/l	5
Isocaproic acid	<math>\leq 5</math>	mg/l	5
Isovaleric acid	<math>\leq 5</math>	mg/l	5
Propionic acid	<math>\leq 5</math>	mg/l	5
Valeric acid	<math>\leq 5</math>	mg/l	5
Volatile fatty acids as acetic acid	<math>\leq 5</math>	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;math&gt;&lt;100 &gt;6\ 000\ 000&lt;/math&gt; /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Leo Cleave** Senior Analyst Microbiology

## Food & Water Testing



**Gabriela Carvalho**  
 Manager Food and Water  
 Testing Chemistry

### EXPLANATORY NOTE

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- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-038612-01** REPORT DATE **27/06/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00190253

**SAMPLE CODE** **812-2024-00089998**

**Product:**

**Sampling Point code:** WIL-HS1A

**Sampling Point name:** Levin HS1A

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:** 27/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)** customer

**RESULTS (UNCERTAINTY) LOQ**

<b>NW179 Ammonia Nitrogen</b>			
Ammoniacal nitrogen (N)	0.05	(± 0.01) mg/l	0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>			
BOD5	2	mg/l	1
<b>NW020 Chemical Oxygen Demand</b>			
Chemical oxygen demand (COD)	31	mg/l	15
<b>NW007 Chloride</b>			
Chloride (Cl)	24.5	(± 2.45) mg/l	0.02
<b>NW00U Chlorophenols</b>			
2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
2,4-Dichlorophenol	<0.01	mg/l	0.01
2,6-Dichlorophenol	<0.2	mg/l	0.2
2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
3,4,5-Trichlorophenol	<0.01	mg/l	0.01
4-Chloro-3-cresol	<0.01	mg/l	0.01
Pentachlorophenol	<0.005	mg/l	0.005
Phenol	<0.01	mg/l	0.01
Total of 2,4,5 & 2,4,6-Trichlorophenol	<0.02	mg/l	0.02
<b>NW023 Conductivity</b>			
Conductivity	24.6	(± 0.5) mS/m	0.1
<b>NW098 Dissolved Aluminium</b>			
Aluminium	0.004	mg/l	0.002
<b>NW583 Dissolved Arsenic</b>			
Arsenic (As)	<0.001	mg/l	0.001
<b>NW103 Dissolved Boron</b>			
Boron (B)	0.04	mg/l	0.03
<b>NW104 Dissolved Cadmium</b>			
Cadmium (Cd)	<0.0002	mg/l	0.0002

## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	12.6	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0007	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.03	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	6.60	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0083	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.72	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.043	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	20.0	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.003	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	800	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.89	(± 0.09) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	19.8	(± 1.98) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	41	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	51	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	59	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	4.0	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

**EXPLANATORY NOTE**

## Food & Water Testing

- ① Test is not accredited
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- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

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Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.

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This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

Eurofins shall have no liability for any indirect or consequential loss including, without limitation, loss of production, loss of contracts, loss of profits, loss of business or costs incurred from business interruption, loss of opportunity, loss of goodwill or damage to reputation and cost of product recall (including any losses suffered as a result of distribution of the Customer's products subject of the Services prior to the report being released by Eurofins). It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Customer.

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### END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-043451-01** REPORT DATE **22/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00101079**

**Sample Name** 354911-0

**Product:** Ground water

**Sampling Point code:** WIL-HS1A

**Sampling Point name:** Levin HS1A

**Reception Date & Time:** 12/07/2024 14:38

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 07:30

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.10 (± 0.01) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) <sup>16</sup> mg/l 15

**NW007 Chloride**

Chloride (Cl) 24.9 (± 2.49) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6-Trichlorophenol <0.02 mg/l 0.02

**NW023 Conductivity**

Conductivity 24.2 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.005 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) <0.001 mg/l 0.001

**NW103 Dissolved Boron**



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.06	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.4	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0010	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.05	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	8.47	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0080	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.81	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.013	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	23.8	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.003	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.28	(± 0.03) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.5	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	21.2	(± 2.12) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<6	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	53	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	71	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	3.9	mg/l	0.1
<b>①NW006</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing

### EXPLANATORY NOTE

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- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✓** (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

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This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031268-01	REPORT DATE	23/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072140

**Sample Name** 349852-0

**Product:** Ground water

**Sampling Point code:** WIL-HS2

**Sampling Point name:** Levin HS2

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 23/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 08:35

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.05	(± 0.01) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	<15	(± 5) mg/l	15
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**NW007 Chloride**

Chloride (Cl)	27.1	(± 2.71) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.02	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
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**NW023 Conductivity**

Conductivity	26.1	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.006	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.06	mg/l	0.03
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.3	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0008	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.09	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.33	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0123	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0006	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.68	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.040	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	17.9	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.003	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.25	(± 0.03) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.6	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	16.6	(± 1.66) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<5	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	65	(± 6) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	66	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	5.2	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Heptanoic acid	<math>\leq 5</math>	mg/l	5
Hexanoic acid	<math>\leq 5</math>	mg/l	5
Isobutyric acid	<math>\leq 5</math>	mg/l	5
Isocaproic acid	<math>\leq 5</math>	mg/l	5
Isovaleric acid	<math>\leq 5</math>	mg/l	5
Propionic acid	<math>\leq 5</math>	mg/l	5
Valeric acid	<math>\leq 5</math>	mg/l	5
Volatile fatty acids as acetic acid	<math>\leq 5</math>	mg/l	5

**LIST OF METHODS**

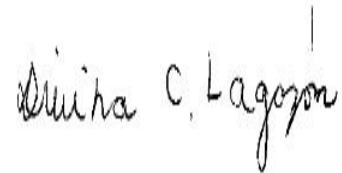
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;math&gt;&lt;100 &gt;6\ 000\ 000&lt;/math&gt; /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

**Signature**


**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited



**Jennifer Mont** Supervisor Eurofins ELS  
Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited



**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited



**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited



**Arvinder Singh** Laboratory Supervisor  
Microbiology

## Food & Water Testing



**Gabriela Carvalho** Manager Food and Water Testing Chemistry

### EXPLANATORY NOTE

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- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

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Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

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If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice.

The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-038610-01** REPORT DATE **27/06/2024**
**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:**

EUNZWE-00190253

**SAMPLE CODE** **812-2024-00089996**
**Product:**
**Sampling Point code:** WIL-HS2

**Sampling Point name:**

Levin HS2

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:**

27/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)**

customer

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.09 (± 0.01) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 &lt;1 mg/l 1

**NW020 Chemical Oxygen Demand**

 Chemical oxygen demand (COD) <sup>21</sup> mg/l 15

**NW007 Chloride**

Chloride (Cl) 26.0 (± 2.60) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol &lt;0.01 mg/l 0.01

2,4-Dichlorophenol &lt;0.01 mg/l 0.01

2,6-Dichlorophenol &lt;0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) &lt;0.01 mg/l 0.01

3,4,5-Trichlorophenol &lt;0.01 mg/l 0.01

4-Chloro-3-cresol &lt;0.01 mg/l 0.01

Pentachlorophenol &lt;0.005 mg/l 0.005

Phenol &lt;0.01 mg/l 0.01

Total of 2,4,5 &amp; 2,4,6- &lt;0.02 mg/l 0.02

Trichlorophenol

**NW023 Conductivity**

Conductivity 25.4 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.005 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) &lt;0.001 mg/l 0.001

**NW103 Dissolved Boron**

Boron (B) 0.04 mg/l 0.03

**NW104 Dissolved Cadmium**

Cadmium (Cd) &lt;0.0002 mg/l 0.0002



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.1	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0007	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.05	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.36	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0176	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.98	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.039	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	22.2	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	400	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.92	(± 0.09) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	20.0	(± 2.00) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<3	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	55	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	65	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	3.9	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

#### ① NWWG6 Volatile Fatty Acids (VFA)

Compound	Uncertainty	Unit	LOQ
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

#### LIST OF METHODS

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

#### EXPLANATORY NOTE

## Food & Water Testing

- ① Test is not accredited
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- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

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### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-043454-01	REPORT DATE	22/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00101105

**Sample Name** 354912-0

**Product:** Ground water

**Sampling Point code:** WIL-HS2

**Sampling Point name:** Levin HS2

**Reception Date & Time:** 12/07/2024 14:54

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 08:00

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	<15	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	26.8	(± 2.68) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.2	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6-Trichlorophenol	<0.02	mg/l	0.02
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**NW023 Conductivity**

Conductivity	25.2	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.004	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.07	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	15.1	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0009	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.06	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	8.77	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0133	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	<0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.83	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.033	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	25.0	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.004	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.34	(± 0.03) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	21.8	(± 2.18) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	<6	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	56	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	74	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	4.1	mg/l	0.1
<b>①NW006</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

#### ① NWWG6 Volatile Fatty Acids (VFA)

Compound	Uncertainty	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

#### LIST OF METHODS

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing

### EXPLANATORY NOTE

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- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✓** (Satisfactory) means meets the specification

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

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### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031269-01	REPORT DATE	23/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072160

**Sample Name** 349854-0

**Product:** Ground water

**Sampling Point code:** WIL-HS3

**Sampling Point name:** Levin HS3

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 23/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 08:50

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 17	(± 6) mg/l		15
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**NW007 Chloride**

Chloride (Cl)	27.7	(± 2.77) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.02	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6	<0.02	mg/l	0.02
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-Trichlorophenol

**NW023 Conductivity**

Conductivity	26.7	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.006	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.06	mg/l	0.03
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.6	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0008	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.09	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.64	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0066	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0007	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.83	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.047	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	19.2	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.30	(± 0.03) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.4	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	16.5	(± 1.65) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	34	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	66	(± 7) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	68	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	5.4	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Heptanoic acid	<math>\leq 5</math>	mg/l	5
Hexanoic acid	<math>\leq 5</math>	mg/l	5
Isobutyric acid	<math>\leq 5</math>	mg/l	5
Isocaproic acid	<math>\leq 5</math>	mg/l	5
Isovaleric acid	<math>\leq 5</math>	mg/l	5
Propionic acid	<math>\leq 5</math>	mg/l	5
Valeric acid	<math>\leq 5</math>	mg/l	5
Volatile fatty acids as acetic acid	<math>\leq 5</math>	mg/l	5

**LIST OF METHODS**

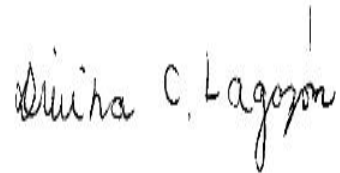
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;math&gt;&lt;100 &gt;6\ 000\ 000&lt;/math&gt; /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222I; APHA 24th Edition

**Signature**


**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited



**Jennifer Mont** Supervisor Eurofins ELS  
Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited



**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited



**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited



**Arvinder Singh** Laboratory Supervisor  
Microbiology

## Food & Water Testing



**Gabriela Carvalho** Manager Food and Water Testing Chemistry

### EXPLANATORY NOTE

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- ⑧ Tested at the sampling point by Eurofins and is accredited
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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-038609-01	REPORT DATE	27/06/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00190253

**SAMPLE CODE** 812-2024-00089995

**Product:**

**Sampling Point code:** WIL-HS3

**Sampling Point name:** Levin HS3

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:** 27/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)** customer

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	0.14	(± 0.01) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 30		mg/l	15
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**NW007 Chloride**

Chloride (Cl)	26.7	(± 2.67) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
2,4-Dichlorophenol	<0.01	mg/l	0.01
2,6-Dichlorophenol	<0.2	mg/l	0.2
2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
3,4,5-Trichlorophenol	<0.01	mg/l	0.01
4-Chloro-3-cresol	<0.01	mg/l	0.01
Pentachlorophenol	<0.005	mg/l	0.005
Phenol	<0.01	mg/l	0.01
Total of 2,4,5 & 2,4,6-Trichlorophenol	<0.02	mg/l	0.02

**NW023 Conductivity**

Conductivity	26.0	(± 0.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.004	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.04	mg/l	0.03
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**NW104 Dissolved Cadmium**

Cadmium (Cd)	<0.0002	mg/l	0.0002
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	14.4	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0011	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.03	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	7.36	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0103	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0006	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	3.26	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.041	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	22.7	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.006	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	200	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.93	(± 0.09) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.5	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	19.6	(± 1.96) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	21	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	57	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	66	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	4.2	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS  
Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
Limited

**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

**EXPLANATORY NOTE**

## Food & Water Testing

- ① Test is not accredited
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- ③ Test is subcontracted within Eurofins group and is not accredited
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- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

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The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.

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The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

Eurofins shall have no liability for any indirect or consequential loss including, without limitation, loss of production, loss of contracts, loss of profits, loss of business or costs incurred from business interruption, loss of opportunity, loss of goodwill or damage to reputation and cost of product recall (including any losses suffered as a result of distribution of the Customer's products subject of the Services prior to the report being released by Eurofins). It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Customer.

Eurofins General Terms and Conditions apply.

### END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-043453-01** REPORT DATE **22/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00101099**

**Sample Name** 354913-0

**Product:** Ground water

**Sampling Point code:** WIL-HS3

**Sampling Point name:** Levin HS3

**Reception Date & Time:** 12/07/2024 14:50

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 08:20

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 0.10 (± 0.01) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 24 mg/l 15

**NW007 Chloride**

Chloride (Cl) 27.0 (± 2.70) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6-Trichlorophenol <0.02 mg/l 0.02

**NW023 Conductivity**

Conductivity 25.7 (± 0.5) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.004 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) <0.001 mg/l 0.001

**NW103 Dissolved Boron**



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.07	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	15.3	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	0.0011	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.06	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	8.77	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0138	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0005	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	2.92	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.020	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	25.0	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.005	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.39	(± 0.04) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.4	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	21.5	(± 2.15) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	49	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	57	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	74	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	4.6	mg/l	0.1
<b>① NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Result	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Leo Cleave** Senior Analyst Microbiology

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing

### EXPLANATORY NOTE

- ① Test is not accredited
- ② Test is subcontracted within Eurofins group and is accredited
- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
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- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✓** (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

Unless otherwise stated, all tests in this analytical report (except for subcontracted tests) are performed at 85 Port Road, Seaview, Lower Hutt, Wellington, NEW ZEALAND.

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Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.

If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice.

The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031270-01	REPORT DATE	23/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072161

**Sample Name** 349856-0

**Product:** Ground water

**Sampling Point code:** WIL-TD1

**Sampling Point name:** Levin TD1

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 23/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 09:10

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	7.91	(± 0.79) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<1	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	125	(± 13) mg/l	15
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**NW007 Chloride**

Chloride (Cl)	85.9	(± 8.59) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.02	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6	<0.02	mg/l	0.02
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-Trichlorophenol

**NW023 Conductivity**

Conductivity	74.2	(± 1.5) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.010	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.34	mg/l	0.03
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	33.5	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	<0.0005	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.36	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	17.2	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0513	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0015	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	20.6	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.027	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	55.6	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.59	(± 0.06) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.3	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	6.54	(± 0.65) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	119	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	221	(± 22) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	155	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	27.4	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Heptanoic acid	<math>\leq 5</math>	mg/l	5
Hexanoic acid	<math>\leq 5</math>	mg/l	5
Isobutyric acid	<math>\leq 5</math>	mg/l	5
Isocaproic acid	<math>\leq 5</math>	mg/l	5
Isovaleric acid	<math>\leq 5</math>	mg/l	5
Propionic acid	<math>\leq 5</math>	mg/l	5
Valeric acid	<math>\leq 5</math>	mg/l	5
Volatile fatty acids as acetic acid	<math>\leq 5</math>	mg/l	5

**LIST OF METHODS**

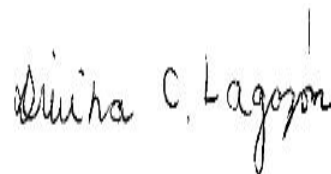
NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;math&gt;&lt;100 &gt;6\ 000\ 000 /100\ ml&lt;/math&gt; (0-3) m-FC Agar-F:</b> SMEWW 9222I; APHA 24th Edition

**Signature**


**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited



**Jennifer Mont** Supervisor Eurofins ELS Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited



**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited



**Ganesh Ilancko** Supervisor Eurofins ELS Limited



**Arvinder Singh** Laboratory Supervisor  
Microbiology

## Food & Water Testing



**Gabriela Carvalho** Manager Food and Water Testing Chemistry

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- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-038608-01	REPORT DATE	27/06/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:**

EUNZWE-00190253

<b>SAMPLE CODE</b>	<b>812-2024-00089990</b>
--------------------	--------------------------

**Product:**

**Sampling Point code:** WIL-TD1

**Sampling Point name:** Levin TD1

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:** 27/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)** customer

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	16.0	(± 1.60) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	<3	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	147	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	85.8	(± 8.58) mg/l	0.02
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**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
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2,4-Dichlorophenol	<0.01	mg/l	0.01
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2,6-Dichlorophenol	<0.2	mg/l	0.2
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2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
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3,4,5-Trichlorophenol	<0.01	mg/l	0.01
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4-Chloro-3-cresol	<0.01	mg/l	0.01
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Pentachlorophenol	<0.005	mg/l	0.005
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Phenol	<0.01	mg/l	0.01
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Total of 2,4,5 & 2,4,6	<0.02	mg/l	0.02
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-Trichlorophenol

**NW023 Conductivity**

Conductivity	97.6	(± 2.0) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.008	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	<0.001	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	0.27	mg/l	0.03
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**NW104 Dissolved Cadmium**

Cadmium (Cd)	<0.0002	mg/l	0.0002
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	63.3	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	<0.0005	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.20	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	25.2	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.433	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0017	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	28.3	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.038	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	71.5	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.004	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	1.13	(± 0.11) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.4	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	3.14	(± 0.31) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	229	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	337	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	262	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	26.0	mg/l	0.1
<b>① NW016</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Uncertainty	Unit	LOQ
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222; APHA 24th Edition

**Signature**

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Sunita Raju** Business Unit Manager

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

## Food & Water Testing



**Gabriela  
Carvalho** Manager Food and Water  
Testing Chemistry

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- ⑧ Tested at the sampling point by Eurofins and is accredited
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**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

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END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

 REPORT CODE **AR-24-NW-043455-01** REPORT DATE **22/07/2024**

**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** **812-2024-00101126**

**Sample Name** 354908-0

**Product:** Ground water

**Sampling Point code:** WIL-TD1

**Sampling Point name:** Levin TD1

**Reception Date & Time:** 12/07/2024 15:00

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 08:45

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

**RESULTS (UNCERTAINTY) LOQ**
**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N) 1.49 (± 0.15) mg/l 0.01

**NW341 BOD5 - Soluble Carbonaceous**

BOD5 <1 mg/l 1

**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD) 389 mg/l 15

**NW007 Chloride**

Chloride (Cl) 77.0 (± 7.70) mg/l 0.02

**NW00U Chlorophenols**

2,3,4,6-Tetrachlorophenol <0.01 mg/l 0.01

2,4-Dichlorophenol <0.01 mg/l 0.01

2,6-Dichlorophenol <0.2 mg/l 0.2

2-Chlorophenol (o-chlorophenol) <0.01 mg/l 0.01

3,4,5-Trichlorophenol <0.01 mg/l 0.01

4-Chloro-3-cresol <0.01 mg/l 0.01

Pentachlorophenol <0.005 mg/l 0.005

Phenol <0.01 mg/l 0.01

Total of 2,4,5 & 2,4,6-Trichlorophenol <0.02 mg/l 0.02

**NW023 Conductivity**

Conductivity 65.7 (± 1.3) mS/m 0.1

**NW098 Dissolved Aluminium**

Aluminium 0.011 mg/l 0.002

**NW583 Dissolved Arsenic**

Arsenic (As) <0.001 mg/l 0.001

**NW103 Dissolved Boron**

## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW103</b>	<b>Dissolved Boron</b>			
	Boron (B)	0.31	mg/l	0.03
<b>NW104</b>	<b>Dissolved Cadmium</b>			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
<b>NW105</b>	<b>Dissolved Calcium</b>			
	Calcium (Ca)	24.8	mg/l	0.1
<b>NW106</b>	<b>Dissolved Chromium</b>			
	Chromium (Cr)	<0.001	mg/l	0.001
<b>NW108</b>	<b>Dissolved Copper</b>			
	Copper (Cu)	<0.0005	mg/l	0.0005
<b>NW109</b>	<b>Dissolved Iron</b>			
	Iron (Fe)	0.25	mg/l	0.01
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	<0.0005	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	21.2	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	0.0127	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0012	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	21.6	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	0.028	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	58.9	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	<0.002	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	5.06	(± 0.51) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.2	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	4.52	(± 0.45) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	518	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	187	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	149	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	48.5	mg/l	0.1
<b>①NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5

## Food & Water Testing

### RESULTS (UNCERTAINTY) LOQ

**① NWWG6 Volatile Fatty Acids (VFA)**

Compound	Result	Unit	LOQ
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

**LIST OF METHODS**

NW003 <b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007 <b>Chloride:</b> APHA Online Edition 4110 B
NW00U <b>Chlorophenols:</b> Internal Method, LC-MS/MS	NW010 <b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011 <b>Sulphate:</b> APHA Online Edition 4110 B	NW020 <b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023 <b>Conductivity:</b> APHA 24th Edition 2510 B	NW030 <b>Total Hardness:</b> APHA Online Edition 2340 B
NW098 <b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103 <b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104 <b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105 <b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106 <b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108 <b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
NW109 <b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.	NW110 <b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.
NW112 <b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.	NW113 <b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.
NW114 <b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.	NW116 <b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.
NW117 <b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.	NW120 <b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.
NW125 <b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179 <b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193 <b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195 <b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206 <b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210 <b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341 <b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583 <b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6 <b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA <b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

#### Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Leo Cleave** Senior Analyst Microbiology

**Gabriela Carvalhaes** Manager Chemistry

## Food & Water Testing

### EXPLANATORY NOTE

- ① Test is not accredited
- ② Test is subcontracted within Eurofins group and is accredited
- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

**✘** (Unsatisfactory) means does not meet the specification

**✔** (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

Unless otherwise stated, all tests in this analytical report (except for subcontracted tests) are performed at 85 Port Road, Seaview, Lower Hutt, Wellington, NEW ZEALAND.

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Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

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The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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Eurofins General Terms and Conditions apply.

### END OF REPORT

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-031457-01	REPORT DATE	24/05/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 Horowhenua Admin  
 P O Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** (06) 367 2705

**Email** horowhenuaadmin@downer.co.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), McMillan

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00184396

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00072168

**Sample Name** 348983-0

**Product:** Ground water

**Sampling Point code:** WIL-LP

**Sampling Point name:** Levin Leachate Pond

**Reception Date & Time:** 16/05/2024 9:30

**Analysis Started on:** 16/05/2024

**Analysis Ending Date:** 24/05/2024

**Product Type** Ground water

**Sampled Date & Time** 15/05/2024 09:30

**Sampler(s)** CUSTOMER

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
Ammoniacal nitrogen (N)	19.3	(± 1.93) mg/l	0.01	
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
BOD5	103	mg/l	1	
<b>NW020 Chemical Oxygen Demand</b>				
Chemical oxygen demand (COD)	3440	(± 170) mg/l	15	
<b>NW007 Chloride</b>				
Chloride (Cl)	1120	(± 112) mg/l	0.02	
<b>NW023 Conductivity</b>				
Conductivity	1860	(± 40.0) mS/m	0.1	
<b>NW098 Dissolved Aluminium</b>				
Aluminium	0.864	mg/l	0.002	
<b>NW583 Dissolved Arsenic</b>				
Arsenic (As)	0.267	mg/l	0.001	
<b>NW103 Dissolved Boron</b>				
Boron (B)	7.49	mg/l	0.03	
<b>NW104 Dissolved Cadmium</b>				
Cadmium (Cd)	<0.0002	mg/l	0.0002	
<b>NW105 Dissolved Calcium</b>				
Calcium (Ca)	82.4	mg/l	0.1	
<b>NW106 Dissolved Chromium</b>				
Chromium (Cr)	0.842	mg/l	0.001	
<b>NW108 Dissolved Copper</b>				
Copper (Cu)	0.0056	mg/l	0.0005	
<b>NW109 Dissolved Iron</b>				
Iron (Fe)	6.95	mg/l	0.01	



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	0.0017	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	46.0	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	1.15	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.128	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	680	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	14.5	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	965	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.063	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	<0.1	mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	89.9	(± 8.99) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	23	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	7670	(± 770) mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	395	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	862	mg/l	0.1
<b>Ⓢ NWWG6</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

### LIST OF METHODS

## Food & Water Testing

NW003	<b>Total Alkalinity:</b> APHA Online Edition 2320 B	NW007	<b>Chloride:</b> APHA Online Edition 4110 B
NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B	NW011	<b>Sulphate:</b> APHA Online Edition 4110 B
NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW030	<b>Total Hardness:</b> APHA Online Edition 2340 B	NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.
NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.	NW104	<b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.
NW105	<b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.	NW106	<b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.
NW108	<b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.	NW109	<b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW112	<b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.
NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW117	<b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.
NW120	<b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.	NW125	<b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW193	<b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G
NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B	NW206	<b>Suspended Solids:</b> APHA Online Edition 2540 D
NW210	<b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B	NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B
NW583	<b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.	NWWG6	<b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.
ZM2GA	<b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222I; APHA 24th Edition		

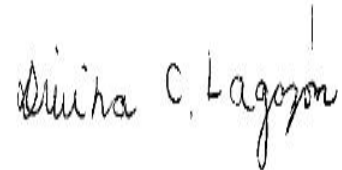
Signature



**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited



**Jennifer Mont** Supervisor Eurofins ELS  
Limited



**Divina Cunanan Lagazon** Supervisor Eurofins ELS  
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**Gordon McArthur** Senior Laboratory Analyst  
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**Ganesh Ilancko** Supervisor Eurofins ELS  
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**Arvinder Singh** Laboratory Supervisor  
Microbiology



**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

EXPLANATORY NOTE

## Food & Water Testing

- ① Test is not accredited
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- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

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The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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### END OF REPORT

## Food &amp; Water Testing

**ANALYTICAL REPORT**

REPORT CODE	AR-24-NW-038904-01	REPORT DATE	29/06/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes

**Contract:** Landfill

**Order code:**

EUNZWE-00190253

<b>SAMPLE CODE</b>	<b>812-2024-00090036</b>
--------------------	--------------------------

**Product:**

**Sampling Point code:** WIL-LP

**Sampling Point name:**

Levin Leachate Pond

**Reception Date & Time:** 20/06/2024 11:30

**Analysis Started on:** 20/06/2024

**Analysis Ending Date:**

29/06/2024

**Sampled Date & Time** 20/06/2024 00:00

**Sampler(s)**

customer

	RESULTS (UNCERTAINTY)	LOQ
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**NW179 Ammonia Nitrogen**

Ammoniacal nitrogen (N)	1530	(± 153) mg/l	0.01
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**NW341 BOD5 - Soluble Carbonaceous**

BOD5	147	mg/l	1
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**NW020 Chemical Oxygen Demand**

Chemical oxygen demand (COD)	2810	mg/l	15
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**NW007 Chloride**

Chloride (Cl)	1220	(± 122) mg/l	0.02
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**NW023 Conductivity**

Conductivity	1910	(± 38.3) mS/m	0.1
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**NW098 Dissolved Aluminium**

Aluminium	0.890	mg/l	0.002
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**NW583 Dissolved Arsenic**

Arsenic (As)	0.296	mg/l	0.001
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**NW103 Dissolved Boron**

Boron (B)	5.56	mg/l	0.03
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**NW104 Dissolved Cadmium**

Cadmium (Cd)	<0.0002	mg/l	0.0002
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**NW105 Dissolved Calcium**

Calcium (Ca)	95.8	mg/l	0.1
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**NW106 Dissolved Chromium**

Chromium (Cr)	0.967	mg/l	0.001
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**NW108 Dissolved Copper**

Copper (Cu)	0.0071	mg/l	0.0005
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**NW109 Dissolved Iron**

Iron (Fe)	7.86	mg/l	0.01
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**NW110 Dissolved Lead**

Lead (Pb)	0.0016	mg/l	0.0005
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## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	59.7	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	1.29	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.141	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	834	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	15.9	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	1120	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.067	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli By Membrane Filtration</b>			
	Escherichia coli	100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	<1	mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	48.9	(± 4.89) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	60	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	7530	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	485	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	921	mg/l	0.1
<b>①NW006</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

### LIST OF METHODS

 NW003 **Total Alkalinity:** APHA Online Edition 2320 B

 NW007 **Chloride:** APHA Online Edition 4110 B

 NW010 **Nitrate-N:** APHA Online Edition 4110 B

 NW011 **Sulphate:** APHA Online Edition 4110 B

## Food & Water Testing

NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D	NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B
NW030	<b>Total Hardness:</b> APHA Online Edition 2340 B	NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.
NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.	NW104	<b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.
NW105	<b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.	NW106	<b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.
NW108	<b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.	NW109	<b>Dissolved Iron:</b> APHA Online Edition 3125 B mod.
NW110	<b>Dissolved Lead:</b> APHA Online Edition 3125 B mod.	NW112	<b>Dissolved Magnesium:</b> APHA Online Edition 3125 B mod.
NW113	<b>Dissolved Manganese:</b> APHA Online Edition 3125 B mod.	NW114	<b>Dissolved Mercury:</b> APHA Online Edition 3125 B mod.
NW116	<b>Dissolved Nickel:</b> APHA Online Edition 3125 B mod.	NW117	<b>Dissolved Potassium:</b> APHA Online Edition 3125 B mod.
NW120	<b>Dissolved Sodium:</b> APHA Online Edition 3125 B mod.	NW125	<b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.
NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H	NW193	<b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G
NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B	NW206	<b>Suspended Solids:</b> APHA Online Edition 2540 D
NW210	<b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B	NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B
NW583	<b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.	NWWG6	<b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.
ZM2GA	<b>Escherichia coli E (Water) [NZ] &lt;100 &gt;6 000 000 /100 ml (0-3) m-FC Agar-F:</b> SMEWW 9222I; APHA 24th Edition		

Signature

**Marylou Cabral** Laboratory Manager  
Eurofins ELS Limited

**Jennifer Mont** Supervisor Eurofins ELS Limited

**Divina Cunanan Lagazon** Supervisor Eurofins ELS Limited

**Gordon McArthur** Senior Laboratory Analyst  
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**Ganesh Ilancko** Supervisor Eurofins ELS Limited

**Arvinder Singh** Laboratory Supervisor  
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**Gabriela Carvalhaes** Manager Food and Water  
Testing Chemistry

**EXPLANATORY NOTE**

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- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

**N/A** means Not Applicable

**Not Detected** means not detected at or above the Limit of Quantification (LOQ)

**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

## Food & Water Testing

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

Unless otherwise stated, all tests in this analytical report (except for subcontracted tests) are performed at 85 Port Road, Seaview, Lower Hutt, Wellington, NEW ZEALAND.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

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The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

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**END OF REPORT**

## Food & Water Testing

# ANALYTICAL REPORT

REPORT CODE	AR-24-NW-043452-01	REPORT DATE	22/07/2024
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**Attention** Downer NZ Ltd (EDI Levin)  
 David McMillan  
 122 Hokio Beach Road  
 PO Box 642  
 4741 Levin  
 NEW ZEALAND

**Phone** +64272491292

**Email** Davidm@horowhenua.govt.nz

**Copy to:** Water and Waste Team

(waterandwasteteam@horowhenua.govt.nz), Admin

**Contact for your orders:** Gabriela Carvalhaes  
**Contract:** Landfill

**Order code:** EUNZWE-00194074

**Purchase Order Number:** Landfill

**SAMPLE CODE** 812-2024-00101096

**Sample Name** 354909-0

**Product:** Ground water

**Sampling Point code:** WIL-LP

**Sampling Point name:** Levin Leachate Pond

**Reception Date & Time:** 12/07/2024 14:44

**Analysis Started on:** 12/07/2024

**Analysis Ending Date:** 22/07/2024

**Product Type** Ground water

**Sampled Date & Time** 11/07/2024 09:00

**Sampler(s)** Client nominated external sampler

**Sampled by Eurofins** No

### RESULTS (UNCERTAINTY) LOQ

<b>NW179 Ammonia Nitrogen</b>				
Ammoniacal nitrogen (N)	1250	(± 125) mg/l		0.01
<b>NW341 BOD5 - Soluble Carbonaceous</b>				
BOD5	122	mg/l		1
<b>NW020 Chemical Oxygen Demand</b>				
Chemical oxygen demand (COD)	2760	mg/l		15
<b>NW007 Chloride</b>				
Chloride (Cl)	986	(± 98.6) mg/l		0.02
<b>NW023 Conductivity</b>				
Conductivity	1780	(± 35.6) mS/m		0.1
<b>NW098 Dissolved Aluminium</b>				
Aluminium	0.721	mg/l		0.002
<b>NW583 Dissolved Arsenic</b>				
Arsenic (As)	0.226	mg/l		0.001
<b>NW103 Dissolved Boron</b>				
Boron (B)	6.47	mg/l		0.03
<b>NW104 Dissolved Cadmium</b>				
Cadmium (Cd)	<0.0002	mg/l		0.0002
<b>NW105 Dissolved Calcium</b>				
Calcium (Ca)	72.4	mg/l		0.1
<b>NW106 Dissolved Chromium</b>				
Chromium (Cr)	0.672	mg/l		0.001
<b>NW108 Dissolved Copper</b>				
Copper (Cu)	0.0028	mg/l		0.0005
<b>NW109 Dissolved Iron</b>				
Iron (Fe)	6.25	mg/l		0.01



## Food & Water Testing

		RESULTS (UNCERTAINTY)		LOQ
<b>NW110</b>	<b>Dissolved Lead</b>			
	Lead (Pb)	0.0006	mg/l	0.0005
<b>NW112</b>	<b>Dissolved Magnesium</b>			
	Magnesium (Mg)	52.5	mg/l	0.01
<b>NW113</b>	<b>Dissolved Manganese</b>			
	Manganese (Mn)	1.10	mg/l	0.0005
<b>NW114</b>	<b>Dissolved Mercury</b>			
	Mercury (Hg)	<0.0005	mg/l	0.0005
<b>NW116</b>	<b>Dissolved Nickel</b>			
	Nickel (Ni)	0.0977	mg/l	0.0005
<b>NW117</b>	<b>Dissolved Potassium</b>			
	Potassium (K)	622	mg/l	0.01
<b>NW193</b>	<b>Dissolved Reactive Phosphorus</b>			
	Phosphorus (soluble reactive)	13.0	mg/l	0.005
<b>NW120</b>	<b>Dissolved Sodium</b>			
	Sodium (Na)	902	mg/l	0.01
<b>NW125</b>	<b>Dissolved Zinc</b>			
	Zinc (Zn)	0.037	mg/l	0.002
<b>ZM2GA</b>	<b>Enumeration of Escherichia coli by Membrane Filtration</b>			
	Escherichia coli	<100	cfu/100 ml	100
<b>NW010</b>	<b>Nitrate-N</b>			
	Nitrate-N	0.13	(± 0.01) mg/l	0.01
<b>NW195</b>	<b>pH (Tested beyond 15 minute APHA holding time)</b>			
	pH	7.7	(± 0.2)	0.1
<b>NW011</b>	<b>Sulphate</b>			
	Sulphate	62.8	(± 6.28) mg/l	0.02
<b>NW206</b>	<b>Suspended Solids</b>			
	Suspended Solids	24	mg/l	3
<b>NW003</b>	<b>Total Alkalinity</b>			
	Alkalinity total	7800	mg CaCO <sub>3</sub> /l	1
<b>NW030</b>	<b>Total Hardness</b>			
	Hardness	397	mg CaCO <sub>3</sub> /l	1
<b>NW210</b>	<b>Total Non-Purgeable Organic Carbon</b>			
	Total Organic Carbon	733	mg/l	0.1
<b>①NW006</b>	<b>Volatile Fatty Acids (VFA)</b>			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

### LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

## Food & Water Testing

NW007	<b>Chloride:</b> APHA Online Edition 4110 B	NW010	<b>Nitrate-N:</b> APHA Online Edition 4110 B
NW011	<b>Sulphate:</b> APHA Online Edition 4110 B	NW020	<b>Chemical Oxygen Demand:</b> APHA Online Edition 5220 D
NW023	<b>Conductivity:</b> APHA 24th Edition 2510 B	NW030	<b>Total Hardness:</b> APHA Online Edition 2340 B
NW098	<b>Dissolved Aluminium:</b> APHA Online Edition 3125 B mod.	NW103	<b>Dissolved Boron:</b> APHA Online Edition 3125 B mod.
NW104	<b>Dissolved Cadmium:</b> APHA Online Edition 3125 B mod.	NW105	<b>Dissolved Calcium:</b> APHA Online Edition 3125 B mod.
NW106	<b>Dissolved Chromium:</b> APHA Online Edition 3125 B mod.	NW108	<b>Dissolved Copper:</b> APHA Online Edition 3125 B mod.
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NW125	<b>Dissolved Zinc:</b> APHA Online Edition 3125 B mod.	NW179	<b>Ammonia Nitrogen:</b> APHA Online Edition 4500-NH3 H
NW193	<b>Dissolved Reactive Phosphorus:</b> APHA Online Edition 4500-P G	NW195	<b>pH (Tested beyond 15 minute APHA holding time):</b> APHA 24th Edition 4500-H B
NW206	<b>Suspended Solids:</b> APHA Online Edition 2540 D	NW210	<b>Total Non-Purgeable Organic Carbon:</b> APHA Online Edition 5310 B
NW341	<b>BOD5 - Soluble Carbonaceous:</b> APHA Online Edition 5210 B	NW583	<b>Dissolved Arsenic:</b> APHA Online Edition 3125 B mod.
NWWG6	<b>Volatile Fatty Acids (VFA):</b> APHA 24th Edition 5560 D mod.	ZM2GA	<b>Enumeration of Escherichia coli by Membrane Filtration:</b> SMEWW 9222I; APHA 24th Edition

Signature

**Marylou Cabral** Laboratory Manager  
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**Jennifer Mont** Supervisor Eurofins ELS  
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**Gordon McArthur** Senior Laboratory Analyst  
Eurofins ELS Limited

**Ganesh Ilancko** Supervisor Eurofins ELS  
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**Arvinder Singh** Laboratory Supervisor  
Microbiology

**Gabriela Carvalhaes** Manager Chemistry

**EXPLANATORY NOTE**

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**LOQ** means Limit of Quantification and the unit of LOQ is the same as the result unit

✘ (Unsatisfactory) means does not meet the specification

✔ (Satisfactory) means meets the specification

## Food & Water Testing

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**END OF REPORT**

# Appendix C Sampling Schedule



**LEVIN LANDFILL - SUMMARY OF SURFACE AND GROUNDWATER MONITORING REQUIREMENTS (July 2023 - April 2026).**

**(The testing regime is based on Consent Conditions following the completion of the 2015 Resource Consent Review process).**

Reports Due		Sampling Month	Table A (Condition 3, ATH-2002003983.02, formerly DP 6010)															Table B (Condition 3, ATH-2002003983.02, formerly DP 6010)										Table C (Condition 3, ATH-2002003983.02, formerly DP 6010)										
			Deep Aquifer Bores						Shallow Aquifer Bores										Irrigation Bores				Hokio Stream <sup>(4), (8)</sup>				Northern Farm Drain <sup>(9)</sup>	Leachate Pond <sup>(5)</sup>										
Annual	Quarterly		C2dd	E1d	E2d	G1d	Xd1	D3rd <sup>(1)</sup>	C1	C2 <sup>(6)</sup>	C2ds <sup>(6)</sup>	D4	B1	B2	B3s	E1s	E2s	D1 <sup>(2)</sup>	D2 <sup>(2)</sup>	D3rs <sup>(1,2)</sup>	D6 <sup>(2)</sup>	G1s	G2s	Xs1 <sup>(6)</sup>	Xs2 <sup>(6)</sup>	D5 <sup>(3)</sup>	F1 <sup>(3)</sup>	F2 <sup>(3)</sup>	F3 <sup>(3)</sup>	HS1	HS1A	HS2	HS3	TD1 <sup>(7)</sup>				
Sep-23	Aug-23	Jul-23	I	I+SW	I	I	C	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	C	C	I	I	I	I+SW	Monthly Comprehensive	I	I	I	I	I	I		
	Nov-23	Oct-23	I	I+SW	I	I	C	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	C	C	I	I	I	I+SW	Monthly Comprehensive	I	I	I	I	I	I		
	Feb-24	Jan-24	I	I+SW	I	I	C	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	C	C	I	I	I	I+SW	Monthly Comprehensive	I	I	I	I	I	I		
	May-24	Apr-24	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	
Sep-24	Aug-24	Jul-24	I	I+SW	I	I	I	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	I	I	I	I	I	I+SW	Sampling at HS1 to be discontinued when HRC advises.	I	I	I	I	I	I		
	Nov-24	Oct-24	I	I+SW	I	I	I	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	I	I	I	I	I	I+SW		C	C	C	C	C	C	C	
	Feb-25	Jan-25	I	I+SW	I	I	I	C	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	C+SW	I	I+SW	I	I	I	I	I	I	I+SW		I	I	I	I	I	I	I	I
	May-25	Apr-25	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A		C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A
Sep-25	Aug-25	Jul-25	I	I+SW	I	I	I	I	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	I+SW	I	I+SW	I	I	I	I	I	I	I+SW		I	I	I	I	I	I	I	I
	Nov-25	Oct-25	I	I+SW	I	I	I	I	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	I+SW	I	I+SW	I	I	I	I	I	I	I+SW		I	I	I	I	I	I	I	I
	Feb-26	Jan-26	I	I+SW	I	I	I	I	I	I	I	I+SW	I	I	I	I+SW	I+SW	I	I+SW	I+SW	I	I+SW	I	I	I	I	I	I	I+SW		I	I	I	I	I	I	I	I
	May-26	Apr-26	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A		C+A	C+A	C+A	C+A	C+A	C+A	C+A	C+A

Measure groundwater level and sample all bores for CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> each time that groundwater is sampled (Condition 4a of DP 6011)

**Notes:**

- (1) Replacement bore D3r consists of two nested piezometers that have been called D3rs and D3rd. **Testing for comprehensive to continue to provide 2 year's of comprehensive monitoring.**
- (2) See table below
- (3) If irrigation re-commences then the annual sampling is to change from comprehensive + 3 times indicator to bi-annual comprehensive + indicator (Clause D of Condition 3, DP 6010) .
- (4) See table below
- (5) See table below
- (6) Measure water level at C2, C2ds, Xs1 and Xs2 when taking monthly samples at TD1 and within the Hokio Stream. **Testing of X-series bores to continue at comprehensive to provide 2 year's of comprehensive data.**
- (7) Start taking comprehensive samples at TD1 every month when sampling the Hokio Stream sites. Also note the depth of water in the drain invert at TD1. **Continue monthly comprehensive sampling to October 2023 to give 24 month's continuous data.**
- (8) Start measuring approximately the depth of flow in the Hokio Stream at each sampling site when sampling monthly. **Monthly sampling at comprehensive level to continue to, and including, October 2023, to give a full continuous 24 months of data.**
- (9) Northern Farm Drain is a name change from the former 'Tatana Drain'
- C Comprehensive list (see below)
- I Indicator list (see below)
- A Pesticide and SVOC analysis
- SW Add sodium and iron analysis (for stormwater consent 102559)

A reduction in sampling frequency at any **groundwater monitoring point** is conditional on (Clauses A - D of Condition 3, DP 6010):

- A. Completion of the initial monitoring program;
- B. Good consistency of groundwater sample analysis results, or a clearly identified reason for inconsistent results that excludes the contaminant source being landfill operations, stored waste or leachate;
- C. No decline in groundwater quality as determined from indicator parameter trends over a period of four consecutive sampling rounds;
- D. If a well being monitored on a conditional frequency becomes non-compliant with condition C, the monitoring frequency for that well should return to the initial monitoring frequency until conditions B and C are again being fulfilled.

<sup>(2)</sup> If site management planning indicates any **early detection monitoring well** is likely to become buried or otherwise destroyed within the following year as a result of normal operations (Clauses E - H, Condition 3, DP 6010):

- E. This must be communicated to the regional council;
- F. A replacement well is to be constructed in a position agreed upon with Horizons Regional Council
- G. The replacement well should be installed in a position suitable to act as an early detection well and be classed as an early detection well;
- H. The replacement well should be constructed as a nested well (or two separate wells) with screens positioned in both shallow and deep aquifers.

<sup>(4)</sup> A reduction in sampling frequency at the **Hokio Stream monitoring locations (HS1A, HS2 and HS3)** is conditional on (Clauses I - L, Condition 3 of DP 6010):

- I. No significant increases in the concentrations between monitoring sites HS1A and HS3, for parameters exceeding the trigger values contained in Table C1 at Site HS3.
- J. A statistical analysis approach is to be used to determine if there is a significant increase in contaminant levels between HS1A and HS3.
- K. Following the 24 month monitoring period, there shall be no significant increases in concentrations between monitoring sites HS1A and HS3.
- L. If the Hokio Stream monitoring locations are being sampled on a conditional frequency and do not meet condition K, the monitoring frequency for all three monitoring locations (HS1A, HS2 and HS3) shall return to the base case intensive monitoring until conditions J and K are again being fulfilled.

<sup>(5)</sup> A reduction in sampling frequency at the **leachate pond outlet** is conditional on (Clauses M - P, Condition 3, DP 6010):

- M. Completion of the initial 2 year monitoring program;
- N. Good consistency of water sample analysis results, or a clearly identified reason for inconsistent results;
- O. No decline in water quality over a period of four consecutive sampling rounds;
- P. If the leachate pond outlet is being sampled on a conditional frequency and becomes non-compliant with condition O, the monitoring frequency should return to the base case intensive monitoring until conditions N and O are again being fulfilled.

**COMPREHENSIVE PARAMETER LIST (Table E of Condition 3, DP 6010)**

Characterising parameters	pH
	electrical conductivity (EC)
	alkalinity
	total hardness
Oxygen demand	suspended solids
	COD and scBOD <sub>5</sub>
Nutrients*	NO3-N, NH4-N, DRP and SO <sub>4</sub>
Metals*	Al, As, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Zn and Hg
Other elements	B, Ca, Cl, K and Na
Organics	Total organic carbon, total phenols, volatile acids
Biological	E. coli

\* Analyses performed for nutrients and metals are for dissolved rather than total concentrations

**INDICATOR PARAMETER LIST (Table F, Condition 3, DP 6010)**

Characterising parameters	pH
	electrical conductivity (EC)
Oxygen demand	COD and scBOD <sub>5</sub>
Nutrients*	NO3-N and NH4-N
Metals*	Al, Mn, Ni, Pb and Hg
Other elements	B and Cl
Biological*	E. coli

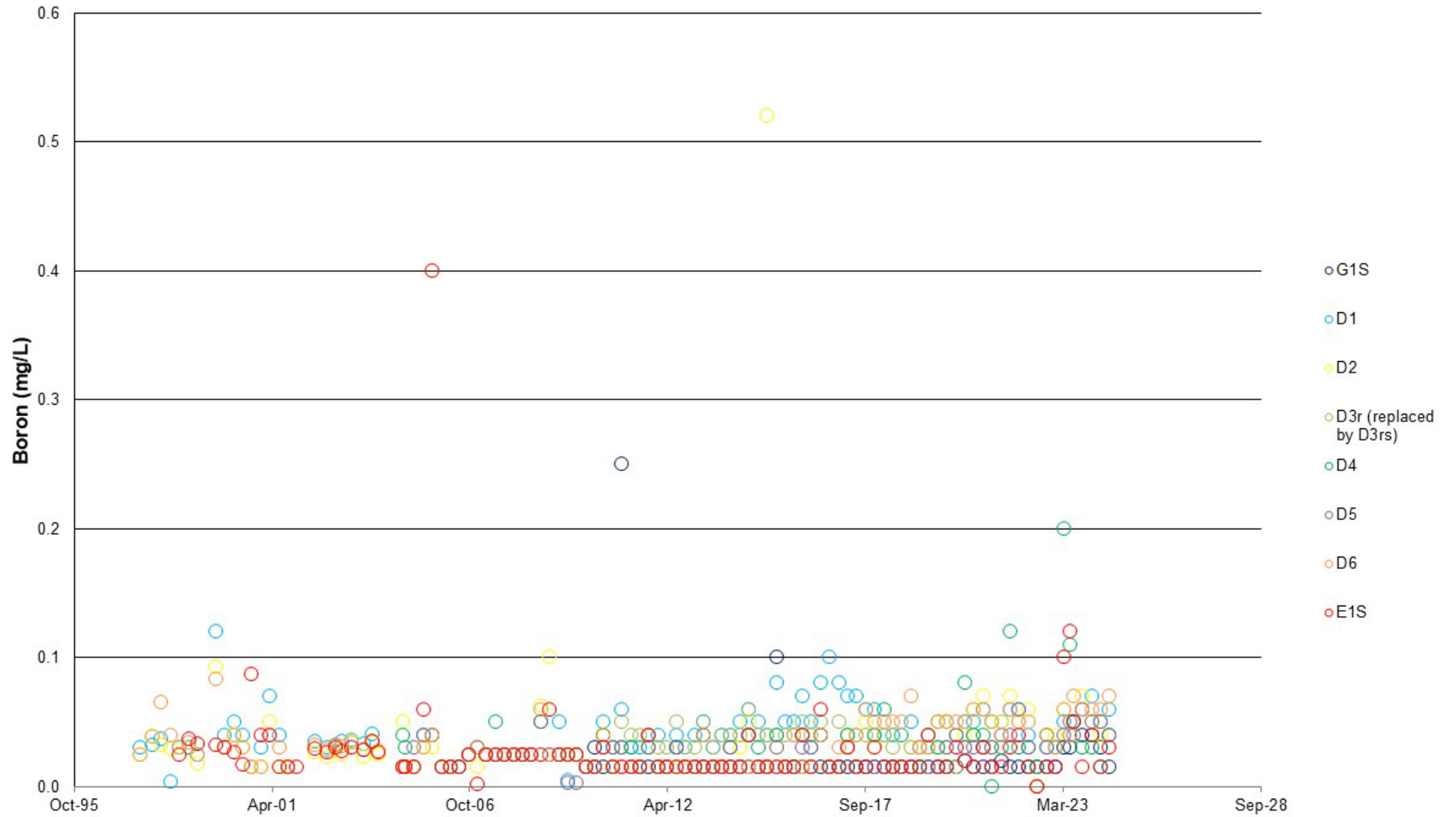
\* Analyses performed for nutrients and metals are for dissolved rather than total concentrations

\* E. coli added from April 2019 sampling onwards

# Appendix D Historical Results Graphs



### Sand Aquifer Downgradient of New Landfill - Boron Concentrations

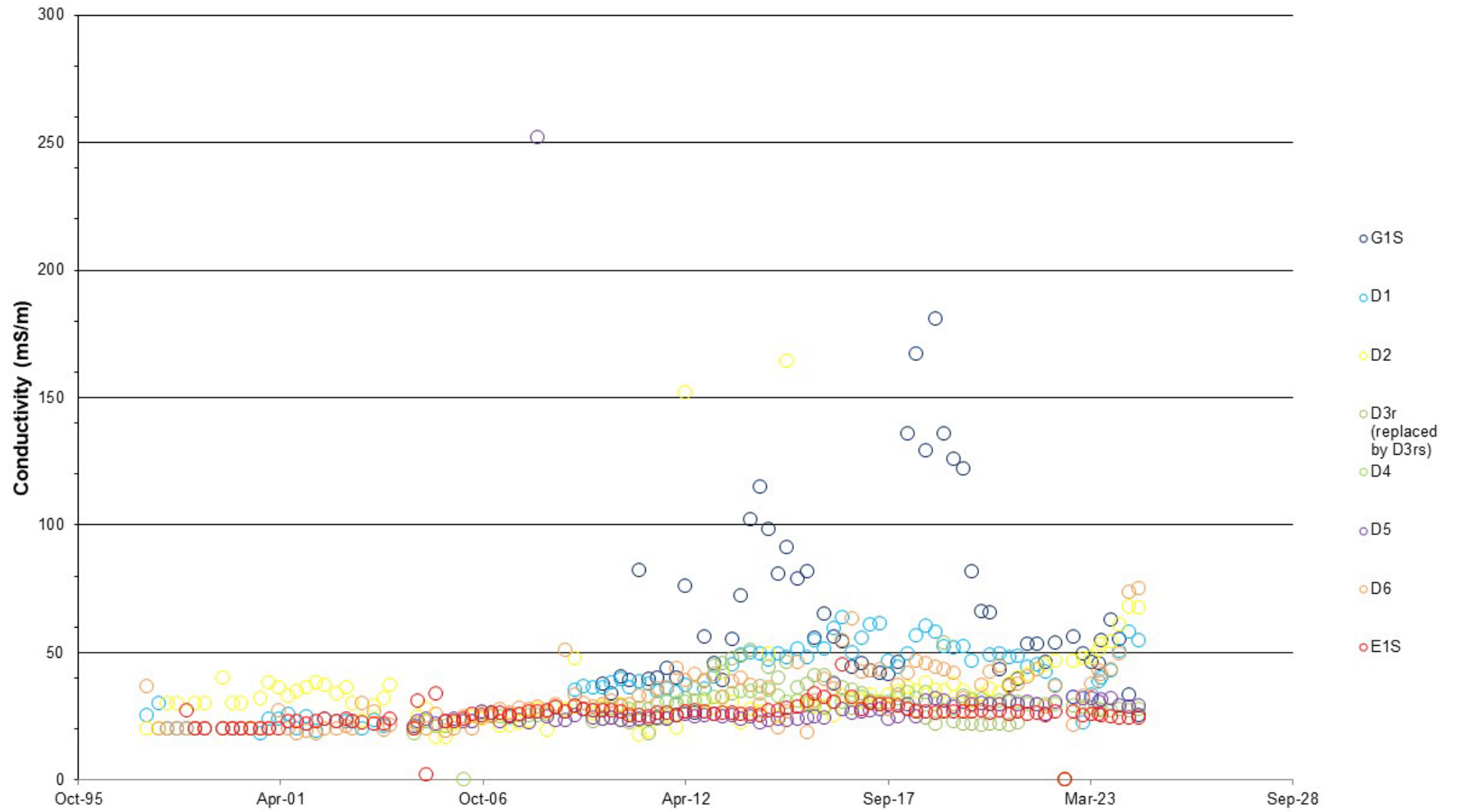






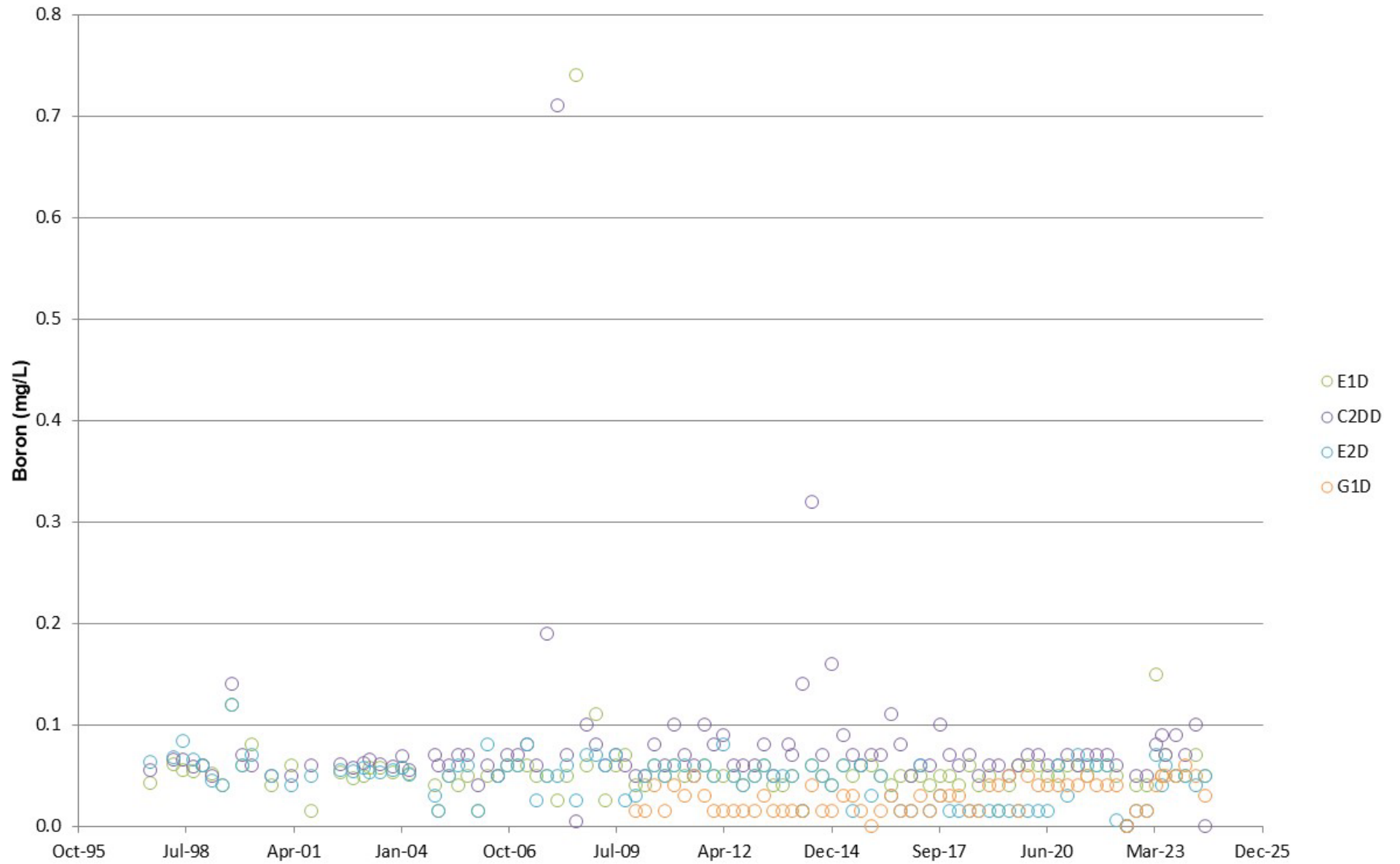


### Sand Aquifer Downgradient of New Landfill - Conductivity Levels

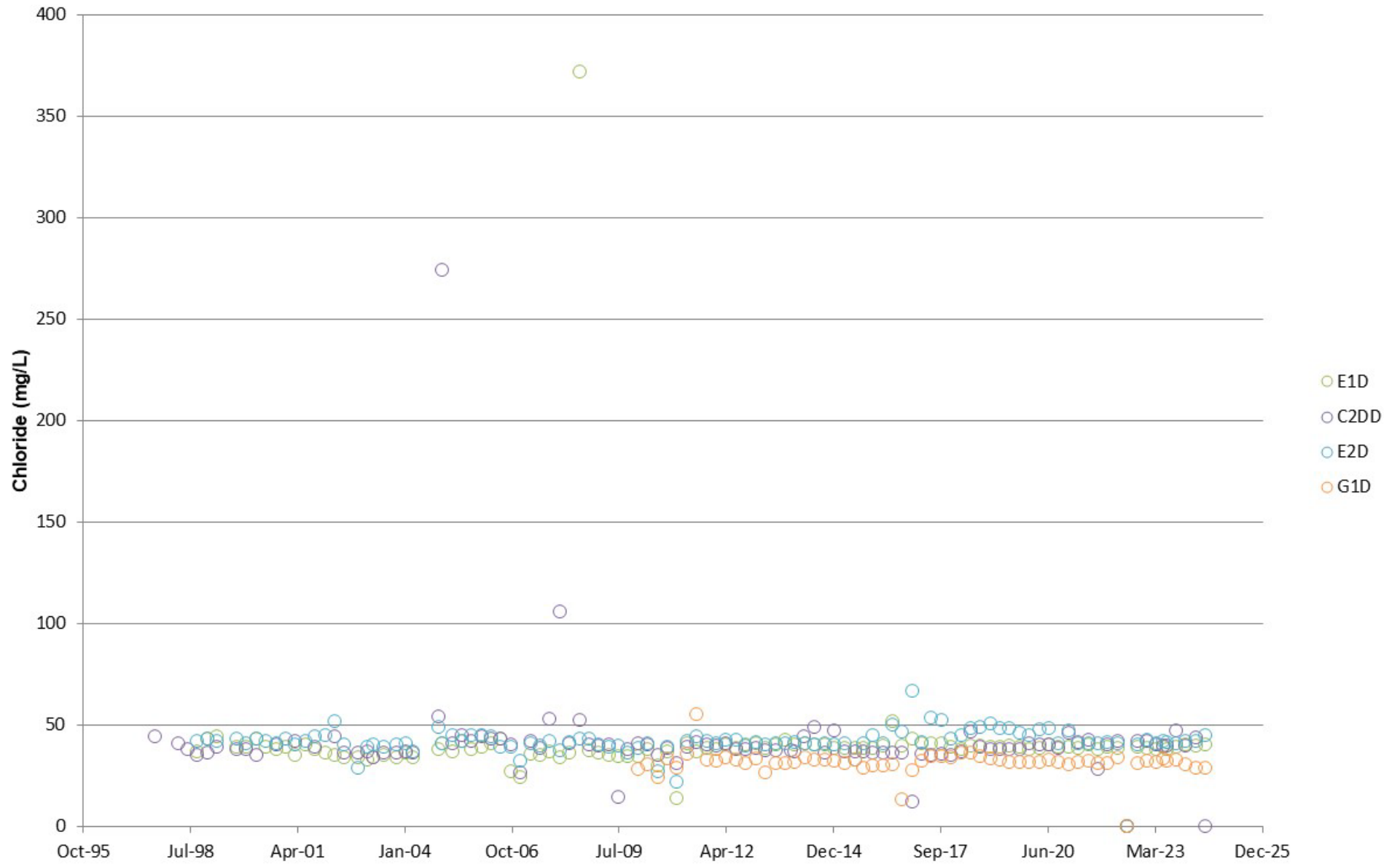




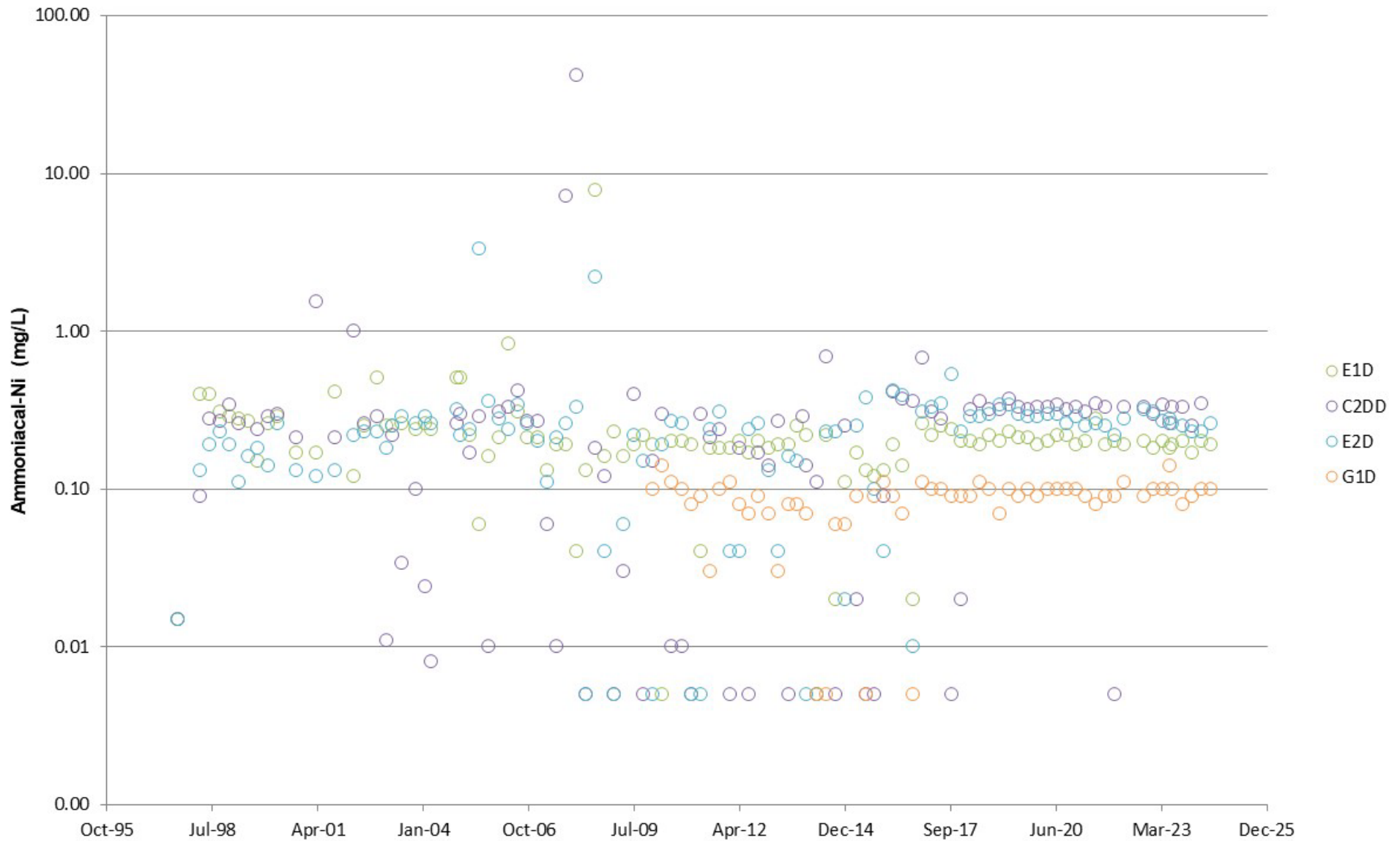
### Gravel Aquifer - Boron Concentrations



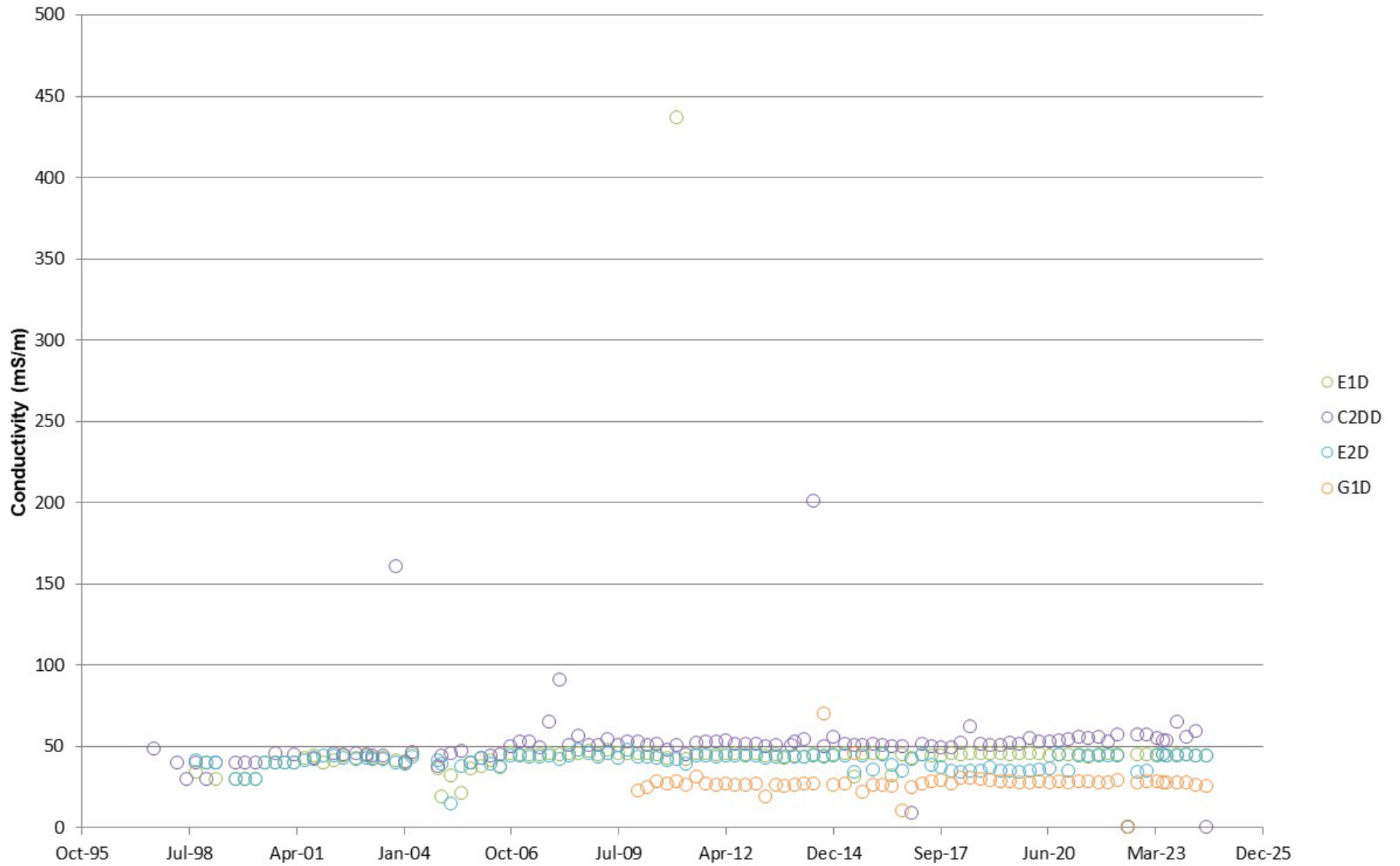
### Gravel Aquifer - Chloride Concentrations



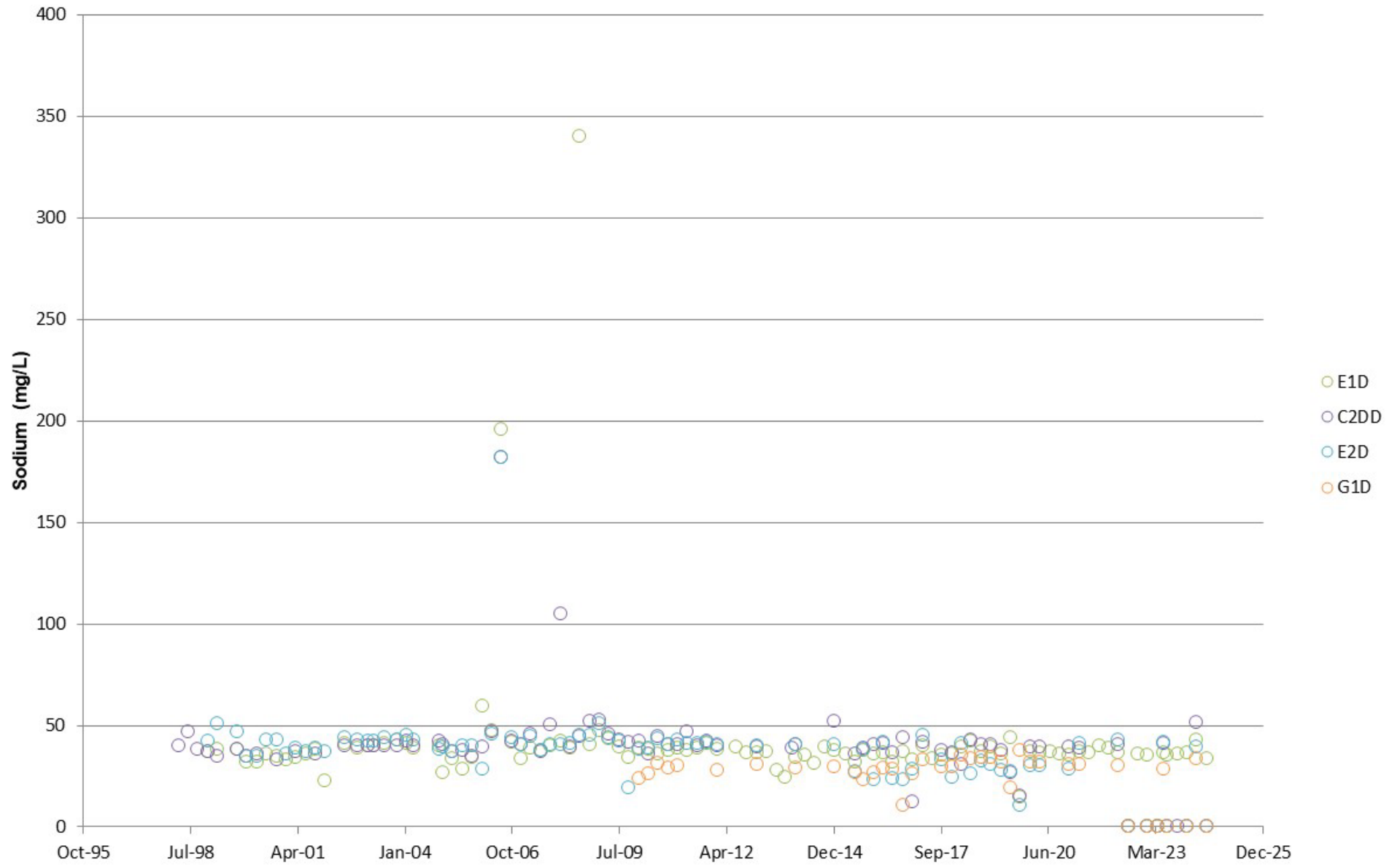
### Gravel Aquifer - Ammoniacal-Nitrogen Concentrations Note: Y-axis scale is Logarithmic



### Gravel Aquifer - Conductivity Levels

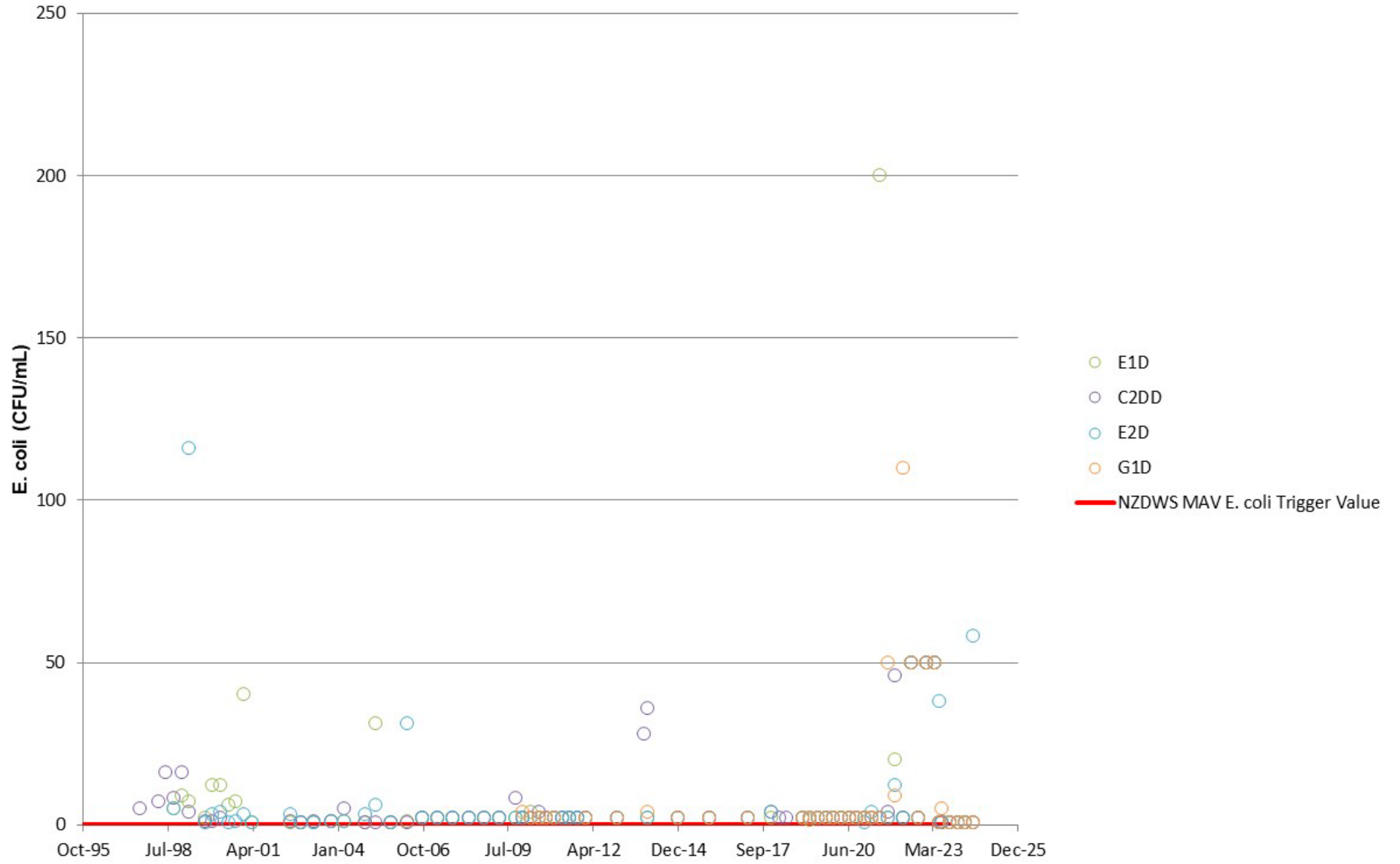


### Gravel Aquifer - Sodium Levels

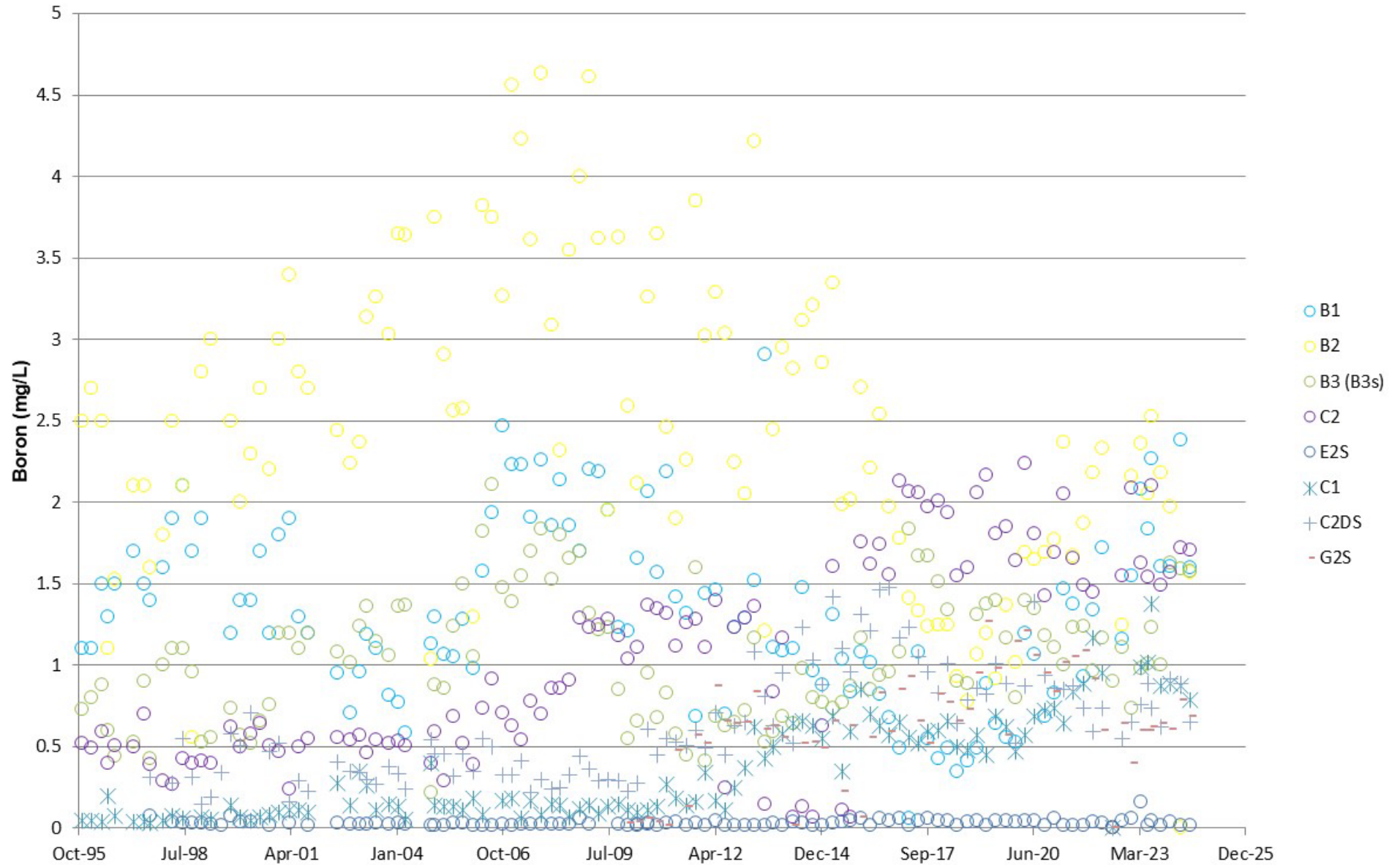




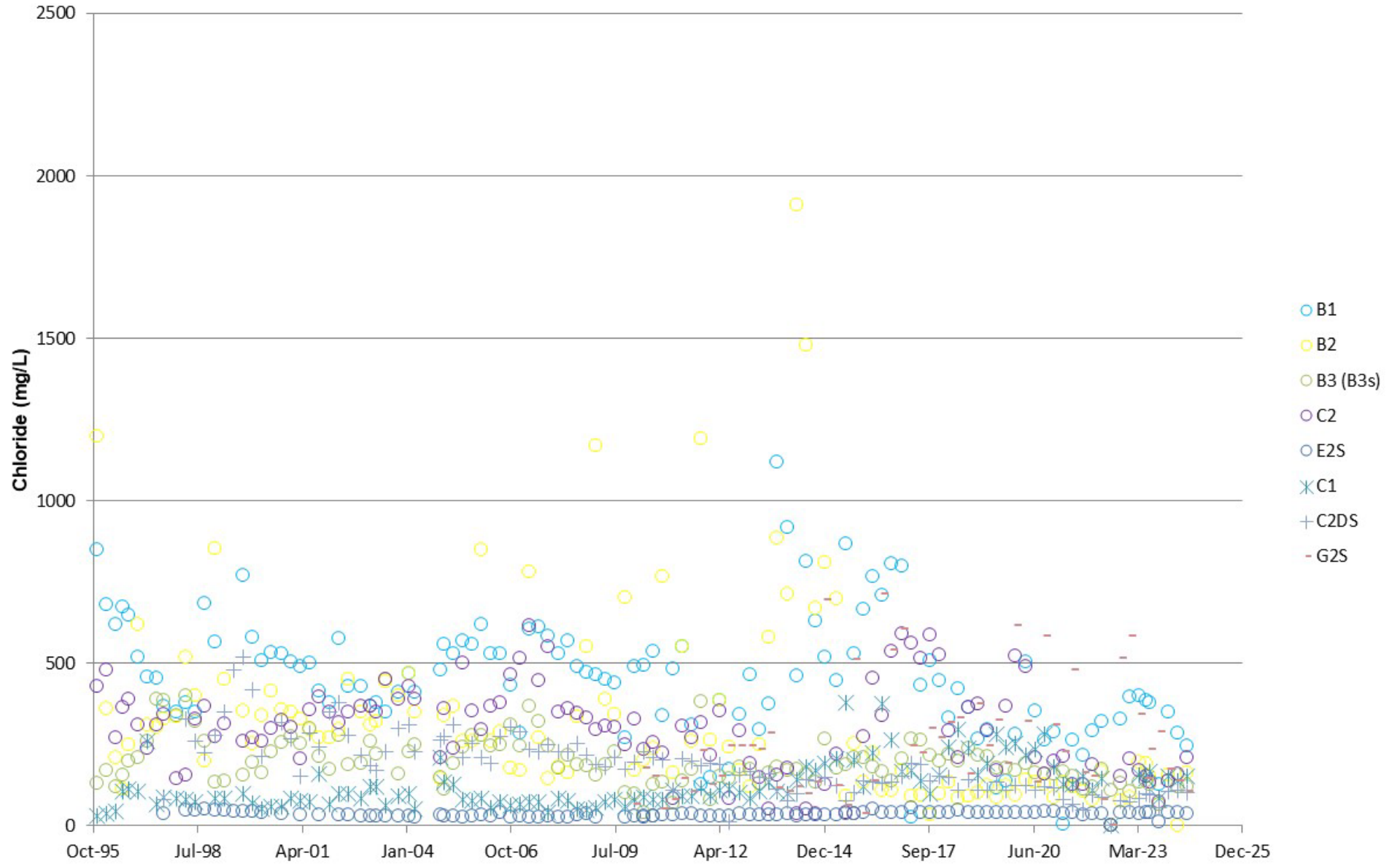
### Gravel Aquifer - E. coli



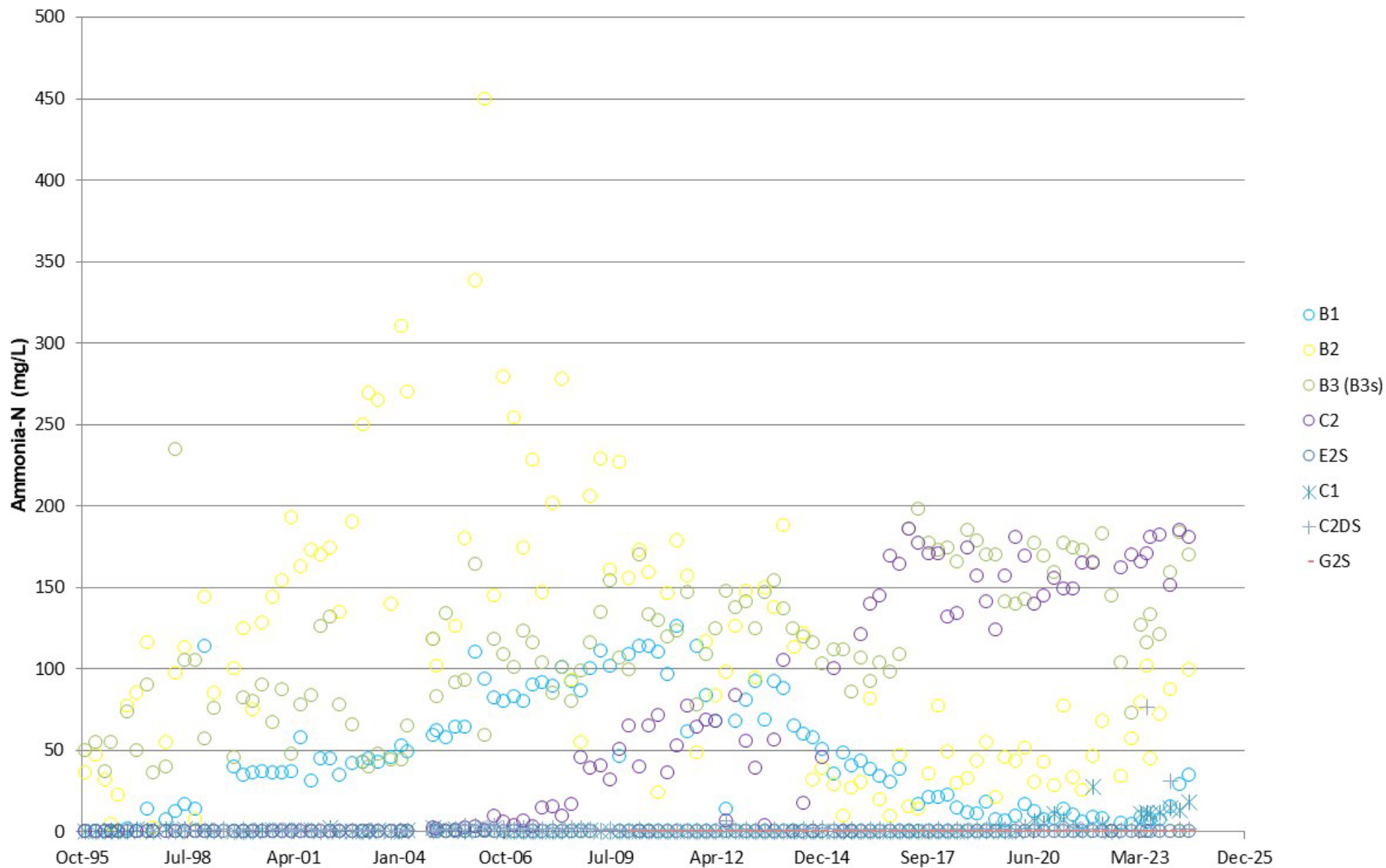
### Sand Aquifer Downgradient of Old Landfill - Boron Concentrations



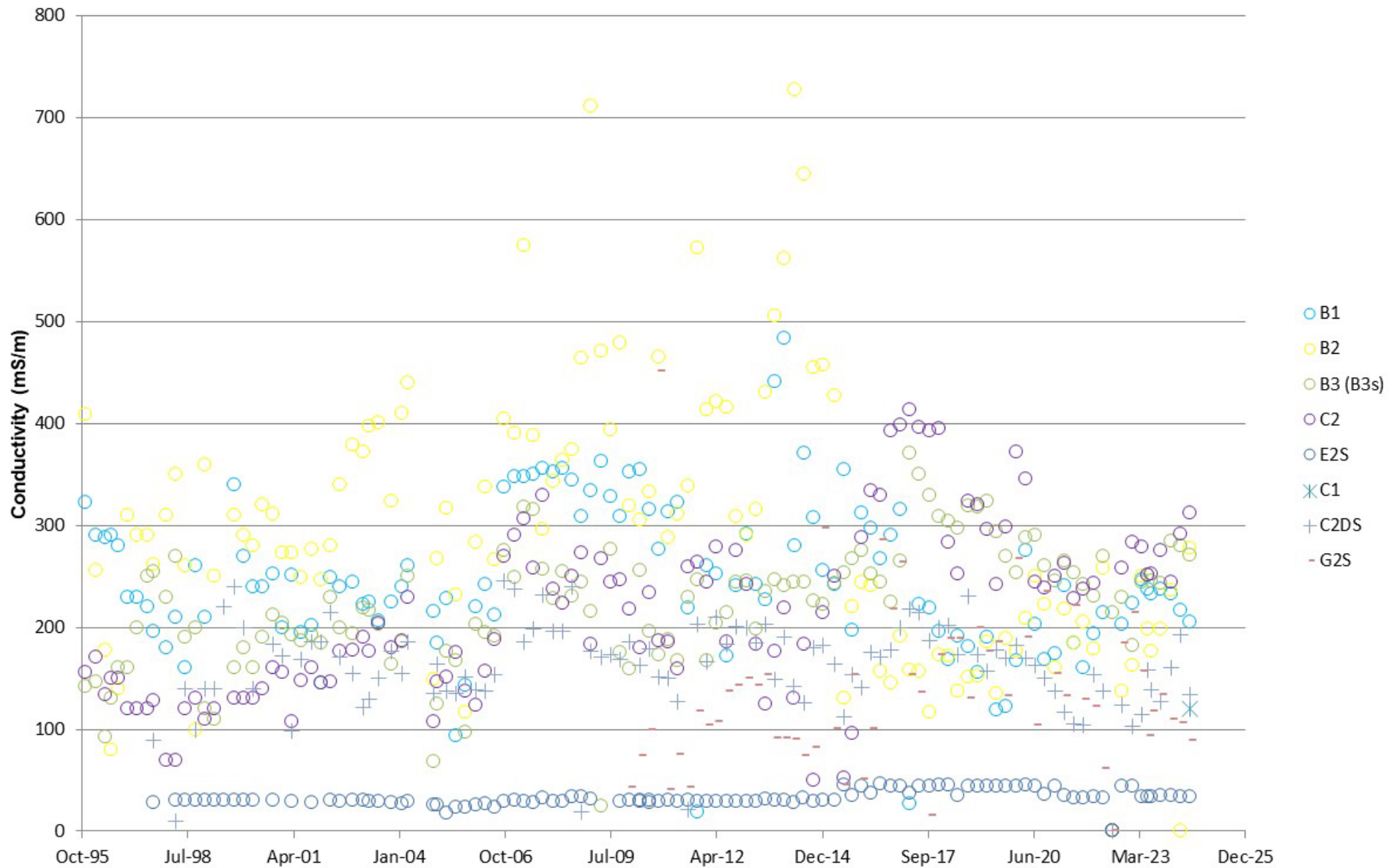
### Sand Aquifer Downgradient of Old Landfill - Chloride Concentrations



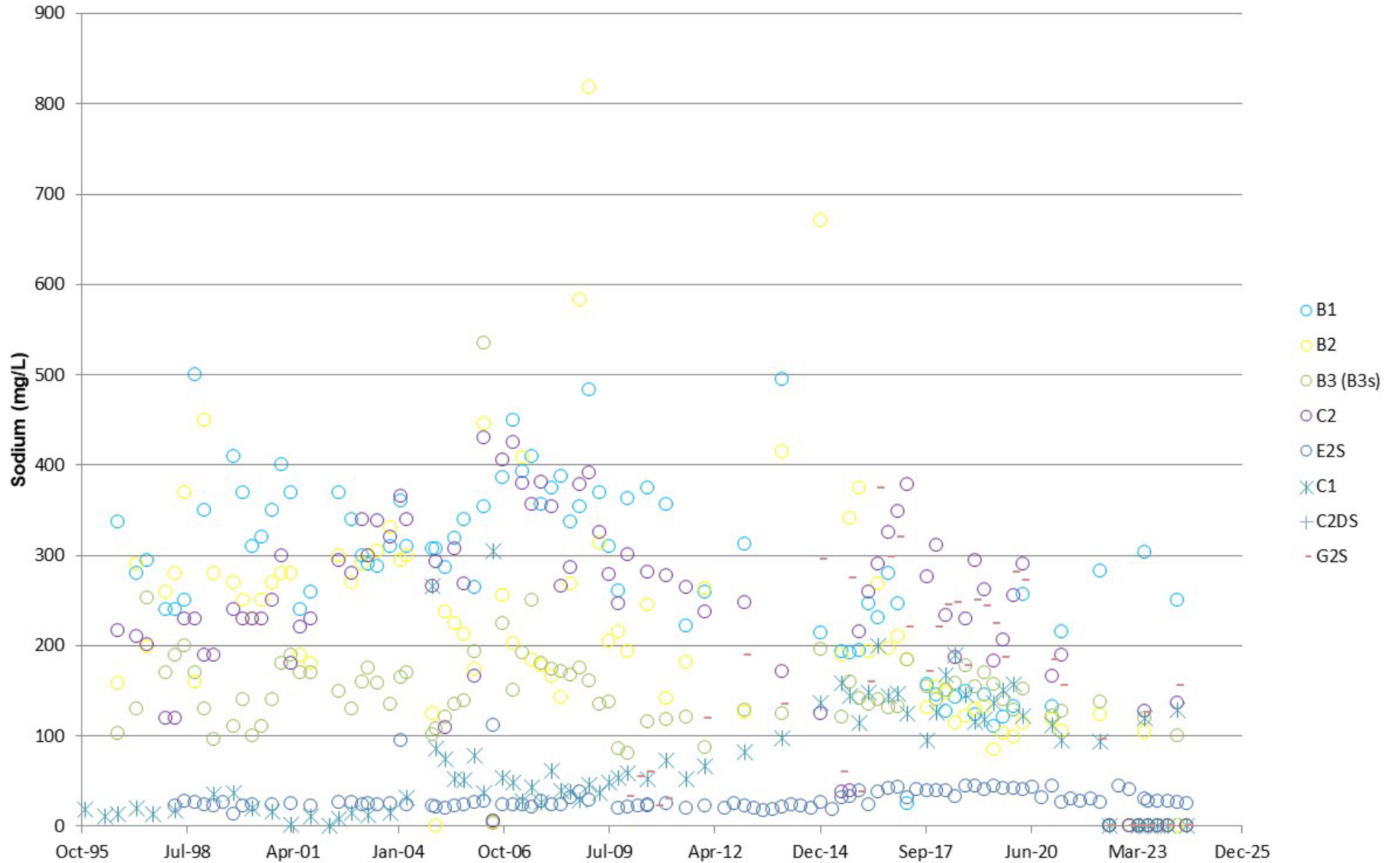
### Sand Aquifer Downgradient of Old Landfill - Ammonia-N Concentrations



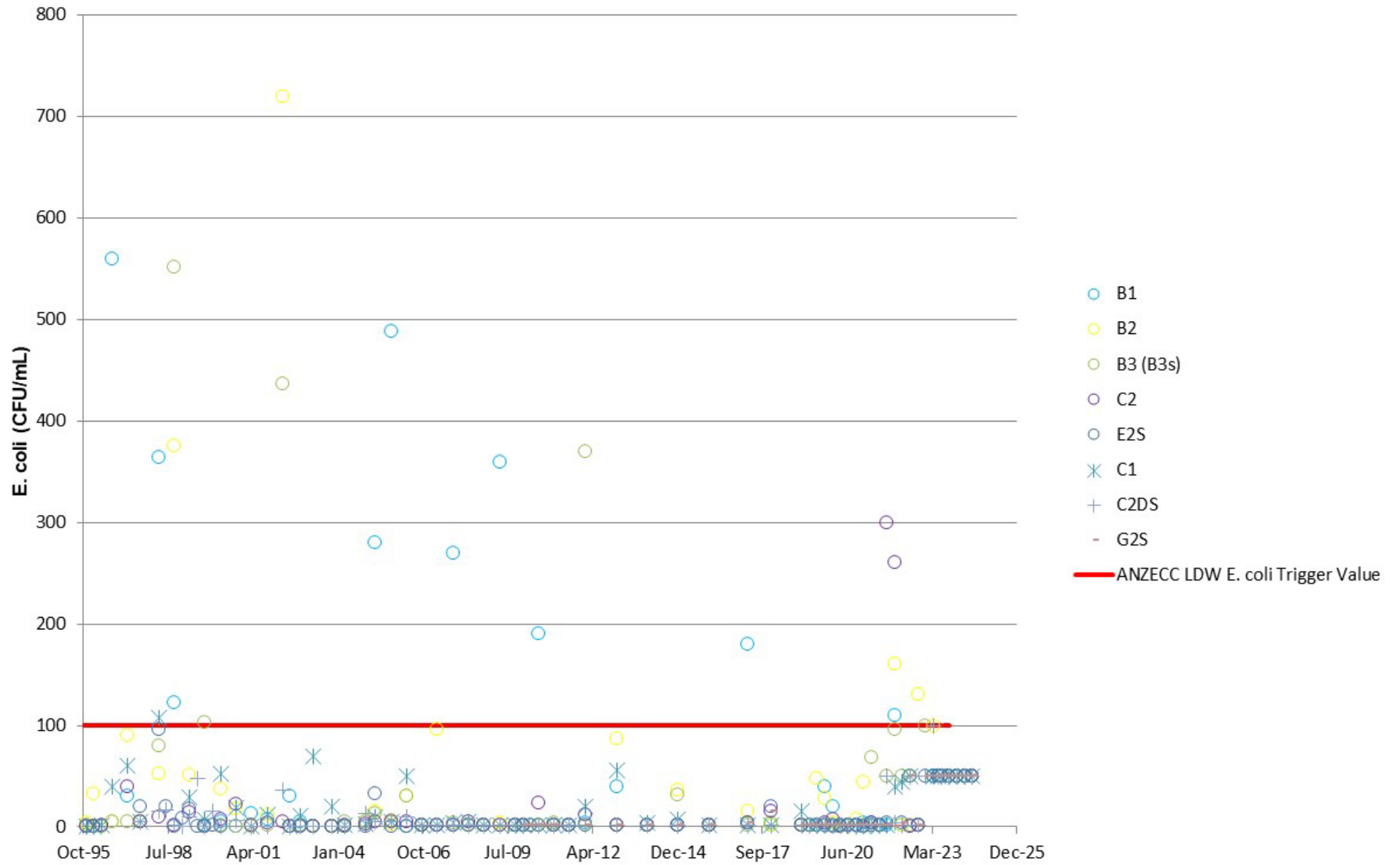
### Sand Aquifer Downgradient of Old Landfill - Conductivity Levels



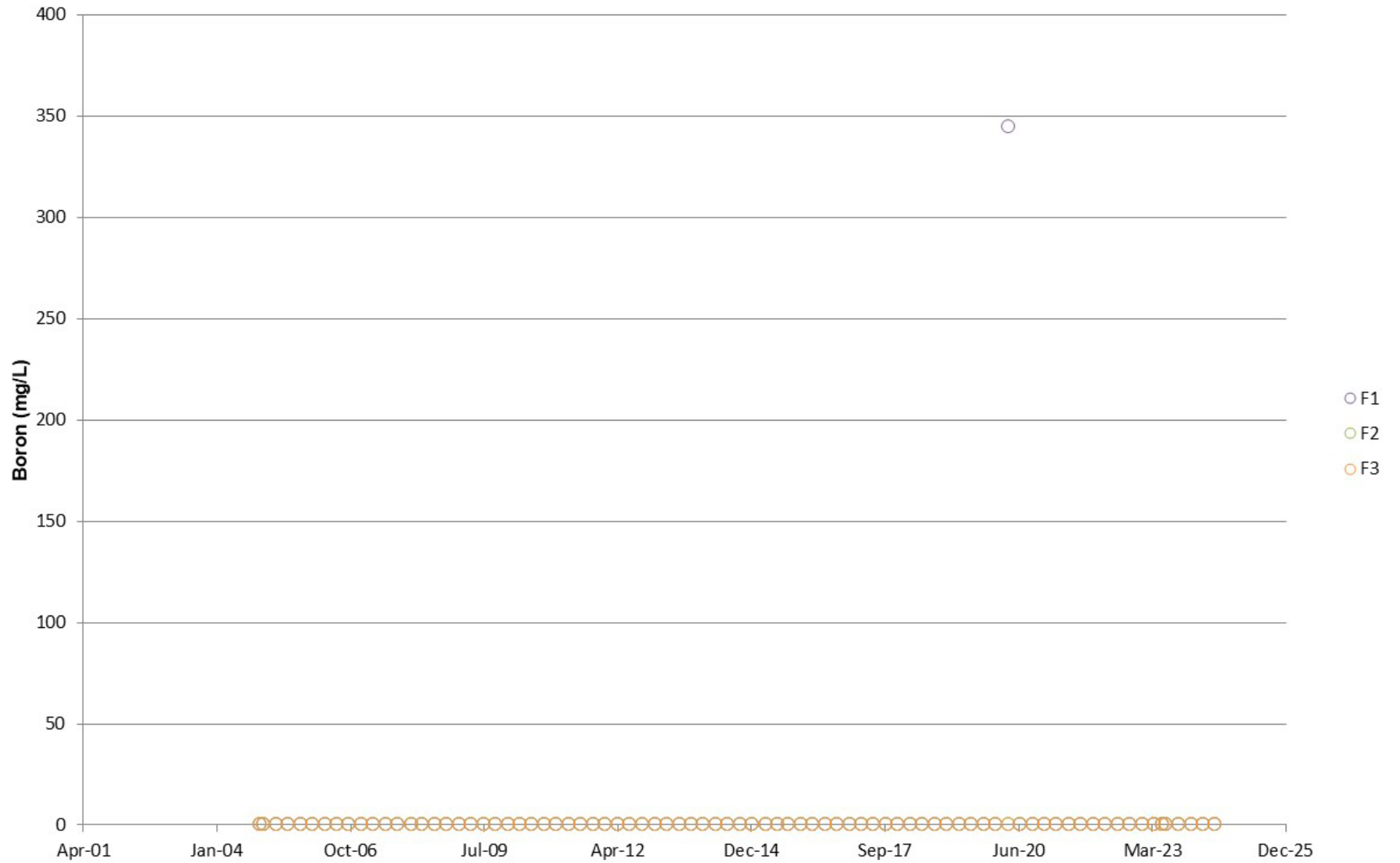
### Sand Aquifer Downgradient of Old Landfill - Sodium Concentrations



### Sand Aquifer Downgradient of Old Landfill - E. coli

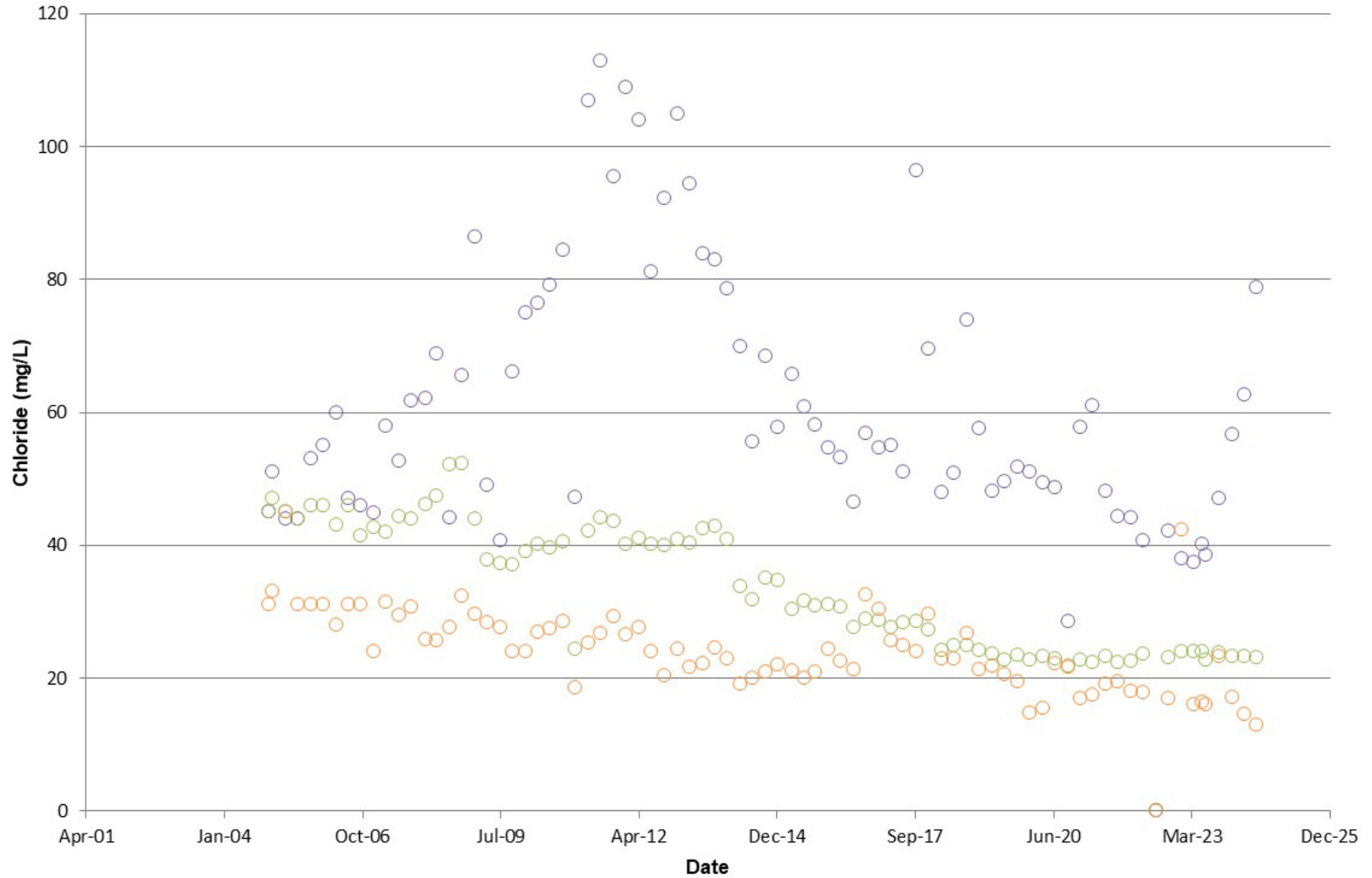


### Irrigation Area - Boron Concentrations

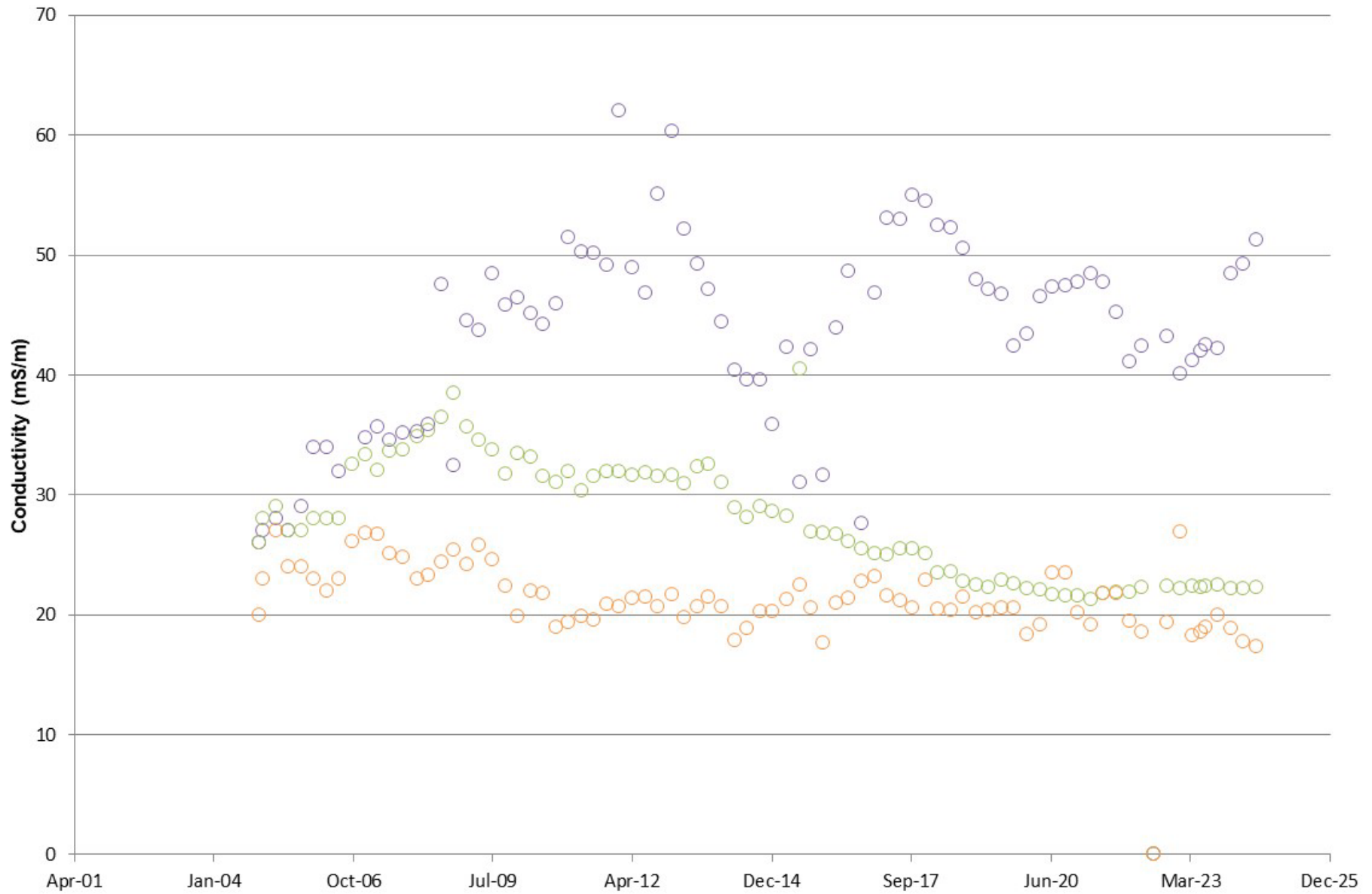




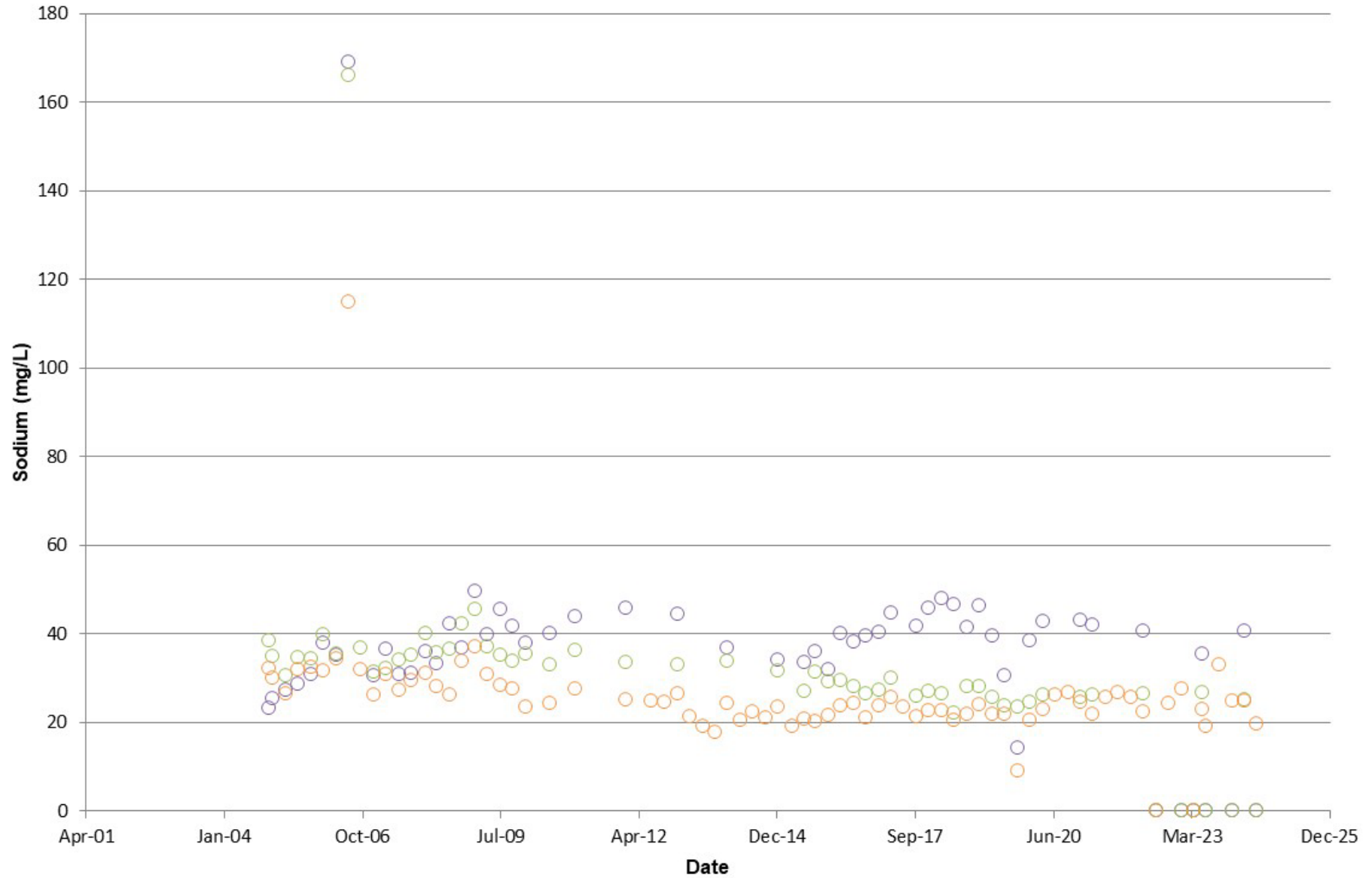
### Irrigation Area - Chloride Concentrations



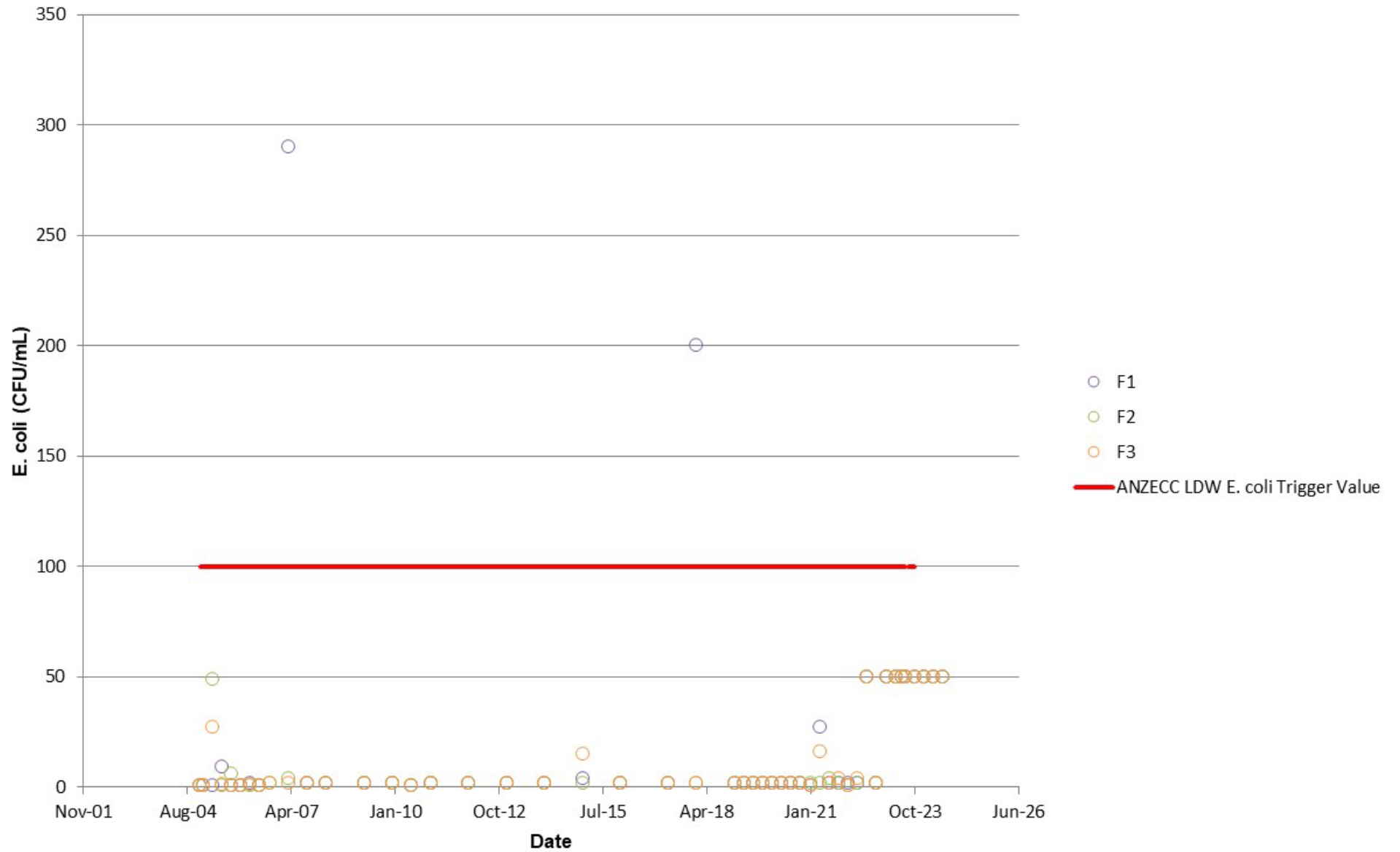
### Irrigation Area - Conductivity Levels



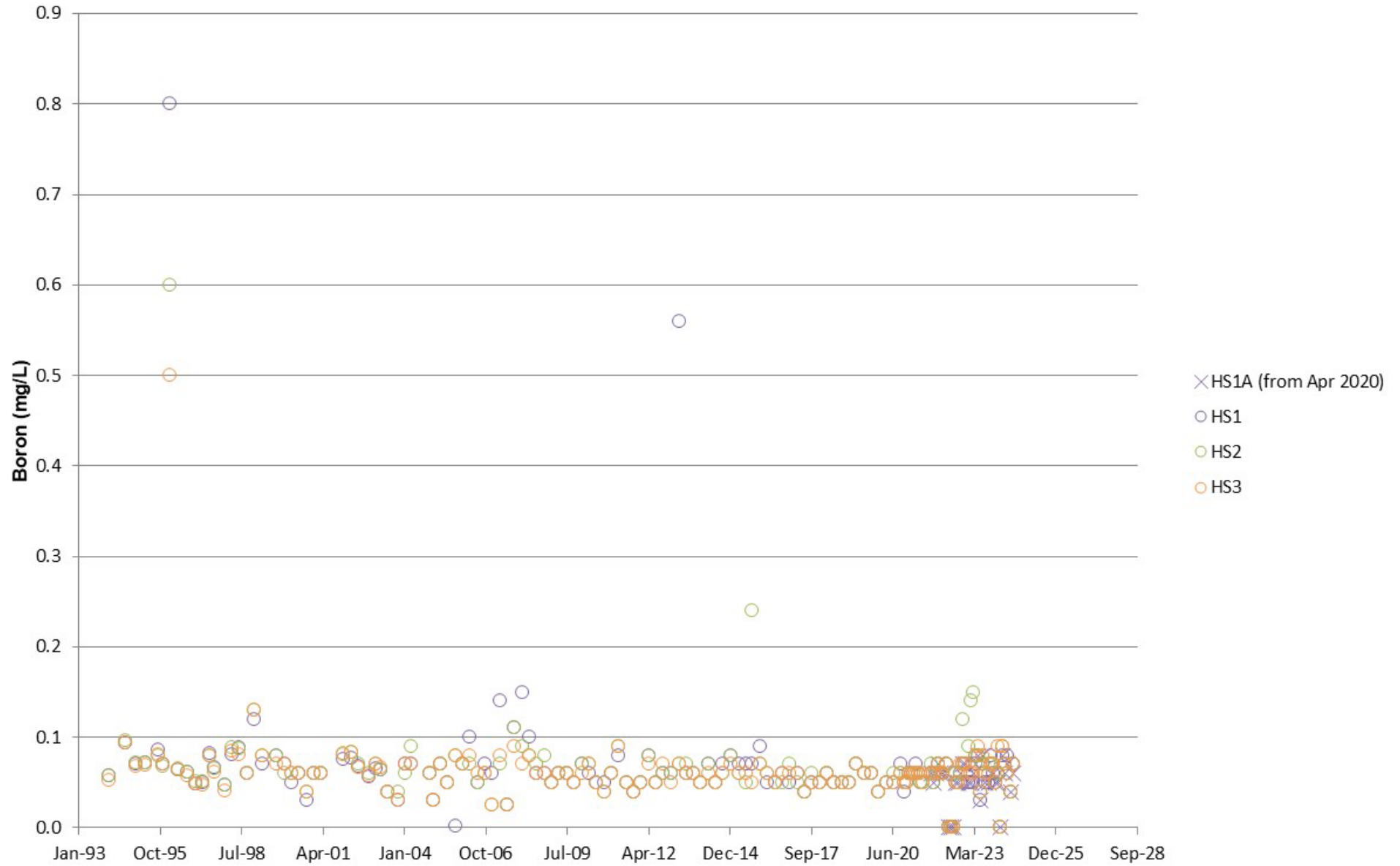
### Irrigation Area - Sodium Concentrations



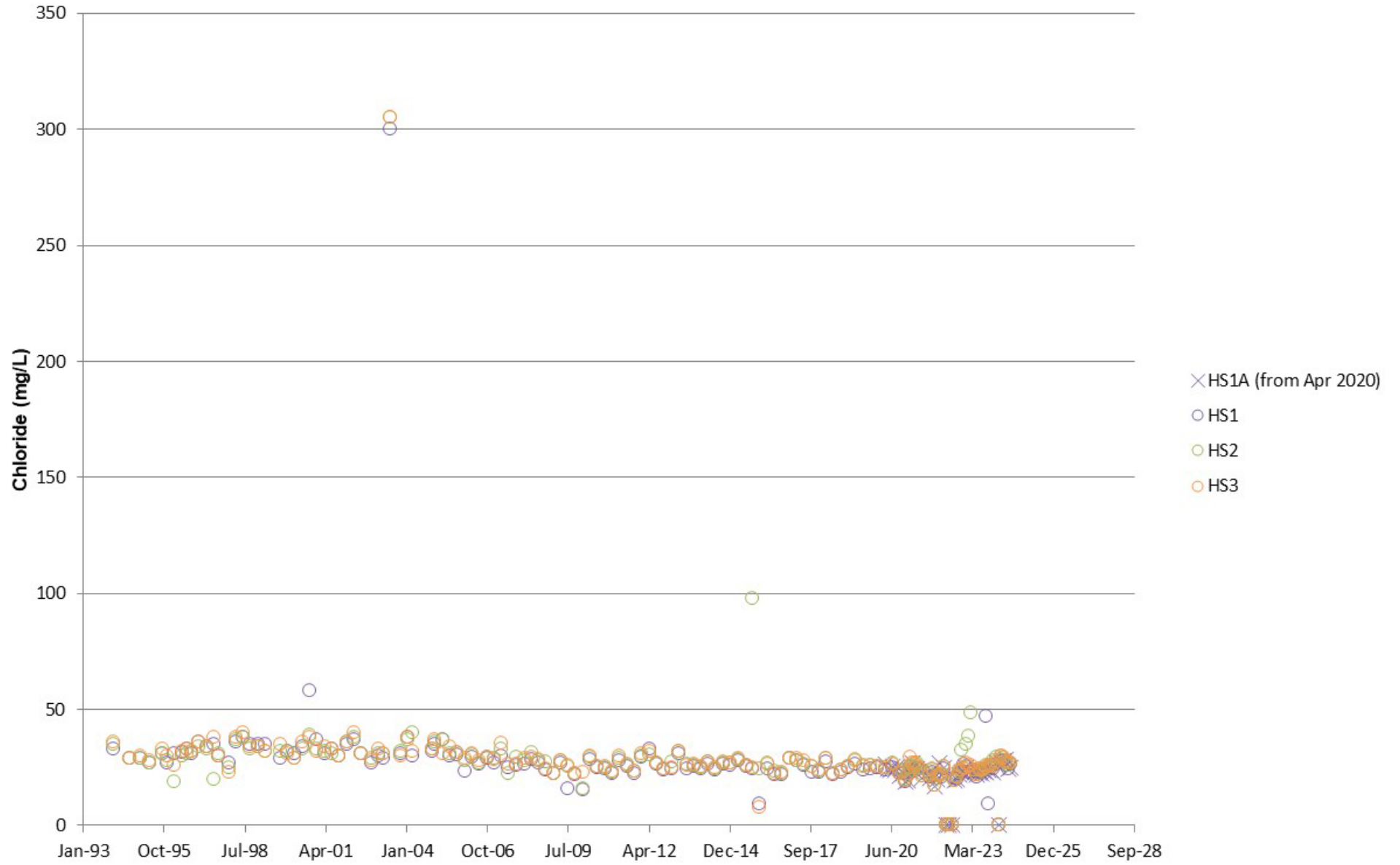
### Irrigation Area - E. coli



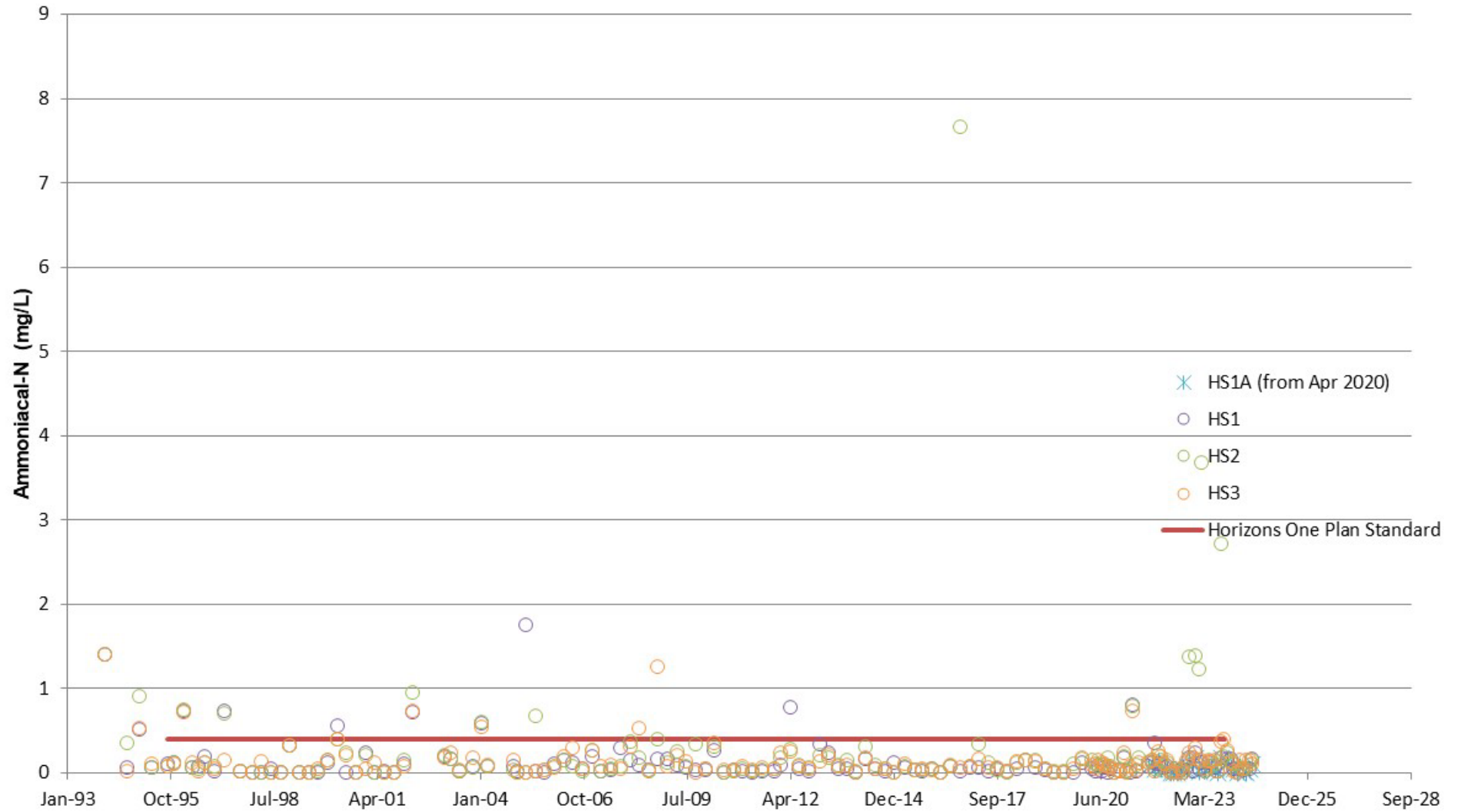
### Hokio Stream - Boron Concentrations



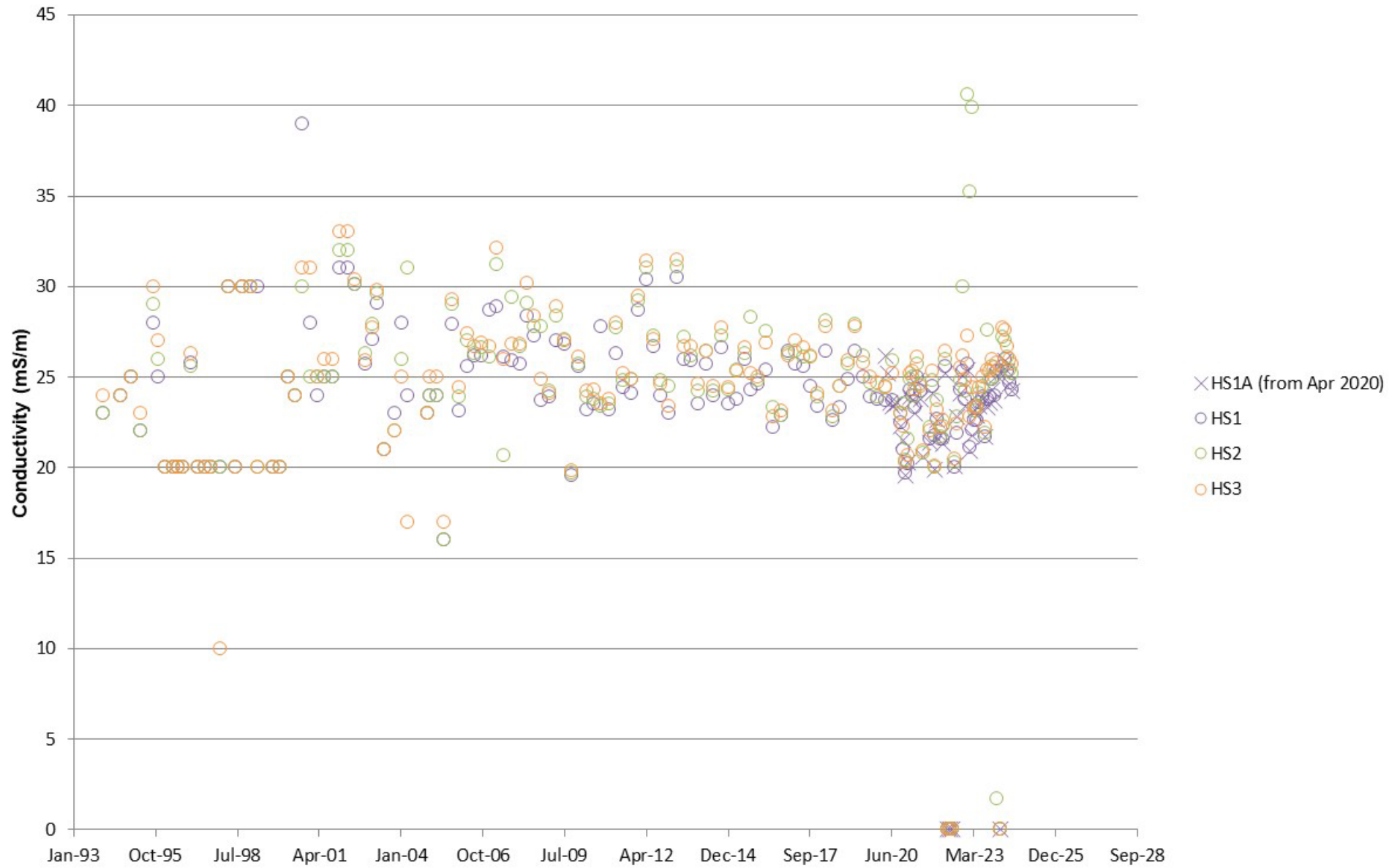
### Hokio Stream - Chloride Concentrations



### Hokio Stream - Ammoniacal-N Concentrations

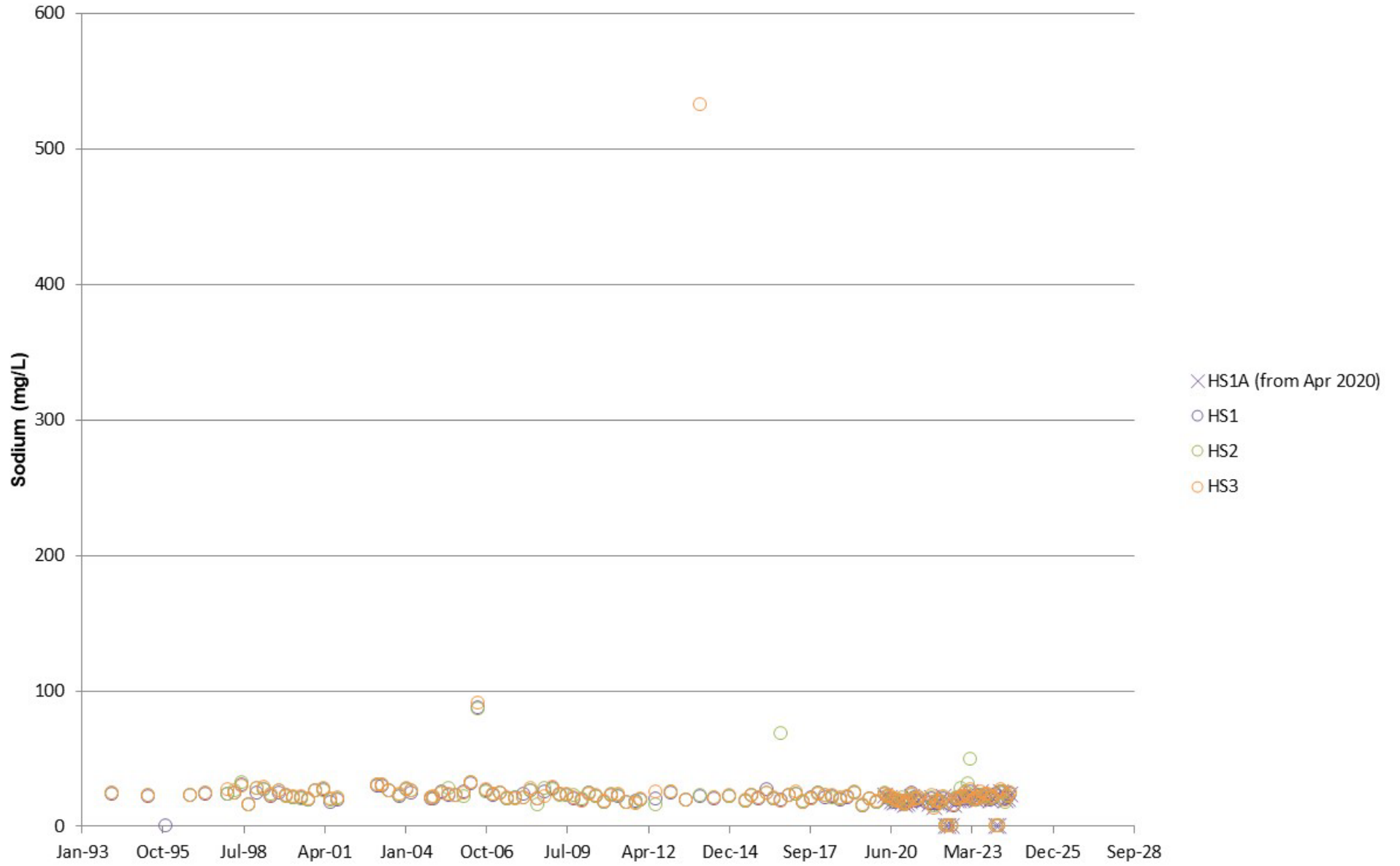


### Hokio Stream - Conductivity

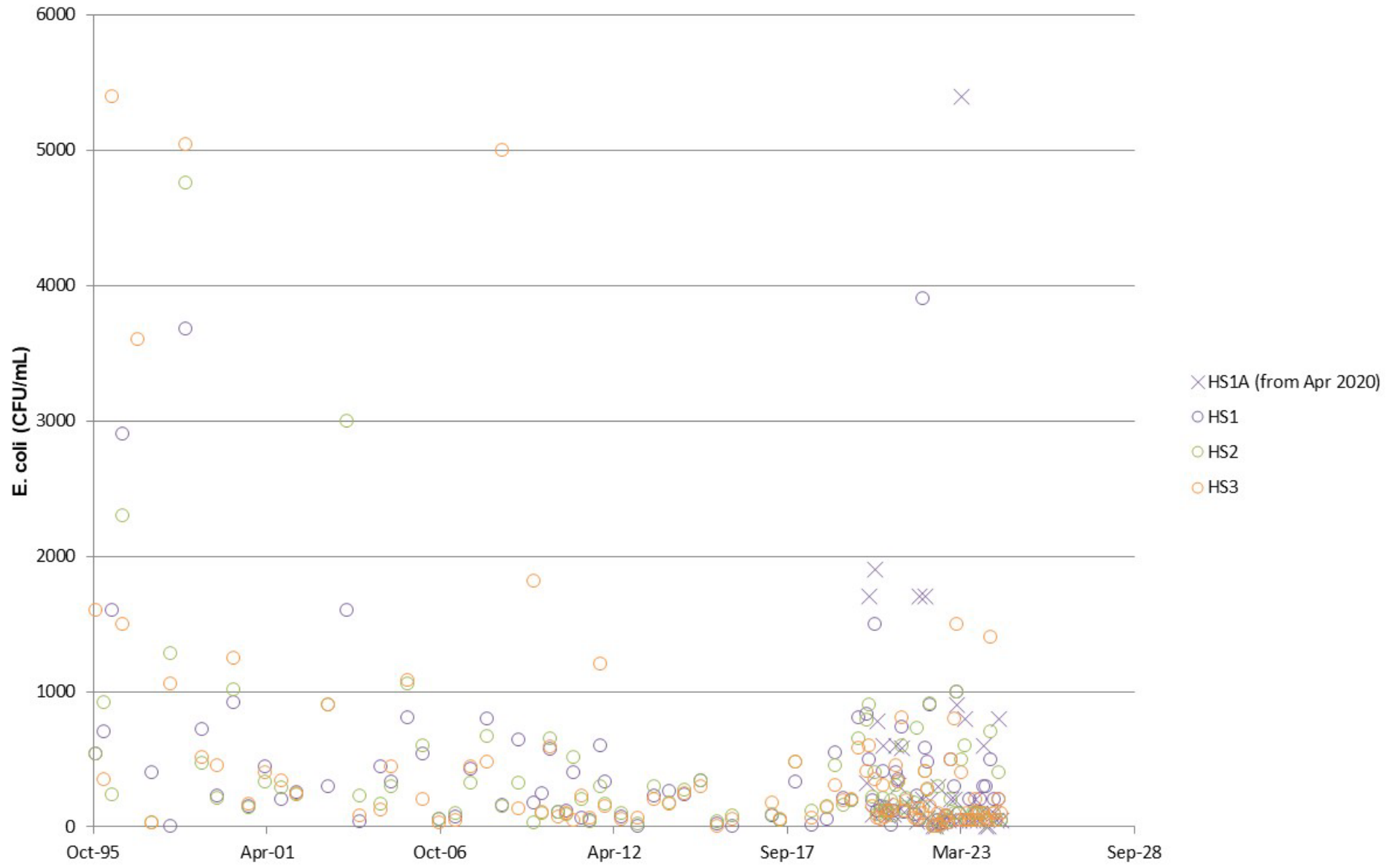




### Hokio Stream Sodium Concentrations



### Hokio Stream - E. coli





# **Appendix E** Landfill Gas Monitoring Results at GW Bores for July 2024



Entry Date	Borehole	Methane (CH <sub>4</sub> ) %	Carbon Dioxide (CO <sub>2</sub> ) %	Hydrogen Sulphide (H <sub>2</sub> S) ppm	Oxygen (O <sub>2</sub> ) %	Weather conditions	Air temperature°C
2024-07-04	Levin Landfill: Levin Xs1	0	0.09	1	20.2	sun	10.8
2024-07-04	Levin Landfill: Levin Xs2	0	0.15	0	21.7	sun	11.3
2024-07-04	Levin Landfill: Levin Xd1	0	0.08	0	20.2		10.6
2024-07-04	Levin Landfill: Levin F2	0	0.17	0	20.6		8.7
2024-07-04	Levin Landfill: Levin F3	0	0.13	0	20.6		9
2024-07-04	Levin Landfill: Levin D3rs	0	0.08	0	20.6	sun	9
2024-07-04	Levin Landfill: Levin E1d	0	0.06	0	19.7	sun	9.5
2024-07-04	Levin Landfill: Levin E1s	0	0.06	0	19.9	sun	9.5
2024-07-04	Levin Landfill: Levin C2dd	0	0.08	0	19.9		11.1
2024-07-04	Levin Landfill: Levin G1s	0	0.05	0	20.6		6
2024-07-04	Levin Landfill: Levin C2	0	0.4	0	19.7		11.1
2024-07-04	Levin Landfill: Levin D5	0	0.09	0	20.3		9.6
2024-07-04	Levin Landfill: Levin F1	0	0.07	0	20.8		6
2024-07-04	Levin Landfill: Levin D3rd	0	0.08	0	20.4		9.4
2024-07-04	Levin Landfill: Levin E2s	0	0.14	0	19.8	sun	10.3
2024-07-04	Levin Landfill: Levin D4	0	0.15	0	19.8	sun	9.9
2024-07-04	Levin Landfill: Levin C1	0	0.25	0	20.4	sun	10.9
2024-07-04	Levin Landfill: Levin C2ds	0	0.06	0	19.9	sun	11
2024-07-04	Levin Landfill: Levin B1	0	0.01	0	20.2	sun	10
2024-07-04	Levin Landfill: Levin B2	0	1.11	0	20.1	sun	10.3
2024-07-04	Levin Landfill: Levin E2d	0	0.12	0	19.8	sun	10.1
2024-07-04	Levin Landfill: Levin D6	0.01	0.12	0	20.5		8.4
2024-07-11	Levin Landfill: Levin G1d	0	0.01	0	20.8		6
2024-07-11	Levin Landfill: Levin D2	0	0.11	0	20.9	sun	8.4
2024-07-11	Levin Landfill: Levin D2	0	0.18	0	20.9	sun	6
2024-07-11	Levin Landfill: Levin G2s	0	0.19	0	20.4	sun	10.9
2024-07-11	Levin Landfill: Levin B3s	0	0.06	0	19.9	sun	10.8



# CREATING COMMUNITIES

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