Levin Landfill January 2022 Quarterly Groundwater, Surface Water and Leachate Monitoring Report

PREPARED FOR Horowhenua District Council | March 2022

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Stantec

Revision Schedule

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Table of Contents

LIST OF TABLES

LIST OF APPENDICES

Abbreviations

ANZECC LDW	ANZECC 2000 Livestock Drinking Water
BDL	below the detection limit
cfu	Colony-forming unit
COD	Chemical Oxygen Demand
DWSNZ GVs	Drinking Water Standards for New Zealand - Guideline Values for aesthetic determinants
DWSNZ MAVs	Drinking Water Standards for New Zealand – Maximum Acceptable Values
EC	Electrical Conductivity
HDC	Horowhenua District Council
Hg	soluble mercury
HRC	Horizons Regional Council
NH_4-N	Ammoniacal-nitrogen
NO_3-N	Nitrate nitrogen
scBOD5	soluble carbonaceous BOD5

Executive Summary

Horowhenua District Council (HDC) is required to carry out quarterly compliance monitoring of groundwater and monthly sampling of most of the surface water monitoring locations at the Levin Landfill, as part of the conditions of Resource Consents DP6009, DP6010, DP6011 and DP102259. This report summarises the findings for the monitoring events from the third quarter (i.e., November 2021 to January 2022) sampling round and includes results for:

- Background (natural) groundwater
- Landfill leachate
- Groundwater bores within the new landfill and old irrigation area
- Shallow aquifers, down-gradient of the old landfill
- The deep aquifer
- The Tatana Drain, and
- The Hokio Stream.

Stantec has reviewed the results of this third 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 26 groundwater bores from around Levin Landfill during January 2022, and from the landfill leachate at a manhole next to the leachate pond, and at five surface water sites during November 2021, December 2021, and January 2022. The samples were analysed for the parameters set out in Discharge Permit 6010.

The January 2022 samples were collected progressively over a 3-day period, which is within the normally accepted 7-day sampling period. Meeting the monitoring timeframe is important because it provides greater confidence in comparing results from different parts of the site.

The resource consent for the landfill (namely, discharge permit 6010) 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 Aquatic Ecosystems (ANZECC AE) 95% trigger values, as required by the revised Resource Consent condition approved in December 2019.

The January 2022 monitoring results have been assessed against these limits, where they are applicable.

Forty-two non-compliances with resource consent conditions were recorded at twenty-one individual monitoring locations, as follows:

- For E. coli in bores D1, D2, D3rs, D4, and D6 (with 790 CFU/100ml, 180 CFU/100ml, 500 CFU/100ml, 260 CFU/100ml, and 830 CFU/100ml respectively) which exceeds the ANZECC LDW trigger value of 100 CFU/100ml.
- For E. coli in bores E2S, B1, B2, and C2 (with 3,200 CFU/100ml, 110 CFU/100ml, 160 CFU/100ml, and 260 CFU/100ml respectively) which exceeds the ANZECC LDW trigger value of 100 CFU/100ml.
- For E. coli in bores E1D, C2DD, E2D, Xd1, and D3rd (with 20 CFU/100ml, 46 CFU/100ml, 12 CFU/100ml, 16 CFU/100ml, and 12 CFU/100ml respectively) which exceeds the DWSNZ MAV value of nil.
- For dissolved manganese in bores Xd1 and D3rd (with 0.497 mg/L and 0.498 mg/L respectively) which exceeds the DWSNZ MAV of 0.4 mg/L.
- For $scBOD_5$ during December 2021 and January 2022 in the Tatana Property Drain (with 7 mg/L and 6 mg/L respectively) which exceeded the ANZECC AE (95%) limit of 2 mg/L.
- For Ammoniacal-N during January 2022 in the Tatana Property Drain (with 5.98 mg/L) which exceeds the ANZECC AE (95%) limit of 2.1 mg/L.

- For nitrate-N during November 2021, December 2021, and January 2022 at all Hokio Stream monitoring locations, HS1A, HS1, HS2, and HS3, exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- For dissolved aluminium during January 2022 at HS1 (with 0.066 mg/L) which exceeds the ANZECC AE (95%) trigger value of 0.055mg/L
- For dissolved copper during November and December 2021 at HS1A, HS1, HS2, and HS3 marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.
- For dissolved zinc during November 2021 at HS2 (with 0.011) which exceeds the ANZECC AE (95%) trigger value of 0.008mg/L.
- For dissolved zinc during December 2021 at HS3 (with 0.01) which exceeds the ANZECC AE (95%) trigger value of 0.008mg/L.
- For dissolved zinc during January 2022 at HS1 (0.009) which exceeds the ANZECC AE (95%) trigger value of 0.008mg/L.

The large number of exceedances for E. coli in the groundwater bores is very unusual. It would be appropriate for the results of the next monitoring round to be tracked closely to determine if this is a trend or possibly the result of sampling errors.

The January 2022 results were also considered in the context of background water quality, both within the groundwater aquifers (shallow and deep bores) and the surface water receiving environment. For example, low pH at background bore G1S, and elevated iron concentrations in the same bore indicate that groundwater could be being impacted by up-gradient activities unrelated to the landfill operations.

There were two exceedances in samples from the leachate effluent. Leachate quality is typical of the composition of leachate recorded generally at Class 1 landfills in New Zealand. Exceedances were for COD in and ammoniacal-N in January 2022.

Methane was detected in eighteen groundwater monitoring bores in the January 2022 sampling round. This is a substantial increase compared to the last monitoring round, but the highest concentration of methane, which was in bore D6 (0.09%), was well below the lower explosive limit for methane (which is 5%).

Hydrogen sulphide was not detected in any of the groundwater bores during the January 2022 sampling round.

1.0 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 32 locations, as required by the resource consent conditions (namely for discharge permit 6010). These sampling locations consist of 26 boreholes penetrating the sand and gravel aquifers, four surface water sampling locations within Hokio Stream, one surface sampling location along the Tatana Drain and a 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 been closed pending a decision by HDC to continue operating it. The new landfill footprint has been 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 is in the process of being capped. Council is due to decide in the first quarter of 2022 whether it will continue with landfilling in a new stage that has yet to be constructed.

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 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 of the changes. Sampling since the January 2021 sampling round has been in line with what has been done previously, but different reference parameters have been applied to assess the surface water sampling results, as required by the new consent conditions.

This report presents the results for the January 2022 quarterly monitoring round.

Please note, the laboratory detection limit for E. coli is 1 cfu/100ml; however, in the results received, results were often noted as being below detection levels at <100 cfu/100ml or <4 cfu/100ml. This is assumed to be an error and has been noted in the report as being "not detected". There were also some results reported with a concentration of 0. It is assumed this means the parameter was below the laboratory detection limit.

2.0 GROUNDWATER AND SURFACE WATER MONITORING

2.1 SAMPLE ANALYSES

Samples were collected by Downer (a contractor to HDC) on 11, 12, and 13 January 2022. Samples were received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington on 12, 13, and 14 January 2022.

The monitoring programme for July 2021 - April 2024 is summarised in the schedule in Appendix B. From July 2019, faecal coliform counts analyses have been included within the indicator and comprehensive analytical suites, as agreed by HDC with the Horizons Regional Council (HRC). This means that faecal coliform counts will be assessed more frequently throughout each year, as compared to the past monitoring regime.

Groundwater samples taken from the boreholes were analysed for the indicator suite of parameters which are outlined in Table 2-1. Surface water samples from Hokio Stream and samples of landfill leachate effluent were analysed for the comprehensive list of parameters. Surface water samples collected from the Tatana Property drain were analysed based on a specific parameter list that has been included in the reviewed resource consent conditions. From the April 2020 monitoring round onwards, sampling of the Tatana Drain has followed the comprehensive and indicator suites of parameters used for other surface water sampling.

Note that, following the revision of the resource consent conditions which were approved in December 2019, soluble carbonaceous BOD_5 ($scBOD_5$) and soluble mercury (Hg) have each been added to the indicator and comprehensive suites of parameters, and E. coli to the comprehensive suite of parameters. The $scBOD_5$ and E. coli parameters replace

BOD_5 and faecal coliforms respectively. Monitoring of these additional parameters has commenced from the April 2020 sampling round.

Table 2-1: Indicator Parameters

Type	Parameters
Characteristics	pH Electrical Conductivity (EC)
Oxygen demand	Chemical Oxygen Demand (COD), $scBOD_5$++
Nutrients*	Nitrate nitrogen (NO_3-N), Ammoniacal-nitrogen (NH_4-N)
Metals*	Aluminium, Manganese, Mercury++, Nickel, Lead
Other elements	Boron, Chloride
Biological+	E. coli

Note:

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

**Selected bores as per stormwater consent 102559

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

++Soluble carbonaceous BOD_5 ($scBOD_5$) and Soluble Mercury added as per revised consent conditions for Discharge Permit 6010, December 2019

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 that is used in the annual report. This is standard practice when dealing with chemical concentrations in water. However, the same rule cannot be applied for E. coli in the context of the Levin Landfill.

2.2 BACKGROUND GROUNDWATER QUALITY

The quality of the natural background water 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 DWSNZ guidelines were used to benchmark the quality of water up-gradient from the landfill site.

Groundwater samples are collected from the two background bores situated hydraulically up-gradient from both the new and old landfills to the southeast of the site (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.

The results are presented in Table 2-2.

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 C and the historical graphs are presented in Appendix D.

Table 2-2: Background Monitoring Results for January 2022

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Water level	mBGL	-	-	14.32	14.89	5.35
pH	-	7 to 8.5*	6 to 9	6.7	7.4	7.1
Conductivity	mS/m	-	-	46.2	27.6	19.5
COD	mg/L	-	-	104	*7.5*	*7,5*
$scBOD_5$	mg/L	-	-	*3*	*0.5*	*0.5*
E. Coli	CFU/100ml	NIL	100	**300**	**9**	*0.5*

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Chloride	mg/L	250*	-	72.2	30.9	18
Nitrate-N	mg/L	11.3	90.3	*0.005*	*0.005*	1.36
Ammoniacal-N	mg/L	1.17	-	0.06	0.09	*0.005*
Sodium	mg/L	200*	-	74.6	n/r	25.7
Dissolved Aluminium	mg/L	0.1*	5	**0.173**	*0.001*	*0.001*
Dissolved Boron	mg/L	1.4	5	*0.015*	0.04	0.03
Dissolved Iron	mg/L	0.2*	-	**4.24**	n/r	*0.005*
Dissolved Lead	mg/L	0.01	0.1	0.0014	0.0006	*0.00025*
Dissolved Manganese	mg/L	0.4	-	0.0744	0.0604	*0.00025*
Dissolved Mercury	mg/L	0.007	0.002	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.08	1	0.0015	*0.00025*	*0.00025*

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

n/r – not required to be tested during this monitoring period

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

Values which exceeded the ANZECC LDW are shown in red

The results in Table 2-2 show that all parameters at bore F3 were within the ANZECC LDW trigger values and DWSNZ limits during the January 2022 monitoring round. Bore G1S however showed exceedances of both the DWSNZ limits and the ANZECC LDW values and Bore G1D showed an exceedance of the DWSNZ limit. At bore G1S, E. coli was detected in a concentration of 300 CFU/100ml, which exceeds the ANZECC LDW value of 100 CFU/100ml and the DWSNZ limit of nil. At G1D, E. coli was also detected at 9 CFU/100ml, which again exceeds the DWSNZ limit of nil. At G1S, the dissolved aluminium (0.173 mg/L) and dissolved iron (4.24 mg/L) concentrations exceeded the DWSNZ limits of 0.1 mg/L and 0.2 mg/L respectively.

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, D3(rs), D4, D5, 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 D4 is likely to show evidence of 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 unlikely that leachate from the new landfill will significantly affect groundwater quality due to the leachate collection system which is in place at the new landfill; however, these bores would still give early warning of any potential problems. It is noted that bore D3r has been replaced with two bores, D3rs, which is a shallow bore and D3rd, which is deep bore. This is discussed in section 2.3.2. It is noted also that new bores D3rs and D3rd should be sampled for the comprehensive suite of parameters for the first two years following installation.

The results from the January 2022 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 C and the historical graphs are presented in Appendix D.

There were **5 exceedances of the resource consent conditions during the January 2022** monitoring round in samples from the shallow aquifer. E. coli was detected in bores D1 (790 CFU/100ml), D2 (180 CFU/100ml), D3rs (500 CFU/100ml), D4 (260 CFU/100ml), and D6 (830 CFU/100ml), which were well above the 100 CFU/100ml ANZECC LDW value. These E. coli concentrations are significantly higher than historical values and should be closely monitored in the next sampling round.

Table 2-3: D-Series and E1S Monitoring Bore Results for January 2022

Determinant	Units	ANZECC LDW	D1	D2	D3(rs)	D4	D5	D6	E1S
Water level	mBGL	-	16.71	21.26	6	8.35	9.97	16.43	11.33
pH	-	6 to 9	6.8	6.5	6.6	7	7.2	6.9	7.1
Conductivity	mS/m	-	42.5	45.2	18.9	29.8	25.9	28.4	25.3
COD	mg/L	-	*7.5*	45	55	*7.5*	*7.5*	*7.5*	40
$scBOD_5$	mg/L	-	*3*	*3*	*3*	*3*	*0.5*	*3*	*3*
E-Coli	CFU/100ml	100	790	180	500	260	48	830	50
Chloride	mg/L	-	24.1	42.8	16.7	38.3	21.6	13.8	26.9
Nitrate-N	mg/L	90.3	8.84	*0.005*	*0.005*	*0.005*	2.79	10.3	*0.005*
Ammoniacal-N	mg/L	-	*0.005*	0.57	0.53	0.19	*0.005*	*0.005*	0.17
Dissolved Aluminium	mg/L	5	*0.001*	0.005	0.073	0.002	0.004	0.004	0.007
Dissolved Boron	mg/L	5	0.06	0.05	0.05	0.03	0.06	0.05	0.04
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.0025
Dissolved Manganese	mg/L	-	0.0007	0.433	0.363	0.19	0.005	0.0064	0.229
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	1	*0.00025*	*0.00025*	0.0009	*0.00025*	*0.00025*	0.0096	*0.00025*

Notes:

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

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

Values which exceeded the ANZECC LDW are shown in red

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 January 2022 compliance monitoring round are presented in Table 2-4. The results have been compared with the DWSNZ as per the requirements of discharge consent 6010. The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D.

Table 2-4: Results for Monitoring Bores within the Deep Aquifer for January 2022

Determinant	Units	DWSNZ MAV	E1D	C2DD	E2D	Xd1	D3rd
Water level	mBGL	-	Not provided	2.37	4.62	2.81	6.4
pH	-	7 to 8.5*	7.7	7.6	7.5	7.6	7.7
Conductivity	mS/m	-	45.9	53	44.5	53.9	53
COD	mg/L	-	17	16	*7.5*	23	*7.5*
$scBOD_5$	mg/L	-	*0.5*	*3*	*0.5*	5.9	*3*
E-Coli	CFU/100ml	NIL	**20**	**46**	**12**	**16**	**12**
Chloride	mg/L	250*	39.3	40.2	41.3	58.2	32
Nitrate-N	mg/L	11.3	*0.005*	0.35	*0.005*	0	0.11
Ammoniacal-N	mg/L	1.17	0.2	*0.005*	0.22	0.39	0.28
Sodium	mg/L	200*	38.7	n/r	n/r	47.7	22.4
Dissolved Aluminium	mg/L	0.1*	0.005	0.002	0.003	0.004	0.002
Dissolved Boron	mg/L	1.4	0.06	0.07	0.06	0.06	0.05
Dissolved Iron	mg/L	0.2*	0.04	n/r	n/r	0.067	0.017
Dissolved Lead	mg/L	0.01	0.0005	0.0005	0.0013	0.0004	*0.00025*
Dissolved Manganese	mg/L	0.4	0.232	0.0159	0.393	**0.497**	**0.498**
Dissolved Mercury	mg/L	0.007	*0.00025*	*0.00025*	*0.00025*	0.0004	*0.00025*
Dissolved Nickel	mg/L	0.08	*0.00025*	*0.00025*	*0.00025*	0.0004	0.0024

Notes:

* Denotes guideline values for aesthetic determinants (G.V.)

Bold – denotes an exceedance of the relevant DWSNZ (2008) standard

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

n/r – not required to be tested during this monitoring period

There were seven exceedances of the DWSNZ limits in samples from the deep gravel aquifer during the January 2022 monitoring round, as follows:

- For E. coli all bores (E1D, C2DD, E2D, Xd1, and D3rd) exceeded the DWSNZ MAV of nil. While the detection of E. coli at bore C2DD and E1D at significant levels is not common, it has occurred previously. As bore D3rd is a new bore, there is only one previous record (8 CFU/100ml) to compare this result to and the current E. coli result exceeds the previous value. This should be scrutinised in future reports to determine if these results are representative of an overall trend. Exceedances of the E. coli DWSNZ limit is uncommon for bores E2D and XD1. It

is unknown why there are such significant exceedances this monitoring round, and this should be checked in the next monitoring round.

- The dissolved manganese concentrations in bores Xd1, and D3rd exceeded the DWSNZ MAV of 0.4mg/L. The results for Xd1 are within the historical range of concentrations observed. As bore D3rd is relatively new any trends will not become apparent until further results have been obtained in subsequent quarterly monitoring rounds and comparisons can be made.

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 50 m 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 Tatana's property and bore Xs2 is next to the driveway leading to a Council-owned property. Bore Xs2 is considered to be hydraulically upgradient of the old landfill (See Site Plan, Appendix A).

The results from the November 2021 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 6010. The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D.

There were **four exceedances of the ANZECC LDW trigger values during the January 2022** monitoring round. These were for E. coli which has a limit of 100 CFU/100ml. This limit was exceeded at bores E2S (3,200 CFU/100ml), B1 (110 CFU/100ml), B2 (160 CFU/100ml), and C2 (260 CFU/100ml).

Therefore, these results show non-compliance with the resource consent conditions.

Table 2-5: Monitoring Results for Shallow Boreholes Down-Gradient from the Old Landfill for January 2022

Determinant	Units	ANZECC LDW	E2S	B1	B2	B3	C1	C2	C2DS	G2S	Xs1	Xs2
Water level	mBGL	-	5.56	1.08	1.25	0	0	0	2.53	2	0.03	2.04
pH	-	6 to 9	7.8	6.9	7	7.1	6.8	7.1	6.9	7.4	6.6	7.1
Conductivity	mS/m	-	33.7	194	179	231	102	243	153	122	136	16.4
COD	mg/L	-	*7.5*	85	82	131	82	196	60	35	26	14.99
$scBOD_5$	mg/L	-	*3*	*3*	*3*	*3*	*3*	5.9	*3*	*0.5*	74	5.9
E-Coli	CFU/100ml	100	**3200**	**110**	**160**	96	40	**260**	4	*0.5*	99	31
Chloride	mg/L	-	38.1	292	79.3	122	108	187	96.2	153	124	12.6
Nitrate-N	mg/L	90.3	0.01	2.73	33.7	*0.05*	*0.005*	0	*0.05*	*0.005*	0	0.66
Ammoniacal-N	mg/L	-	0.29	8.72	46.1	166	27.4	165	1.69	*0.005*	8.69	0.01
Sodium	mg/L	-	30.2	n/r	n/r	n/r	n/r	n/r	n/r	n/r	99.5	13.8
Dissolved Aluminium	mg/L	5	0.003	0.007	0.012	0.005	0.019	0.017	0.004	0.003	0.004	0.006
Dissolved Boron	mg/L	5	0.04	1.34	2.18	0.97	1.17	1.45	0.59	0.92	0.45	0.04
Dissolved Iron	mg/L	-	0.06	n/r	n/r	n/r	n/r	n/r	n/r	n/r	2.71	0.05
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.0004	*0.00025*	*0.00025*	0.0004	0.0004
Dissolved Manganese	mg/L	-	0.219	6.95	3.44	2.73	0.397	0.0832	2.82	0.0762	1.3	0.0491
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.0004	*0.00025*	*0.00025*	0.0004	0.0004
Dissolved Nickel	mg/L	1	*0.00025*	0.0046	0.0029	0.0075	0.0018	0.0043	0.0022	0.0036	0.0027	0.0004

Notes:

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

n/r – not required to be tested during this monitoring period

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

Bold - denotes exceedance of ANZECC LDW

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 6010. The full laboratory report is included in Appendix C 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 January 2022 monitoring round.

Table 2-6: Results from Monitoring Bores in the Irrigation Area for January 2022

Determinant	Units	ANZECC LDW	F1	F2	F3
Water level	mBGL	-	7.96	3	5.35
pH	-	6 to 9	7	7.2	7.1
Conductivity	mS/m	-	41.1	21.9	19.5
COD	mg/L	-	*7.5*	*7.5*	*7.5*
$scBOD_5$	mg/L	-	*0.5*	*0.5*	*0.5*
E-Coli	CFU/100ml	100	2	*0.5*	*0.5*
Chloride	mg/L	-	44.1	22.6	18
Nitrate-N	mg/L	90.3	0.93	0.28	1.36
Ammoniacal-N	mg/L	-	*0.005*	*0.005*	*0.005*
Dissolved Aluminium	mg/L	5	*0.001*	0.002	*0.001*
Dissolved Boron	mg/L	5	0.04	0.04	0.03
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	-	0.0044	0.002	*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 to be tested during this monitoring period

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

* Value was noted as '0' in results received, however it is assumed it indicates the concentration was below the laboratory detection limit.

2.6 LEACHATE EFFLUENT RESULTS

Leachate effluent from the landfill is not subject to any water quality consent conditions. However, for comparison purposes, typical leachate characteristics for landfills, as published by the Waste Management Institute New Zealand (*Technical Guidelines for Disposal to Land*, August 2018, WasteMINZ), have been compared against the leachate quality monitoring results (Table 2-7). The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D. Table 2-7 shows that the concentrations of monitored parameters

for leachate effluent samples collected in November 2021, December 2021, and January 2022 were mostly within the typical ranges to be expected for this type of landfill.

There were however two exceedances of the typical leachate characteristics. Typical leachate characteristics were exceeded for COD in and for ammoniacal-N in the January 2022 monitoring results.

It is noted that the leachate effluent is sent to Levin WWTP for treatment.

Table 2-7: Results from Leachate Effluent Monitoring for November 2021, December 2021, and January 2022

Determinant	Units	Typical Leachate Characteristics* (range)	November	December	January
pH		5.9 - 8.5	7.6	7.7	7.8
Suspended Solids	mg/l	-	114	194	61
Phenol	mg/L	-	*0.025*	*0.025*	*0.025*
VFA	mg/L	-	*25*	*25*	21
TOC	mg/L	-	705	624	729
Alkalinity	mg $CaCO_3$/L	-	6250	6180	6740
Conductivity	mS/m	308 – 27,900	1440	1340	1530
COD	mg/L	84 – 5,090	5010	2510	**6320**
$scBOD_5$	mg/L	-	82	112	124
E-Coli	CFU/100mL	-	*2*	2700	400
Chloride	mg/L	45 – 2,584	1060	1020	1140
Nitrate-N	mg/L	-	*0.5*	*0.5*	*0.5*
Sulphate	mg/L	-	16.3	12.6	11.9
Ammonia-N	mg/L	3.4 – 1,440	1310	1230	**1540**
Hardness	mg $CaCO_3$/L	-	496	479	530
Calcium	mg/L	-	109	105	106
Magnesium	mg/L	-	54.2	52.3	64.1
Potassium	mg/L	-	676	585	725
Sodium	mg/L	50 – 4,000**	1010	806	988
D.R. Phosphorus	mg/L	-	13.3	13.1	16
Dissolved Aluminium	mg/L	-	0.62	0.512	0.741
Dissolved Arsenic	mg/L	-	0.277	0.22	0.359
Dissolved Boron	mg/L	0.54 – 20.1	5.92	5.51	6.87
Dissolved Cadmium	mg/L	-	*0.001*	*0.0001*	*0.001*
Dissolved Chromium	mg/L	-	0.93	0.576	0.739
Dissolved Copper	mg/L	-	0.0271	0.0082	0.0066
Dissolved Iron	mg/L	1.6 – 220	5.09	4.98	5.08
Dissolved Lead	mg/L	0.001 - 0.42	*0.0025*	0.0043	*0.0025*
Dissolved Manganese	mg/L	0.3 - 45***	1.18	1.1	1.34
Dissolved Mercury	mg/L	0.2 – 50	*0.0025*	*0.00025*	*0.0025*
Dissolved Nickel	mg/L	0.02 – 2.05**	0.122	0.103	0.124
Dissolved Zinc	mg/L	-	0.062	0.08	0.045

Notes:

* For Class 1-type landfills, Table 5-5, p82, Technical Guidelines for Disposal to Land, WasteMINZ August 2018 (same as Table 4.2 of the CAE Landfill Guidelines 2000, but corrections made to Table 5-5 in line with Table 4.2)

**Data taken from Table 5-4, p81 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, p81 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

2.7 TATANA PROPERTY DRAIN

A drain is located on 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).

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'.

Results from the January 2022 sampling round are presented in Table 2-8 and have been compared with the ANZECC AE[1] 95% trigger values, as per the revised resource consent conditions.

Table 2-8 Tatana Drain Monitoring Results for November 2021, December 2021, and January 2022

Determinant	Units	ANZECC AE (95%)	TD1 (formerly SW3)		
			November	December	January
pH	-	-	7.9	6.7	6.8
Conductivity	mS/m	-	41.8	27.8	75.8
COD	mg/L	-	468	113	291
scBOD$_5$/	mg/L	2	***3***	**7**	**6**
E-Coli	CFU/100ml	-	*50*	1100	2200
Chloride	mg/L	-	50.8	26.2	82.5
Nitrate-N	mg/L	0.16	*0.005*	0.06	*0.005*
Ammoniacal-N	mg/L	2.1	0.45	0.66	**5.98**
Dissolved Aluminium	mg/L	0.055	0.028	0.018	0.022
Dissolved Boron	mg/L	-	0.18	0.08	0.27
Dissolved Lead	mg/L	0.0034	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	1.9	0.472	0.468	1.27
Dissolved Mercury	mg/L	0.0006	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.011	0.001	0.0007	0.0025

Notes:
Bold – denotes an exceedance of the ANZECC AE 95% protection level trigger values
All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italics
n/r – not required to be tested during this monitoring period

There were exceedances of the resource consent conditions for two monitored parameters in samples from the Tatana Drain property at the TD1 location during the November 2021, December 2021, and January 2022 sampling rounds.

[1]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

The $scBOD_5$ was exceeded in November 2021 (with 3 mg/L), December 2021 (with 7 mg/L), January 2022 (with 6 mg/L). This exceeded the ANZECC AE 95% trigger value of 2 mg/L. The concentration of $scBOD_5$ of 3mg/L in November 2021 is not considered an issue however, as the result for $scBOD_5$ was below the detection limit of 6 mg/L; it has therefore been depicted as “3” in italics. In other words, this apparent exceedance of the trigger value is misleading.

Previously, the ammoniacal-N concentration was noted as exceeding the ANZECC AE (95%) limit of 2.1 mg/L and showing a sudden change compared to the historical results. It is noted that the concentrations of this parameter in the previous monitoring reports (April, July, and October 2021) were all below the ANZECC AE (95%) limit and significantly lower than historical ranges. The results for November and December 2021 (0.45 mg/L and 0.66 mg/L respectively) were also below the ANZECC AE 95% limit, however, the January 2022 (5.98 mg/L) result was significantly above the limit. The cause of this significant concentration fluctuation is not known, and this matter should be kept under observation in subsequent reports.

2.8 HOKIO STREAM

Surface water grab samples are obtained 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 Tatana Property Drain discharge, and HS3 is located approximately 50m down-stream of the landfill site property boundary and the Tatana Property Drain discharge. Samples from these monitoring locations on Hokio Stream are analysed for a comprehensive suite of parameters every month (as shown in Appendix B).

Results from the January 2022 sampling round are presented in Table 2-9 and have been compared with the ANZECC AE 95% trigger values, as per the revised resource consent conditions.

Monitoring for $scBOD_5$ and soluble mercury concentrations has now been added as per the revised Resource Consent conditions.

The revised conditions have recently been implemented and monitoring of these additional parameters, including at the new location, commenced during the April 2020 monitoring round.

Table 2-9: Hokio Stream Monitoring Results for November 2021, December 2021, and January 2022

Determinant	Units	ANZECC AE (95%)	Consent Trigger Values (Table C1)	HS1A (new)	HS1	HS2	HS3	HS1A (new)	HS1	HS2	HS3	HS1A (new)	HS1	HS2	HS3
				November				December				January			
pH	-	-	-	7.8	7.7	7.7	7.9	7	7.2	7.3	7.2	7.3	7.3	7.2	7.3
Suspended Solids	mg/l	-	-	*3*	7	25	15	46	*3*	6	12	29	16	26	19
Phenol	mg/L	0.320	-	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*	*0.025*
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	-	-	7.1	6.8	6.9	7.3	10.8	11.3	10.5	10.7	8.3	8.4	8.2	8.4
Alkalinity	mg CaCO3/L	-	-	63	63	65	68	52	57	52	53	55	55	59	58
Conductivity	mS/m	-	-	24.1	24.5	24.8	25.3	19.9	21.8	20	20.1	22.6	22.7	23.7	23.2
COD	mg/L	-	-	31	20	27	51	72	56	42	63	34	34	26	57
$scBOD_5$	mg/L	2	Monthly Ave. 2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
E-Coli	CFU/100ml	-	-	35	230	730	58	1700	49	60	130	200	3900	140	100
Chloride	mg/L	-	-	23.6	22.9	23.7	24.4	16.8	21.5	17.5	17.5	20	20.6	20.4	21.5
Nitrate-N	mg/L	0.16	0.16	**0.34**	**0.33**	**0.36**	**0.36**	**0.56**	**0.48**	**0.44**	**0.34**	**0.81**	**0.85**	**0.8**	**0.8**
Sulphate	mg/L	-	-	19.7	19	18.9	18.7	14.4	15.4	14.3	13.6	16.3	16.3	16.2	16.6
Ammoniacal-N	mg/L	2.1	Max. 2.1 Ave. 0.400	0.11	0.12	0.14	0.15	0.05	0.35	0.04	0.02	0.14	0.1	0.21	0.25
Hardness	mg CaCO3/L	-	-	65.0	62	64	68	60	63	63	56	65	67	67	67
Calcium	mg/L	-	-	14.2	13.5	13.9	15	13.2	13.8	13.7	12.3	14	14.3	14.3	14.3
Magnesium	mg/L	-	-	7.28	6.95	7.08	7.49	6.6	6.98	6.91	6.15	7.39	7.48	7.64	7.58
Potassium	mg/L	-	-	3.0	2.87	3.1	3.4	4.34	4.91	4.45	4.38	3.58	4.06	3.76	3.88
Sodium	mg/L	-	-	21.3	20	21.1	22.5	14.6	16.6	15.3	13.7	18	18.1	18.4	18.7
D.R. Phosphorus	mg/L	-	-	0.05	0.05	0.049	0.049	0.055	0.112	0.065	0.052	0.011	0.008	0.023	0.034
Dissolved Aluminium	mg/L	0.055	Med. 0.055	0.03	0.019	0.014	0.023	0.023	0.039	0.023	0.022	0.035	**0.066**	0.02	0.024
Dissolved Arsenic	mg/L	0.024	Med. 0.024	0.001	*0.0005*	*0.0005*	*0.0005*	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Determinant	Units	ANZECC AE (95%)	Consent Trigger Values (Table C1)	HS1A (new)	HS1	HS2	HS3	HS1A (new)	HS1	HS2	HS3	HS1A (new)	HS1	HS2	HS3
				November				December				January			
Dissolved Boron	mg/L	0.370	-	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07
Dissolved Cadmium	mg/L	0.0002	Med. 0.0002	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*
Dissolved Chromium (VI)	mg/L	0.001	-	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*
Dissolved Copper	mg/L	0.0014	Med. 0.0014	**0.0021**	**0.002**	**0.0028**	**0.0018**	**0.0016**	**0.0015**	**0.0017**	**0.0016**	0.0013	0.0012	0.001	0.0009
Dissolved Iron	mg/L	-	-	0.075	0.12	0.071	0.11	0.128	0.215	0.174	0.192	0.135	0.357	0.161	0.173
Dissolved Lead	mg/L	0.0034	Med. 0.0034	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	1.9	-	0.0296	0.0227	0.0315	0.038	0.0018	0.0019	0.0068	0.002	0.095	0.125	0.117	0.0456
Dissolved Mercury	mg/L	0.0006	Med. 0.0006	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.011	Med. 0.011	*0.00025*	*0.00025*	0.0006	*0.00025*	*0.00025*	*0.00025*	0.0006	*0.00025*	*0.00025*	0.0006	*0.00025*	*0.00025*
Dissolved Zinc	mg/L	0.008	Med. 0.008	0.003	0.002	**0.011**	0.002	0.002	0.006	0.007	**0.01**	*0.001*	**0.009**	*0.001*	*0.001*

Notes:

NR = Not reported

BDL = Below detection limit

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

Underlined – denotes exceedance of the Consent Trigger Values

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

* Value was noted as '0' in results received, however it is assumed it indicates the concentration was below the laboratory detection limit

There were **twenty-four exceedances** of the resource consent conditions in samples from the Hokio Stream during the November 2021, December 2021, and January 2022 sampling rounds. These are summarised as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- Dissolved aluminium exceeded the ANZECC AE (95%) trigger value of 0.055mg/L for HS1 during the January 2022 sampling round.
- For all sampling locations during the November and December 2021 sampling rounds, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.
- Dissolved zinc exceeded the ANZECC AE (95%) trigger value of 0.008mg/L during the November 2021 sampling round for HS2; the December 2021 sampling round for HS3; and the January 2022 sampling round for HS1

Please note that using the method of halving results that are recorded as being below detection limits, the $scBOD_5$ concentrations at all four sites (HS1A, HS1, HS2, and HS3) in the November 2021, December 2021, and January 2022 monitoring rounds is expressed as 3 mg/L. This suggests that there are exceedances of the ANZECC AE (95%) trigger value of 2 mg/L which is incorrect. Therefore, these results for $scBOD_5$ concentrations have been represented in Table 2-9 as being below the detection limit (i.e., as "BDL").

Overall, the differences in monitoring results between the sites are marginal and there is little to no change in concentrations between upstream and downstream sites on the Hokio Stream. An exception is the E. coli concentrations which differ significantly between sites and sampling rounds. However, the concentrations noted in this report are within the historical range.

3.0 LANDFILL GAS DETECTION IN MONITORING WELLS

Condition 4 of Discharge Permit 6011 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 17 January 2022.

Out of the 26 groundwater monitoring bores:

- Methane was detected in eighteen of the bores. The highest recorded level was 0.09% in bore G1D. This is well below the lower explosive limit of 5% and is therefore deemed at represent a 'safe' level. However, the detection of methane reinforces the need for the necessary precautions generally applicable at landfill sites to be taken when conducting sampling.
- Hydrogen sulphide was not detected at any bores.
- These landfill gas levels are more elevated than those levels reported in the October 2021 quarterly monitoring report and reinforce the importance of continuing to monitor these changes and map any patterns.

The possibility of encountering methane in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring, as is the case for the landfill gas extraction wells. No smoking should be permitted when personnel undertake groundwater sampling or when in the vicinity of the groundwater monitoring wells, or in fact anywhere else on the Levin Landfill site.

4.0 DISCUSSION

4.1 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 a sampling period that is too long may make comparisons of results between rounds and individual monitoring locations less valid.

The January 2022 samples were collected progressively over a 3-day period, which is well within the normally accepted 7 days (which is a consent condition requirement). Meeting the monitoring timeframe is important because it means that there can be greater confidence in comparing results from different parts of the site.

4.2 BACKGROUND GROUNDWATER QUALITY

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

Results since 2010 for the background bores indicate that low pH values are representative of background water quality in the shallow sand aquifer (G1S). However, the pH level for the January 2022 sampling round was 6.7 which is below the lower limit of the DWSNZ MAV. As usual the deeper gravel aquifer (G1D) has a slightly higher pH of 7.4.

Dissolved iron concentrations have fluctuated considerably at both the G1S and G1D bores since monitoring began and are occasionally above the DWSNZ GV. During the January 2022 sampling round, the iron concentration at G1S (4.24 mg/L) exceeded the DWSNZ GV of 0.2 mg/L but was still within the historical results range recorded at these bores. Elevated iron concentrations in groundwater are likely to be related to hydrogeological conditions found at the site and this phenomenon is common in groundwater in this area.

During the January 2022 sampling round, the dissolved aluminium concentration at G1S (0.173 mg/L) marginally exceeded the DWSNZ MAV limit of 0.1 mg/L. The January 2022 value is within historical ranges.

During the January 2022 monitoring round, E. coli also exceeded the DWSNZ GV of nil at G1S (with 300 CFU/100ml) and G1D (with 9 CFU/100ml). The E. coli result for G1S also exceeded the ANZECC LDW of 100 CFU/100ml. Bore GIS result is a significant increase from previous monitoring rounds and is the highest ever recorded at this bore. The results for G1D were also an increase from the previous monitoring round, though is within the historical variation observed.

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 and therefore may not be suitable to use as a yardstick of background water quality in the future.

High E.coli results have been measured at other groundwater bores in this monitoring round, which is unusual and this needs to be monitored to see if it continues for the next sampling round.

4.3 SHALLOW AQUIFER GROUNDWATER QUALITY

4.3.1 Hydraulically up-gradient of the Old Landfill and down gradient of the new landfill

There were **5 exceedances of the ANZECC LDW trigger values during the January 2022** monitoring round. These exceedances were all for E. coli which has a limit of 100 CFU/100ml. This limit was exceeded at bores D1, D2, D3rs, D4, and D6 which had results of 790 CFU/100ml, 180 CFU/100ml, 500 CFU/100ml, 260 CFU/100ml, and 830 CFU/100ml, respectively.

Therefore, these results show the water quality in the shallow monitoring bores hydraulically up-gradient from the old landfill does not comply with the discharge consent conditions. However, as noted in the section above, the

high incidences of E. coli in many of the groundwater bores in this monitoring round is exceptional and needs to be monitored closely in the next sampling round.

4.3.2 Hydraulically down-gradient of the Old Landfill

There were **four exceedances of the ANZECC LDW trigger values during the January 2022** monitoring round. These were all for E. coli which has a limit of 100 CFU/100ml. This limit was exceeded at bores E2S (3,200 CFU/100ml), B1 (110 CFU/100ml), B2 (160 CFU/100ml), and C2 (260 CFU/100ml).

Therefore, these results show non-compliance with the resource consent conditions. However, the comments in the previous two sections about monitoring samples closely next sampling round for elevated E.Coli are relevant here, too.

4.3.3 Irrigation Area

There were **no exceedances of the resource consent conditions** during the January 2021 monitoring round in samples from the Irrigation Area.

4.4 DEEP AQUIFER GROUNDWATER QUALITY

There were seven exceedances of the DWSNZ limits in samples from the deep gravel aquifer during the January 2022 monitoring round.

The concentration of E. coli exceeded the DWSNZ MAV of nil in bores E1D, C2DD, E2D, Xd1, and D3rd with 20 CFU/100ml, 46 CFU/100ml, 12 CFU/100ml, 16 CFU/100ml, and 12 CFU/100ml respectively. As bore D3rd is a new bore, there is only one previous record of results (8 CFU/100ml) to compare this result to and this exceeds that value. This should be scrutinised in future reports to determine if these results are representative of an overall trend. Exceedances of the E. coli DWSNZ limit is uncommon for bores E2D and XD1. Exceedances of the limit was noted in the July and October 2021 monitoring rounds and are outside historical ranges. It is unknown why there are such significant exceedances, and this should be closely monitored in the next monitoring round.

The dissolved manganese concentrations in bores Xd1, and D3rd exceeded the DWSNZ MAV of 0.4mg/L during the January 2022 monitoring round with 0.497 mg/L and 0.498 mg/L respectively. The results for Xd1 are within the historical range of concentrations observed. As discussed above, with bore D3rd having been recently installed, any trends will not become apparent until further results have been obtained in subsequent quarterly monitoring rounds and comparisons can be made.

4.5 LEACHATE EFFLUENT

Monitoring results from the leachate effluent samples are not required to meet either the ANZECC LDW trigger values or DWSNZ standards. However, there were two exceedances of the typical composition ranges for leachate at Class 1 landfills, as published in the WasteMINZ guidelines[2] during the January 2022 monitoring round.

These were for COD in January 2022 (6,320 mg/L) which exceeded the range of 84 – 5,090 mg/L; and for ammoniacal-N in January 2022 (1,540 mg/L) which exceeded the range of 3.4 – 1,440 mg/L.

While, these exceedances are not common, it is noted these results are within the historical range of results observed. It is noted that the leachate effluent is sent to Levin WWTP for treatment.

4.6 TATANA PROPERTY DRAIN

Under the revised resource consent conditions approved in December 2019, the monitoring location ‘SW3’ is now re-designated as ‘TD1’, and sampling at locations ‘SW2’, ‘SW3’ and ‘SW4’ has been discontinued.

[2] Technical Guidelines for Disposal to Land, WasteMINZ, 2018

Under the revised conditions, the Tatana Property drain samples are now assessed against the ANZECC AE 95% trigger values.

There were two exceedances of the ANZECC AE (95%) limits and therefore the resource consent conditions are not met.

For $scBOD_5$ during the December 2021 and January 2022 the trigger value of 2 mg/L was exceeded with a result of 7 mg/L and 6 mg/L respectively. However, it is important to note that the result for the $scBOD_5$ concentration is below the laboratory detection limit and, as per our methodology, has been assumed to be half of the detection limit (3mg/L) for the purposes of reporting of results. Therefore, the results of 3 mg/L for November 2021 have not been considered a true exceedance of the limits or resource consent condition. The results for $scBOD_5$ are in line with historical ranges observed.

Ammoniacal – N also exceeded the trigger value of 2.1 mg/L with a concentration of 5.98 mg/L during the January 2022 monitoring round. It is noted that the concentrations of this parameter in the previous monitoring reports (April, July, and October 2021) were all below the ANZECC AE (95%) limit and significantly lower than historical ranges. The results for November and December 2021 (0.45 mg/L and 0.66 mg/L respectively) were also below the ANZECC AE 95% limit, however, the January 2022 (5.98 mg/L) result was significantly higher than the limit. The cause of this significant increase is not known, and this matter should be kept under observation in subsequent reports.

4.7 HOKIO STREAM

Under the revised resource consent conditions, a new monitoring location (HS1A), upstream of HS1, was added to the Hokio Stream monitoring sites and all monitoring results for the Hokio Stream samples are now assessed against the ANZECC AE 95% trigger values.

There were **twenty-four exceedances** of the resource consent conditions in samples from the Hokio Stream during the November 2021, December 2021, and January 2022 sampling rounds. These are summarised as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- Dissolved aluminium exceeded the ANZECC AE (95%) trigger value of 0.055mg/L for HS1 during the January 2022 sampling round.
- For all sampling locations during the November and December 2021 sampling rounds, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.
- Dissolved zinc exceeded the ANZECC AE (95%) trigger value of 0.008mg/L during the November 2021 sampling round for HS2; the December 2021 sampling round for HS3; and the January 2022 sampling round for HS1

Please note that using the method of halving results that are recorded as being below detection limits, the $scBOD_5$ concentrations at all four sites (HS1A, HS1, HS2, and HS3) in the November 2021, December 2021, and January 2022 monitoring rounds is expressed as 3 mg/L. This suggests that there are exceedances of the ANZECC AE (95%) trigger value of 2 mg/L which is incorrect. Therefore, these results for $scBOD_5$ concentrations have been represented in Table 2-9 as being below the detection limit (i.e. as “BDL”).

4.8 CONSENT COMPLIANCE

Discharge permit 6010 states that quarterly and annual monitoring results shall comply with the ANZECC LDW trigger values in the shallow groundwater aquifer (sand aquifer) and surface water bodies. Samples from the deep groundwater (gravel aquifer) shall comply with the applicable DWSNZ values. 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.

Shallow aquifer

There were 5 exceedances of consent conditions hydraulically up-gradient of the old landfill and down-gradient of the new landfill during the January 2022 monitoring period. These were for E. coli at bores D1, D2, D3rs, D4, and D6.

There were also four exceedances of the consent conditions hydraulically down-gradient of the old landfill during the January 2022 monitoring period. This was for E. coli at bores E2S, B1, B2, and C2.

Deeper gravel aquifer

There were seven exceedances of the resource consent conditions in samples from the deeper gravel aquifer during the January 2022 sampling round:

- For E. Coli in bores E1D, C2DD, E2D, Xd1, and D3rd (being 20 CFU/100ml, 46 CFU/100ml, 12 CFU/100ml, 16 CFU/100ml, and 12 CFU/100ml respectively, which exceeds the DWSNZ limit of nil)
- For the dissolved manganese concentration in bores Xd1 and D3rd (being 0.497 mg/L and 0.498 mg/L respectively which each exceed the DWSNZ MAV of 0.4mg/L)

Irrigation area

There were no exceedances of the resource consent conditions during the January 2022 sampling round for samples obtained from the irrigation area.

Tatana Property drain

There were two exceedances of the resource consent conditions in samples from Tatana Drain during the December 2021 and January 2022 sampling rounds, as follows:

- The scBOD5 concentration exceeded the ANZECC AE (95%) limit during the December 2021 and January 2022 monitoring rounds with concentrations of 7 mg/L and 6 mg/L respectively.
- The ammoniacal-N concentration exceeded the ANZECC AE (95%) limit during the January 2022 sampling round with a concentration of 5.98 mg/L.

Hokio Stream

During the November 2021, December 2021, and January 2022 monitoring rounds there were twenty-four exceedances of the resource consent conditions in samples from the Hokio Stream, as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- Dissolved aluminium exceeded the ANZECC AE (95%) trigger value of 0.055mg/L for HS1 during the January 2022 sampling round.
- For all sampling locations during the November and December 2021 sampling rounds, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.
- Dissolved zinc exceeded the ANZECC AE (95%) trigger value of 0.008mg/L during the November 2021 sampling round for HS2; the December 2021 sampling round for HS3; and the January 2022 sampling round for HS1

5.0 CONCLUSIONS

Monitoring results obtained in the January 2022 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 January 2022 monitoring period there were forty-two exceedances of the resource consent conditions; nine exceedances were in samples from the shallow aquifer, seven exceedances were in samples from the deep gravel aquifer, two exceedances were in samples from Tatana Property drain, and twenty-four exceedances occurred in samples from the surface water monitoring at Hokio Stream.

All of the exceedances in the shallow aquifer and five of the seven exceedances in the deep aquifer were on account of elevated E. coli counts. This is an unusual result for so many groundwater bores and this needs to be checked closely next sampling round to determine if it is a new trend.

There were two exceedances in samples from the leachate effluent. Leachate quality is typical of the composition of leachate recorded generally at Class 1 landfills in New Zealand. Exceedances were for COD in January 2022; and for ammoniacal-N in January 2022. Note that leachate effluent is not subject to any consent limits.

There were no exceedances during the January 2021 monitoring round in samples from the Irrigation Area.

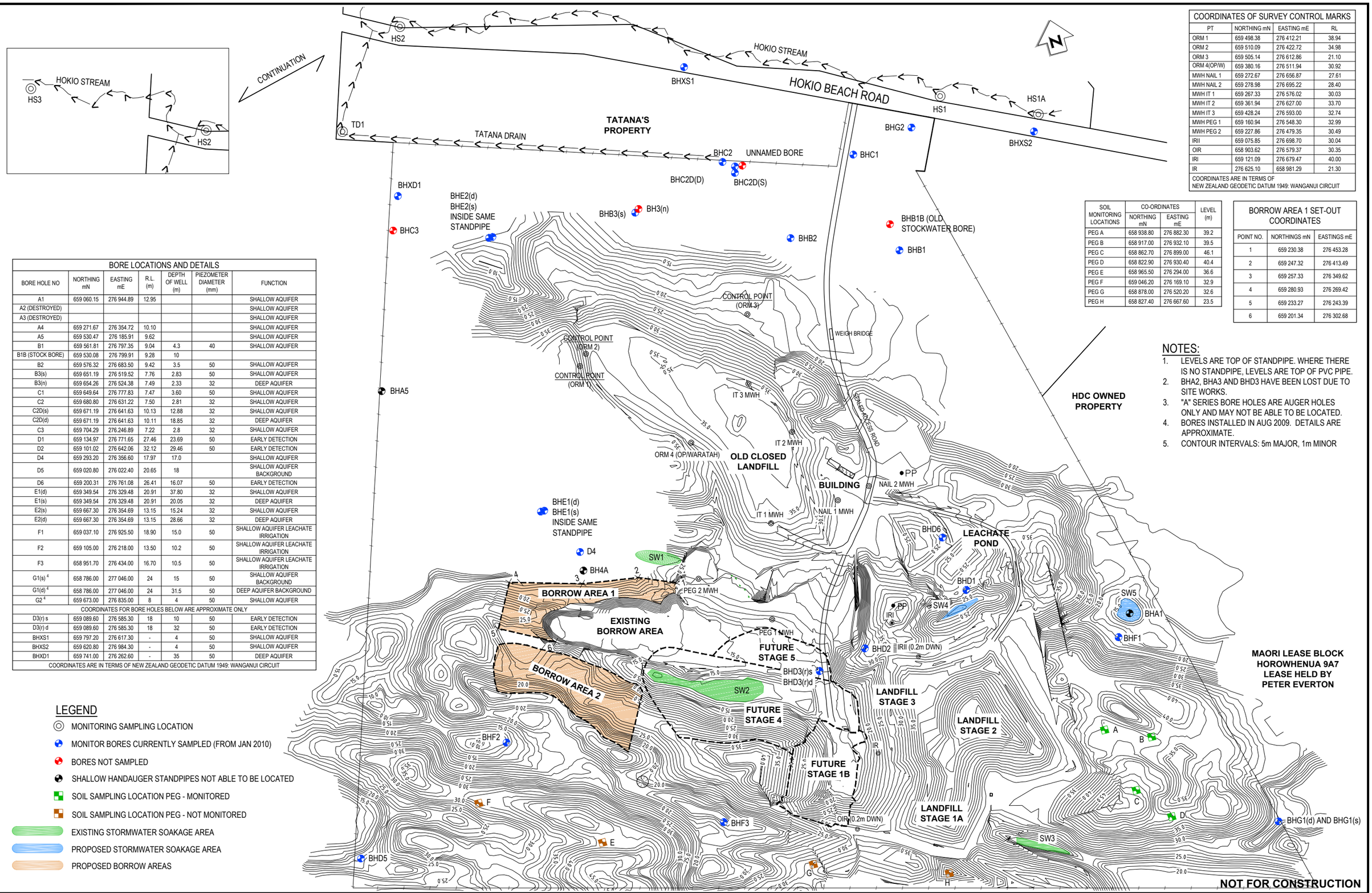
Methane was detected in eighteen groundwater monitoring bores in the January 2022 sampling round. This is a substantial increase compared to the last monitoring round. The highest concentration of methane was in bore D6 (0.09%) which was well below the lower explosive limit for methane (which is 5%).

Hydrogen sulphide was not detected in any of the groundwater bores during the October 2021 sampling round.

Appendices

We design with community in mind

APPENDIX A SITE PLAN



COORDINATES OF SURVEY CONTROL MARKS			
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) [4]	658 786.00	277 046.00	24	15	50	SHALLOW AQUIFER BACKGROUND
G1(d) [4]	658 786.00	277 046.00	24	31.5	50	DEEP AQUIFER BACKGROUND
G2 [4]	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						

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:

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

NOT FOR CONSTRUCTION

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

REV	REVISIONS	DRN	CHK	APP	DATE
E	FOR INFORMATION - BHD3(r)s AND BHD3(r)d ADDED, AND CONTOURS UPDATED FROM JULY 2021 SURVEY	BCJ	PSL	PSL	24.09.21
D	FOR INFORMATION - BORROW AREA 2 RELOCATED, DEFINED AREAS OF FUTURE STAGES 1B, 4 AND 5	BCJ	PSL	PSL	01.06.21
C	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES AND BORE HOLES AND SAMPLING LOCATIONS ADDED FOR HOKIO STREAM AND TATANA DRAIN	BCJ	PSL	PSL	24.03.21
B	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES	BCJ	PSL	PSL	22.09.20
A	FOR INFORMATION	BCJ	PSL	PSL	26.08.19

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:		

Stantec

Client:

HOROWHENUA DISTRICT COUNCIL
LEVIN LANDFILL

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

Status Stamp: FOR INFORMATION ONLY
Date Stamp: 24.09.21
Scales: 1:2000 (A1) 1:4000 (A3)
Drawing No.: 310101088-19-001-G001
Rev.: E

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

pw:\\stantec-ap-pw.bentley.com:stantec-ap-pw-01\Documents\New Zealand Clients\Horowhenua District Council\80500724 (310101088) - Levin Landfill Volumes\2019\General\310101088-19-001-G001

APPENDIX B SAMPLING SCHEDULE

LEVIN LANDFILL - SUMMARY OF SURFACE AND GROUNDWATER MONITORING REQUIREMENTS (July 2021 - April 2024).

(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, DP 6010)	Table B (Condition 3, DP 6010)																						Table C (Condition 3, DP 6010)						
			Deep Aquifer Bores	Shallow Aquifer Bores																				Irrigation Bores				Hokio Stream[4], [8]				Tatana Drain	Leachate Pond[5]	
Annual	Quarterly		C2dd	E1d	E2d	G1d	Xd1	D3rd[1]	C1	C2[6]	C2ds[6]	D4	B1	B2	B3s	E1s	E2s	D1[2]	D2[2]	D3rs[1,2]	D6[2]	G1s	G2s	Xs1[6]	Xs2[6]	D5[3]	F1[3]	F2[3]	F3[3]	HS1	HS1A	HS2	HS3	TD1[7]		
Sep-21	**Aug-21**	**Jul-21**	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 Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre.	
	Nov-21	**Oct-21**	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							A
	Feb-22	**Jan-22**	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							
	May-22	**Apr-22**	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	C	C	C	C + A	
Sep-22	**Aug-22**	**Jul-22**	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	Discontinue after 2 years, i.e. after March 2022	I	I	I	I	I	
	Nov-22	**Oct-22**	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	
	Feb-23	**Jan-23**	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	
	May-23	**Apr-23**	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	C	C	C	C	
Sep-23	**Aug-23**	**Jul-23**	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	
	Nov-23	**Oct-23**	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		C	C	C	C	C	
	Feb-24	**Jan-24**	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	
	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	C	C	C	C	

Measure groundwater level and sample all bores for CH_4, CO_2 and O_2 each time that groundwater is sampled (Condition 4a of DP 6011)

Notes:

(1) Replacement bore D3r consists of two nested piezometers that have been calledL D3rs and D3rd.
(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.
(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.
(8) Start measuring approximately the depth of flow in the Hokio Stream at each sampling site when sampling monthly.
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.

(2) 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 a 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.

(4) 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 signficant 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.

(5) 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
	suspended solids
Oxygen demand	COD and $scBOD_5$
Nutrients*	NO3-N, NH4-N, DRP and SO_4
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 $scBOD_5$
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 C ANALYTICAL RESULTS

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40816
Issue: 1
21 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40816-01	Levin B1		13/01/2022 00:00	14/01/2022 10:27	0

Notes: 234363-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.9		15/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	194	mS/m	15/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	85	g/m³	17/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/01/2022	Marylou Cabral KTP
0602	Chloride	292	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	2.73	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	8.72	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.007	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	1.34	g/m³	19/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	6.95	g/m³	19/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0046	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	110	cfu/100mL	14/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		14/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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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.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40817
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40817-01	Levin B2		13/01/2022 00:00	14/01/2022 10:27	0

Notes: 234364-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		14/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	179	mS/m	14/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	82	g/m³	17/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	79.3	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	33.7	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	46.1	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.012	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	2.18	g/m³	19/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	3.44	g/m³	19/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0029	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	160	cfu/100mL	14/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		14/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40818
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40818-01	Levin B3s		13/01/2022 00:00	14/01/2022 10:27	0

Notes: 234365-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.1		14/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	231	mS/m	14/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	131	g/m³	17/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	122	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.10	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	166	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.97	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	2.73	g/m³	19/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0075	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	96	cfu/100mL	14/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		14/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/43004
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/43004-01	Levin C1		12/01/2022 00:00	13/01/2022 09:06	0

Notes: 234359-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.8		14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	102	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	82	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	108	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	27.4	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.019	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	1.17	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.397	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0018	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	40	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/42954
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/42954-01	Levin C2dd		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234355-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.6		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	53.0	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	16	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	40.2	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.35	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0159	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	46	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.
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.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/42934
Issue: 1
21 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/42934-01	Levin C2ds		13/01/2022 00:00	14/01/2022 10:27	0

Notes: 234361-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.9		14/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	153	mS/m	14/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	60	g/m³	17/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	96.2	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.10	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	1.69	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.004	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.59	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	2.82	g/m³	20/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0022	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	4	cfu/100mL	14/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		14/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40821
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40821-01	Levin D1		12/01/2022 00:00	13/01/2022 09:14	0

Notes: 234368-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.8		13/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	42.5	mS/m	13/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	< 15	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	24.1	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	8.84	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0007	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	790	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40822
Issue: 1
21 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40822-01	Levin D2		12/01/2022 00:00	13/01/2022 09:14	0

Notes: 234369-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.5		14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	45.2	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	45	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	42.8	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.57	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	18/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	2.34	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.433	g/m³	18/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	39.2	g/m³	20/01/2022	Amit Kumar KTP
M0104	E. coli	180	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40876
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40876-01	Levin D3rd		12/01/2022 00:00	13/01/2022 09:07	0

Notes: 234425-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	122	g/m³	15/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	5.6	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	222	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	53.0	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/01/2022	Marylou Cabral KTP
0602	Chloride	32.0	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.11	g/m³	14/01/2022	Divina Lagazon KTP
0607	Sulphate	< 0.02	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.28	g/m³	14/01/2022	Divina Lagazon KTP
1642	Total Hardness	223	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	64.7	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	0.017	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	14.8	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	22.4	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	1.18	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.020	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0012	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.498	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	20/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0024	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	7.52	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	< 0.002	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	12	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40877
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40877-01	Levin D3rs		12/01/2022 00:00	13/01/2022 09:14	0

Notes: 234426-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.6		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	< 6	g/m³	15/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	20.9	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	64	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	18.9	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	55	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/01/2022	Marylou Cabral KTP
0602	Chloride	16.7	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	2.01	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.53	g/m³	17/01/2022	Divina Lagazon KTP
1642	Total Hardness	48	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	12.0	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	16.0	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	4.42	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	20.8	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.076	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.073	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	0.004	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	15.9	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.363	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0009	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	3.80	g/m³	13/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	20.7	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	0.005	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	500	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification	1 g/m³

Test	Methodology	Detection Limit
	inhibitor.	
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40815
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40815-01	Levin D4		12/01/2022 00:00	13/01/2022 09:10	0

Notes: 234362-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		13/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	29.8	mS/m	13/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	38.3	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.19	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.03	g/m³	13/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	0.95	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.190	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	35.5	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	260	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40827
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40827-01	Levin D5		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234374-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	25.9	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	21.6	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	2.79	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.004	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0050	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	48	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40824
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40824-01	Levin D6		12/01/2022 00:00	13/01/2022 09:10	0

Notes: 234371-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.9		13/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	28.4	mS/m	13/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	13.8	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	10.3	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.004	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0064	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0096	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	830	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/42938
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/42938-01	Levin E1d		13/01/2022 00:00	14/01/2022 10:27	0

Notes: 234356-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		14/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	45.9	mS/m	14/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	17	g/m³	17/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	14/01/2022	Gordon McArthur KTP
0602	Chloride	39.3	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.20	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	18/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	0.04	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.232	g/m³	18/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	38.7	g/m³	19/01/2022	Amit Kumar KTP
M0104	E. coli	20	cfu/100mL	14/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		14/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40819
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40819-01	Levin E1s		12/01/2022 00:00	13/01/2022 09:14	0

Notes: 234366-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.1		13/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	25.3	mS/m	13/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	40	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	26.9	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.17	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.007	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	13/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	4.59	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0025	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.229	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	30.0	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	50	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/42937
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/42937-01	Levin E2d		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234357-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	44.5	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	41.3	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.22	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0013	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.393	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	12	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40820
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40820-01	Levin E2s		12/01/2022 00:00	13/01/2022 09:14	0

Notes: 234367-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		13/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	33.7	mS/m	13/01/2022	Jennifer Mont KTP
0081	Chemical Oxygen Demand	< 15	g/m³	14/01/2022	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	38.1	g/m³	14/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.01	g/m³	14/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.29	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	13/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	0.06	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.219	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	30.2	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	3,200	cfu/100mL	13/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40828
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40828-01	Levin F1		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234375-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	41.1	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	44.1	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.93	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0044	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	2	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40829
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40829-01	Levin F2		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234376-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	21.9	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	22.6	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.28	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0020	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	< 1	cfu/100mL	12/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40830
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40830-01	Levin F3		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234377-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.1		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	19.5	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	18.0	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	1.36	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.03	g/m³	12/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	< 0.01	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	25.7	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	< 1	cfu/100mL	12/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/42936
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/42936-01	Levin G1D		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234358-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	27.6	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	30.9	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.09	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0006	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0604	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	9	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40825
Issue: 1
20 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40825-01	Levin G1S		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234372-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.7		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	46.2	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	104	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	72.2	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.06	g/m³	19/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.173	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	< 0.03	g/m³	12/01/2022	Amit Kumar KTP
6717	Iron - Dissolved	4.24	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	0.0014	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0744	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0015	g/m³	12/01/2022	Amit Kumar KTP
6731	Sodium - Dissolved	74.6	g/m³	14/01/2022	Amit Kumar KTP
M0104	E. coli	300	cfu/100mL	12/01/2022	Maria Norris KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40826
Issue: 1
17 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40826-01	Levin G2s		11/01/2022 00:00	12/01/2022 09:11	0

Notes: 234373-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		12/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	122	mS/m	12/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	35	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 1	g/m³	12/01/2022	Marylou Cabral KTP
0602	Chloride	153	g/m³	13/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	13/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	12/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.92	g/m³	12/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0762	g/m³	12/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0036	g/m³	12/01/2022	Amit Kumar KTP
M0104	E. coli	< 1	cfu/100mL	12/01/2022	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/01/2022	Candy Barrenechea .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36569
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36569-01	Levin HS1		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231830-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		19/11/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	7	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	6.8	g/m³	19/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	63	g CaCO3/m³	19/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	24.5	mS/m	19/11/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	20	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	22.9	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.33	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	19.0	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.12	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	62	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	13.5	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.120	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	6.95	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	20.0	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.050	g/m³	19/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.019	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0020	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0227	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	2.87	g/m³	19/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.002	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	230	cfu/100mL	18/11/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36570
Issue: 1
13 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36570-01	Levin HS1		15/12/2021 00:00	16/12/2021 08:41	0

Notes: 231831-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		18/12/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	< 6	g/m³	16/12/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	11.3	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	57	g CaCO3/m³	18/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	21.8	mS/m	18/12/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	56	g/m³	16/12/2021	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	17/12/2021	Marylou Cabral KTP
0602	Chloride	21.5	g/m³	21/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.48	g/m³	21/12/2021	Divina Lagazon KTP
0607	Sulphate	15.4	g/m³	21/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.35	g/m³	21/12/2021	Divina Lagazon KTP
1642	Total Hardness	63	g CaCO3/m³	16/12/2021	Amit Kumar KTP
1810	Calcium - Dissolved	13.8	g/m³	16/12/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.215	g/m³	16/12/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	6.98	g/m³	16/12/2021	Amit Kumar KTP
1834	Sodium - Dissolved	16.6	g/m³	16/12/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.112	g/m³	20/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.039	g/m³	17/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.001	g/m³	17/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	17/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	17/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	17/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0015	g/m³	17/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0019	g/m³	17/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	4.91	g/m³	17/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.006	g/m³	17/12/2021	Sharon van Soest KTP
M0104	E. coli	49	cfu/100mL	16/12/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sunita Raju Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Sunita Raju Transcribed by
P1859	Sample Filtration	Completed		16/12/2021	Candy Barrenechea .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40833
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40833-01	Levin HS1		12/01/2022 00:00	13/01/2022 08:37	0

Notes: 234380-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	16	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	8.4	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	55	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	22.7	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	34	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	20.6	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.85	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	16.3	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.10	g/m³	17/01/2022	Divina Lagazon KTP
1642	Total Hardness	67	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	14.3	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	0.357	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	7.48	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	18.1	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.008	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.066	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0012	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.125	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0006	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	4.06	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	0.009	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	3,900	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36572
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36572-01	Levin HS1A		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231833-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		19/11/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	< 6	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	7.1	g/m³	19/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	63	g CaCO3/m³	19/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	24.1	mS/m	19/11/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	31	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	23.6	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.34	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	19.7	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.11	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	65	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	14.2	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.075	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	7.28	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	21.3	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.050	g/m³	19/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.030	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0021	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0296	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	3.00	g/m³	19/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.003	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	35	cfu/100mL	18/11/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36573
Issue: 1
13 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36573-01	Levin HS1A		15/12/2021 00:00	16/12/2021 08:56	0

Notes: 231834-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		21/12/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	46	g/m³	20/12/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	10.8	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	52	g CaCO3/m³	21/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	19.9	mS/m	21/12/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	72	g/m³	16/12/2021	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	3	g/m³	20/12/2021	Marylou Cabral KTP
0602	Chloride	16.8	g/m³	21/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.56	g/m³	21/12/2021	Divina Lagazon KTP
0607	Sulphate	14.4	g/m³	21/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.05	g/m³	21/12/2021	Divina Lagazon KTP
1642	Total Hardness	60	g CaCO3/m³	16/12/2021	Amit Kumar KTP
1810	Calcium - Dissolved	13.2	g/m³	16/12/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.128	g/m³	16/12/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	6.60	g/m³	16/12/2021	Amit Kumar KTP
1834	Sodium - Dissolved	14.6	g/m³	16/12/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.055	g/m³	20/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.023	g/m³	17/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.001	g/m³	17/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	17/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	17/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	17/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0016	g/m³	17/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0018	g/m³	17/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	4.34	g/m³	17/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.002	g/m³	17/12/2021	Sharon van Soest KTP
M0104	E. coli	1,700	cfu/100mL	16/12/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sunita Raju Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Sunita Raju Transcribed by
P1859	Sample Filtration	Completed		16/12/2021	Candy Barrenechea .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40834
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40834-01	Levin HS1A		12/01/2022 00:00	13/01/2022 08:37	0

Notes: 234381-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	29	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	8.3	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	55	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	22.6	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	34	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	20.0	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.81	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	16.3	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.14	g/m³	17/01/2022	Divina Lagazon KTP
1642	Total Hardness	65	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	14.0	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	0.135	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	7.39	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	18.0	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.011	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.035	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0013	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0950	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	3.58	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	< 0.002	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	200	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36575
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36575-01	Levin HS2		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231836-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		19/11/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	25	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	6.9	g/m³	19/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	65	g CaCO3/m³	19/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	24.8	mS/m	19/11/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	27	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	23.7	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.36	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	18.9	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.14	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	64	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	13.9	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.071	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	7.08	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	21.1	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.049	g/m³	19/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.014	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0028	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0315	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0006	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	3.10	g/m³	19/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.011	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	730	cfu/100mL	18/11/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36576
Issue: 1
13 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36576-01	Levin HS2		15/12/2021 00:00	16/12/2021 09:03	0

Notes: 231837-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		18/12/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	6	g/m³	16/12/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	10.5	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	52	g CaCO3/m³	18/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	20.0	mS/m	18/12/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	42	g/m³	16/12/2021	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	17/12/2021	Marylou Cabral KTP
0602	Chloride	17.5	g/m³	21/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.44	g/m³	21/12/2021	Divina Lagazon KTP
0607	Sulphate	14.3	g/m³	21/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.04	g/m³	21/12/2021	Divina Lagazon KTP
1642	Total Hardness	63	g CaCO3/m³	16/12/2021	Amit Kumar KTP
1810	Calcium - Dissolved	13.7	g/m³	16/12/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.174	g/m³	16/12/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	6.91	g/m³	16/12/2021	Amit Kumar KTP
1834	Sodium - Dissolved	15.3	g/m³	16/12/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.065	g/m³	21/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.023	g/m³	17/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.001	g/m³	17/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	17/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	17/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	17/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0017	g/m³	17/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0068	g/m³	17/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0006	g/m³	17/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	4.45	g/m³	17/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.007	g/m³	17/12/2021	Sharon van Soest KTP
M0104	E. coli	60	cfu/100mL	16/12/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sunita Raju Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Sunita Raju Transcribed by
P1859	Sample Filtration	Completed		16/12/2021	Candy Barrenechea .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40835
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40835-01	Levin HS2		12/01/2022 00:00	13/01/2022 08:37	0

Notes: 234382-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	26	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	8.2	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	59	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	23.7	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	26	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	20.4	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.80	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	16.2	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.21	g/m³	17/01/2022	Divina Lagazon KTP
1642	Total Hardness	67	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	14.3	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	0.161	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	7.64	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	18.4	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.023	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.020	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0010	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.117	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	3.76	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	< 0.002	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	140	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36578
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36578-01	Levin HS3		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231839-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.9		19/11/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	15	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	7.3	g/m³	19/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	68	g CaCO3/m³	19/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	25.3	mS/m	19/11/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	51	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	24.4	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.36	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	18.7	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.15	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	68	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	15.0	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.110	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	7.49	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	22.5	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.049	g/m³	19/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.023	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0018	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0380	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	3.40	g/m³	19/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.002	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	58	cfu/100mL	18/11/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36579
Issue: 1
13 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36579-01	Levin HS3		15/12/2021 00:00	16/12/2021 08:45	0

Notes: 231840-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		18/12/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	12	g/m³	17/12/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	10.7	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	53	g CaCO3/m³	18/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	20.1	mS/m	18/12/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	63	g/m³	16/12/2021	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	17/12/2021	Marylou Cabral KTP
0602	Chloride	17.5	g/m³	21/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.34	g/m³	21/12/2021	Divina Lagazon KTP
0607	Sulphate	13.6	g/m³	21/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.02	g/m³	21/12/2021	Divina Lagazon KTP
1642	Total Hardness	56	g CaCO3/m³	17/12/2021	Sharon van Soest KTP
1810	Calcium - Dissolved	12.3	g/m³	17/12/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.192	g/m³	17/12/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	6.15	g/m³	17/12/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	13.7	g/m³	17/12/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.052	g/m³	20/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.022	g/m³	17/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.001	g/m³	17/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	17/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	17/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	17/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0016	g/m³	17/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0020	g/m³	17/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	17/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	4.38	g/m³	17/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.010	g/m³	17/12/2021	Sharon van Soest KTP
M0104	E. coli	130	cfu/100mL	16/12/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sunita Raju Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Sunita Raju Transcribed by
P1859	Sample Filtration	Completed		16/12/2021	Candy Barrenechea .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40836
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40836-01	Levin HS3		12/01/2022 00:00	13/01/2022 08:12	0

Notes: 234383-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	19	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	8.4	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	58	g CaCO3/m³	14/01/2022	Gordon McArthur KTP
0055	Conductivity at 25°C	23.2	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	57	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	21.5	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.80	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	16.6	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.25	g/m³	17/01/2022	Divina Lagazon KTP
1642	Total Hardness	67	g CaCO3/m³	13/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	14.3	g/m³	13/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	0.173	g/m³	13/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	7.58	g/m³	13/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	18.7	g/m³	13/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.034	g/m³	17/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.024	g/m³	13/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	13/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	13/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	13/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	13/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0009	g/m³	13/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	0.0456	g/m³	13/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	3.88	g/m³	13/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	< 0.002	g/m³	13/01/2022	Amit Kumar KTP
M0104	E. coli	100	cfu/100mL	13/01/2022	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36596
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36596-01	Levin Leachate Pond		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231845-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.6		19/11/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	114	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	705	g/m³	26/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	6,250	g CaCO3/m³	23/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	1,440	mS/m	19/11/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	5,010	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	82	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	1,060	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 1.00	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	16.3	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	1,310	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	496	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	109	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	5.09	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	54.2	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	1,010	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	13.3	g/m³	19/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.620	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	0.277	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	5.92	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0020	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	0.930	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0271	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0050	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	1.18	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0050	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.122	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	676	g/m³	23/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.062	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	19/11/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 50 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36597
Issue: 1
27 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36597-01	Levin Leachate Pond		16/12/2021 00:00	17/12/2021 09:09	0

Notes: 231846-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		21/12/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	194	g/m³	17/12/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	624	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	6,180	g CaCO3/m³	21/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	1,340	mS/m	21/12/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	2,510	g/m³	17/12/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	112	g/m³	17/12/2021	Marylou Cabral KTP
0602	Chloride	1,020	g/m³	23/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.10	g/m³	23/12/2021	Divina Lagazon KTP
0607	Sulphate	12.6	g/m³	23/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	1,230	g/m³	21/12/2021	Divina Lagazon KTP
1642	Total Hardness	479	g CaCO3/m³	20/12/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	105	g/m³	20/12/2021	Edwin Lowe KTP
1819	Iron - Dissolved	4.98	g/m³	20/12/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	52.3	g/m³	20/12/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	806	g/m³	20/12/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	13.1	g/m³	21/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.512	g/m³	18/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.220	g/m³	18/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	5.51	g/m³	18/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	18/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	0.576	g/m³	18/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0082	g/m³	18/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	0.0043	g/m³	18/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	1.10	g/m³	18/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.103	g/m³	18/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	585	g/m³	18/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.080	g/m³	18/12/2021	Sharon van Soest KTP
M0104	E. coli	2,700	cfu/100mL	17/12/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 50 *	g/m³		Lizzie Addis Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		17/12/2021	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40832
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40832-01	Levin Leachate Pond		12/01/2022 00:00	13/01/2022 08:12	0

Notes: 234379-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	61	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	729	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	6,740	g CaCO3/m³	22/01/2022	Marylou Cabral KTP
0055	Conductivity at 25°C	1,530	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	6,320	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	124	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	1,140	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 1.00	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	11.9	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	1,540	g/m³	18/01/2022	Divina Lagazon KTP
1642	Total Hardness	530	g CaCO3/m³	14/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	106	g/m³	14/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	5.08	g/m³	14/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	64.1	g/m³	14/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	988	g/m³	14/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	16.0	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.741	g/m³	18/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.359	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	6.87	g/m³	18/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0020	g/m³	18/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	0.739	g/m³	18/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0066	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0050	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	1.34	g/m³	18/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0050	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.124	g/m³	18/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	725	g/m³	18/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	0.045	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	400	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	21 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36581
Issue: 1
02 December 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36581-01	Levin TD1		01/11/2021 00:00	18/11/2021 09:35	0

Notes: 231842-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.9		19/11/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	112	g/m³	18/11/2021	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	24.4	g/m³	19/11/2021	Amit Kumar KTP
0052	Alkalinity - Total	125	g CaCO3/m³	19/11/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	41.8	mS/m	19/11/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	468	g/m³	18/11/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	18/11/2021	Gordon McArthur KTP
0602	Chloride	50.8	g/m³	23/11/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	23/11/2021	Divina Lagazon KTP
0607	Sulphate	0.97	g/m³	23/11/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.45	g/m³	19/11/2021	Divina Lagazon KTP
1642	Total Hardness	91	g CaCO3/m³	19/11/2021	Amit Kumar KTP
1810	Calcium - Dissolved	17.8	g/m³	19/11/2021	Amit Kumar KTP
1819	Iron - Dissolved	2.43	g/m³	19/11/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	11.4	g/m³	19/11/2021	Amit Kumar KTP
1834	Sodium - Dissolved	46.5	g/m³	19/11/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.057	g/m³	23/11/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.028	g/m³	19/11/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	0.002	g/m³	19/11/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.18	g/m³	19/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	19/11/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	19/11/2021	Amit Kumar KTP
6713	Copper - Dissolved	0.0012	g/m³	19/11/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.472	g/m³	19/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	19/11/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0010	g/m³	19/11/2021	Amit Kumar KTP
6726	Potassium - Dissolved	10.7	g/m³	19/11/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.002	g/m³	19/11/2021	Amit Kumar KTP
M0104	E. coli	< 100	cfu/100mL	18/11/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Rob Deacon Transcribed by
P1859	Sample Filtration	Completed		18/11/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36582
Issue: 1
13 January 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36582-01	Levin TD1		20/12/2021 00:00	21/12/2021 08:59	0

Notes: 231843-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.7		23/12/2021	Jennifer Mont KTP
0002	Suspended Solids - Total	22	g/m³	22/12/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	19.4	g/m³	21/12/2021	Sharon van Soest KTP
0052	Alkalinity - Total	92	g CaCO3/m³	23/12/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	27.8	mS/m	23/12/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	113	g/m³	22/12/2021	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	7	g/m³	22/12/2021	Marylou Cabral KTP
0602	Chloride	26.2	g/m³	24/12/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.06	g/m³	24/12/2021	Divina Lagazon KTP
0607	Sulphate	8.15	g/m³	24/12/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.66	g/m³	22/12/2021	Divina Lagazon KTP
1642	Total Hardness	81	g CaCO3/m³	22/12/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	17.1	g/m³	22/12/2021	Edwin Lowe KTP
1819	Iron - Dissolved	2.28	g/m³	22/12/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	9.26	g/m³	22/12/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	20.1	g/m³	22/12/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.030	g/m³	22/12/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.018	g/m³	21/12/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.002	g/m³	21/12/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.08	g/m³	21/12/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	21/12/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	21/12/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0010	g/m³	21/12/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	21/12/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.468	g/m³	21/12/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	21/12/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0007	g/m³	21/12/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	10.4	g/m³	21/12/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.009	g/m³	21/12/2021	Sharon van Soest KTP
M0104	E. coli	1,100	cfu/100mL	21/12/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sunita Raju Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Sunita Raju Transcribed by
P1859	Sample Filtration	Completed		21/12/2021	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Elysia Kinross

Report Number: 21/40831
Issue: 1
02 February 2022

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/40831-01	Levin TD1		12/01/2022 00:00	13/01/2022 08:12	0

Notes: 234378-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.8		14/01/2022	Gordon McArthur KTP
0002	Suspended Solids - Total	111	g/m³	13/01/2022	Jennifer Mont KTP
0040	Total (NP) Organic Carbon	70.2	g/m³	13/01/2022	Amit Kumar KTP
0052	Alkalinity - Total	262	g CaCO3/m³	14/01/2022	Jennifer Mont KTP
0055	Conductivity at 25°C	75.8	mS/m	14/01/2022	Gordon McArthur KTP
0081	Chemical Oxygen Demand	291	g/m³	13/01/2022	Marylou Cabral KTP
0180	BOD5 - Soluble Carbonaceous	6	g/m³	13/01/2022	Marylou Cabral KTP
0602	Chloride	82.5	g/m³	18/01/2022	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	18/01/2022	Divina Lagazon KTP
0607	Sulphate	0.13	g/m³	18/01/2022	Divina Lagazon KTP
0760	Ammonia Nitrogen	5.98	g/m³	18/01/2022	Divina Lagazon KTP
1642	Total Hardness	208	g CaCO3/m³	14/01/2022	Edwin Lowe KTP
1810	Calcium - Dissolved	42.3	g/m³	14/01/2022	Edwin Lowe KTP
1819	Iron - Dissolved	2.84	g/m³	14/01/2022	Edwin Lowe KTP
1822	Magnesium - Dissolved	24.9	g/m³	14/01/2022	Edwin Lowe KTP
1834	Sodium - Dissolved	70.0	g/m³	14/01/2022	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.028	g/m³	18/01/2022	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.022	g/m³	18/01/2022	Amit Kumar KTP
6703	Arsenic - Dissolved	0.007	g/m³	18/01/2022	Amit Kumar KTP
6707	Boron - Dissolved	0.27	g/m³	18/01/2022	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	18/01/2022	Amit Kumar KTP
6711	Chromium - Dissolved	0.001	g/m³	18/01/2022	Amit Kumar KTP
6713	Copper - Dissolved	0.0007	g/m³	18/01/2022	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6721	Manganese - Dissolved	1.27	g/m³	18/01/2022	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	18/01/2022	Amit Kumar KTP
6724	Nickel - Dissolved	0.0025	g/m³	18/01/2022	Amit Kumar KTP
6726	Potassium - Dissolved	39.9	g/m³	18/01/2022	Amit Kumar KTP
6738	Zinc - Dissolved	0.005	g/m³	18/01/2022	Amit Kumar KTP
M0104	E. coli	2,200	cfu/100mL	13/01/2022	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Marylou Cabral Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		13/01/2022	Candy Barrenechea .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

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.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

Bore C2								
Sample:	Unit:	Date	14/07/2020 13:44	8/10/2020 11:23	8/01/2021 7:24	21/07/2021 9:15	14/10/2021 17:09	13/01/2022 13:57
		Status	Processed	Processed	Sent	Processed	Processed	Processed
		Lab Reference			20/59248-15	21/17692-01	21/30471-01	21/42935-01
Levin Landfill	g/mÂ³	Aluminium - Dissolved	0.014	0.015	No Result	0.018	0.023	0.017
Levin Landfill	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration	140	145	No Result	149	165	165
Levin Landfill	g/mÂ³	BOD - Soluble Carbonaceous	5.9	0.9	No Result	5.9	5.9	5.9
Levin Landfill	g/mÂ³	Boron - Dissolved	1.81	1.43	No Result	1.66	1.49	1.45
Levin Landfill	g/mÂ³	Chemical Oxygen Demand	105	129	No Result	132	135	196
Levin Landfill	g/mÂ³	Chloride - Add P1859 Filtration	212	161	No Result	127	126	187
Levin Landfill	mS/m	Conductivity at 25Â°C - mS/m unit	245	239	No Result	228	238	243
Levin Landfill	cfu/100mL	E. coli by MF - Environmental Water	3.9	3.9	No Result	3.9	300	260
Levin Landfill		IC - 2 Elements	Completed	Completed	Completed	Completed	Completed	Completed
Levin Landfill		ICP-MS - 7 Elements	Completed	Completed	Completed	Completed	Completed	Completed
Levin Landfill	g/mÂ³	Lead - Dissolved	0.0004	0.0004	No Result	0.0004	0.0008	0.0004
Levin Landfill	g/mÂ³	Manganese - Dissolved	0.0402	0.0428	No Result	0.0411	0.0554	0.0832
Levin Landfill	g/mÂ³	Mercury - Dissolved	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Levin Landfill	g/mÂ³	Nickel - Dissolved	0.0041	0.0039	No Result	0.0043	0.0049	0.0043
Levin Landfill	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration	0	0	No Result	0	0	0
Levin Landfill		pH	6.9	6.9	No Result	7.3	7.2	7.1
Levin Landfill		Sample Filtration	Completed	Completed	Completed	Completed	Completed	Completed

Bore Xd1				
Sample:	Unit:	Date	14/10/2021 17:09	13/01/2022 12:55
		Status	Processed	At Lab
		Lab Reference	21/36504-01	21/40873-01
Levin Landfill Sample	g CaCO3/mÂ³	Alkalinity - Total	180	184
Levin Landfill Sample	g/mÂ³	Aluminium - Dissolved	0.003	0.004
Levin Landfill Sample	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration	0.38	0.39
Levin Landfill Sample	g/mÂ³	Arsenic - Dissolved	0	0
Levin Landfill Sample	g/mÂ³	BOD - Soluble Carbonaceous	2.9	5.9
Levin Landfill Sample	g/mÂ³	Boron - Dissolved	0.05	0.06
Levin Landfill Sample	g/mÂ³	Cadmium - Dissolved	0.0001	0.0001
Levin Landfill Sample	g/mÂ³	Calcium - Dissolved by OES	35	38.1
Levin Landfill Sample	g/mÂ³	Chemical Oxygen Demand	31	23
Levin Landfill Sample	g/mÂ³	Chloride - Add P1859 Filtration	62.7	58.2
Levin Landfill Sample	g/mÂ³	Chromium - Dissolved	0	0
Levin Landfill Sample	mS/m	Conductivity at 25Â°C - mS/m unit	54.3	53.9
Levin Landfill Sample	g/mÂ³	Copper - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Dissolved Reactive Phosphorus - Add P1859 Filtration	0.118	0.111
Levin Landfill Sample	cfu/100mL	E. coli by MF - Environmental Water	3.9	16
Levin Landfill Sample		IC - 3 Elements	Completed	Completed
Levin Landfill Sample		ICP-MS - 16 Elements	Completed	Completed
Levin Landfill Sample	g/mÂ³	Iron - Dissolved by OES	0.048	0.067
Levin Landfill Sample	g/mÂ³	Lead - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Magnesium - Dissolved by OES	15	16
Levin Landfill Sample	g/mÂ³	Manganese - Dissolved	0.471	0.497
Levin Landfill Sample	g/mÂ³	Mercury - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Nickel - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration	0	0
Levin Landfill Sample		pH	7.5	7.6
Levin Landfill Sample	g/mÂ³	Potassium - Dissolved	5.31	5.47

Bore Xd1				
Sample:	Unit:	Date	14/10/2021 17:09	13/01/2022 12:55
		Status	Processed	At Lab
		Lab Reference	21/36504-01	21/40873-01
Levin Landfill Sample		Sample Filtration	Completed	Completed
Levin Landfill Sample	g/mÂ³	Sodium - Dissolved by OES	45.1	47.7
Levin Landfill Sample	g/mÂ³	Sulphate - Add P1859 Filtration	0.01	0.01
Levin Landfill Sample	g/mÂ³	Suspended Solids - Total	72	38
Levin Landfill Sample	g CaCO3/mÂ³	Total Hardness by OES requires Ca and Mg by ICPOES	149	161
Levin Landfill Sample	g/mÂ³	Total Non-Purgeable Organic Carbon	4.6	4.2
Levin Landfill Sample	g/mÂ³	Total Phenolics	0.04	No Result
Levin Landfill Sample	g/mÂ³	Volatile Fatty Acids	4.9	No Result
Levin Landfill Sample	g/mÂ³	Zinc - Dissolved	0.001	0.001
		Unscheduled tests (if present)		

Bore Xs1				
Sample:	Unit:	Date	14/10/2021 17:10	13/01/2022 12:56
		Status	Processed	At Lab
		Lab Reference	21/36507-01	21/40875-01 1
Levin Landfill Sample	g CaCO3/mÂ³	Alkalinity - Total	331	569
Levin Landfill Sample	g/mÂ³	Aluminium - Dissolved	0.006	0.004
Levin Landfill Sample	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration	11.2	8.69
Levin Landfill Sample	g/mÂ³	Arsenic - Dissolved	0.001	0
Levin Landfill Sample	g/mÂ³	BOD - Soluble Carbonaceous	5.9	74
Levin Landfill Sample	g/mÂ³	Boron - Dissolved	0.09	0.45
Levin Landfill Sample	g/mÂ³	Cadmium - Dissolved	0.0001	0.0001
Levin Landfill Sample	g/mÂ³	Calcium - Dissolved by OES	69.3	97.1
Levin Landfill Sample	g/mÂ³	Chemical Oxygen Demand	68	26
Levin Landfill Sample	g/mÂ³	Chloride - Add P1859 Filtration	52.5	124
Levin Landfill Sample	g/mÂ³	Chromium - Dissolved	0	0.001
Levin Landfill Sample	mS/m	Conductivity at 25Â°C - mS/m unit	86.6	136
Levin Landfill Sample	g/mÂ³	Copper - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Dissolved Reactive Phosphorus - Add P1859 Filtration	0.025	0.015
Levin Landfill Sample	cfu/100mL	E. coli by MF - Environmental Water	8	99.999
Levin Landfill Sample		IC - 3 Elements	Completed	Completed
Levin Landfill Sample		ICP-MS - 16 Elements	Completed	Completed
Levin Landfill Sample	g/mÂ³	Iron - Dissolved by OES	2.61	2.71
Levin Landfill Sample	g/mÂ³	Lead - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Magnesium - Dissolved by OES	24.1	50.2
Levin Landfill Sample	g/mÂ³	Manganese - Dissolved	1.6	1.3
Levin Landfill Sample	g/mÂ³	Mercury - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Nickel - Dissolved	0.0006	0.0027
Levin Landfill Sample	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration	0	0
Levin Landfill Sample		pH	6.5	6.6
Levin Landfill Sample	g/mÂ³	Potassium - Dissolved	12.2	20.3

Bore Xs1				
Sample:	Unit:	Date	14/10/2021 17:10	13/01/2022 12:56
		Status	Processed	At Lab
		Lab Reference	21/36507-01	21/40875-01 1
Levin Landfill Sample		Sample Filtration	Completed	Completed
Levin Landfill Sample	g/mÂ³	Sodium - Dissolved by OES	45.3	99.5
Levin Landfill Sample	g/mÂ³	Sulphate - Add P1859 Filtration	29.7	1.99
Levin Landfill Sample	g/mÂ³	Suspended Solids - Total	45	79
Levin Landfill Sample	g CaCO3/mÂ³	Total Hardness by OES requires Ca and Mg by ICPOES	273	449
Levin Landfill Sample	g/mÂ³	Total Non-Purgeable Organic Carbon	25.7	26.5
Levin Landfill Sample	g/mÂ³	Total Phenolics	0.04	No Result
Levin Landfill Sample	g/mÂ³	Volatile Fatty Acids	4.9	No Result
Levin Landfill Sample	g/mÂ³	Zinc - Dissolved	0.001	0.002
		Unscheduled tests (if present)		

Bore Xs2				
Sample:	Unit:	Date	14/10/2021 17:10	13/01/2022 12:56
		Status	Processed	At Lab
		Lab Reference	21/36512-01	21/40874-01
Levin Landfill Sample	g CaCO3/mÂ³	Alkalinity - Total	49	48
Levin Landfill Sample	g/mÂ³	Aluminium - Dissolved	0.008	0.006
Levin Landfill Sample	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration	0.1	0.01
Levin Landfill Sample	g/mÂ³	Arsenic - Dissolved	0	0
Levin Landfill Sample	g/mÂ³	BOD - Soluble Carbonaceous	2.9	5.9
Levin Landfill Sample	g/mÂ³	Boron - Dissolved	0.02	0.04
Levin Landfill Sample	g/mÂ³	Cadmium - Dissolved	0.0001	0.0001
Levin Landfill Sample	g/mÂ³	Calcium - Dissolved by OES	8.7	9.49
Levin Landfill Sample	g/mÂ³	Chemical Oxygen Demand	14.99	14.99
Levin Landfill Sample	g/mÂ³	Chloride - Add P1859 Filtration	11.5	12.6
Levin Landfill Sample	g/mÂ³	Chromium - Dissolved	0	0
Levin Landfill Sample	mS/m	Conductivity at 25Â°C - mS/m unit	16.6	16.4
Levin Landfill Sample	g/mÂ³	Copper - Dissolved	0.0007	0.0008
Levin Landfill Sample	g/mÂ³	Dissolved Reactive Phosphorus - Add P1859 Filtration	0.015	0.022
Levin Landfill Sample	cfu/100mL	E. coli by MF - Environmental Water	3.9	31
Levin Landfill Sample		IC - 3 Elements	Completed	Completed
Levin Landfill Sample		ICP-MS - 16 Elements	Completed	Completed
Levin Landfill Sample	g/mÂ³	Iron - Dissolved by OES	0.158	0.05
Levin Landfill Sample	g/mÂ³	Lead - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Magnesium - Dissolved by OES	4.78	4.65
Levin Landfill Sample	g/mÂ³	Manganese - Dissolved	0.0725	0.0491
Levin Landfill Sample	g/mÂ³	Mercury - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Nickel - Dissolved	0.0004	0.0004
Levin Landfill Sample	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration	0.65	0.66
Levin Landfill Sample		pH	6.8	7.1
Levin Landfill Sample	g/mÂ³	Potassium - Dissolved	3.31	3.83

Bore Xs2				
Sample:	Unit:	Date	14/10/2021 17:10	13/01/2022 12:56
		Status	Processed	At Lab
		Lab Reference	21/36512-01	21/40874-01
Levin Landfill Sample		Sample Filtration	Completed	Completed
Levin Landfill Sample	g/mÂ³	Sodium - Dissolved by OES	14.2	13.8
Levin Landfill Sample	g/mÂ³	Sulphate - Add P1859 Filtration	9.02	7.42
Levin Landfill Sample	g/mÂ³	Suspended Solids - Total	7	27
Levin Landfill Sample	g CaCO3/mÂ³	Total Hardness by OES requires Ca and Mg by ICPOES	41	43
Levin Landfill Sample	g/mÂ³	Total Non-Purgeable Organic Carbon	2.2	2
Levin Landfill Sample	g/mÂ³	Total Phenolics	0.04	No Result
Levin Landfill Sample	g/mÂ³	Volatile Fatty Acids	4.9	No Result
Levin Landfill Sample	g/mÂ³	Zinc - Dissolved	0.001	0.001
		Unscheduled tests (if present)		

APPENDIX D HISTORICAL RESULTS GRAPHS

APPENDIX E LANDFILL GAS MONITORING RESULTS AT GW BORES FOR JANUARY 2022

Date	Time	Bore	Methane (CH4)	Carbon Dioxide (CO2)	Hydrogen Sulphide (H2S)	Oxygen (O2)	Air temperature °C
17/01/2022	2:10:00 p.m.	G1d	0.09	0.05	0	21.6	18
17/01/2022	2:12:00 p.m.	G1s	0.07	0.05	0	21.7	18
17/01/2022	2:13:00 p.m.	G2s	0	0.2	0	20.3	18
17/01/2022	2:14:00 p.m.	D5	0	20.9	0	20.9	18
17/01/2022	2:15:00 p.m.	F1	0.05	0.05	0	21.9	18
17/01/2022	2:16:00 p.m.	F2	0.04	0.14	0	19.9	18
17/01/2022	2:17:00 p.m.	F3	0.04	0.05	0	20.3	18
17/01/2022	2:18:00 p.m.	C2dd	0.01	0.19	0	20.9	18
17/01/2022	2:18:00 p.m.	E1d	0.01	0.04	0	21	18
17/01/2022	2:19:00 p.m.	E2d	0.01	0.06	0	20.7	18
17/01/2022	2:20:00 p.m.	D1	0	0.07	0	20.8	18
17/01/2022	2:21:00 p.m.	D2	0.05	0.29	0	20.8	18
17/01/2022	2:22:00 p.m.	3rd	0.02	0.03	0	20.6	18
17/01/2022	2:23:00 p.m.	D3rs	0.02	0.03	0	20.9	18
17/01/2022	2:24:00 p.m.	D6	0	0.05	0	20.6	18
17/01/2022	2:25:00 p.m.	E1s	0	0.04	0	21	18
17/01/2022	2:26:00 p.m.	E2s	0.05	0.06	0	20.7	18
17/01/2022	2:26:00 p.m.	D4	0.01	0.04	0	21	18
17/01/2022	2:27:00 p.m.	C2	0.01	0.11	0	21	18
17/01/2022	2:28:00 p.m.	C2ds	0.03	0.38	0	20.7	18
17/01/2022	2:29:00 p.m.	B1	0	0.45	0	20.4	18
17/01/2022	2:30:00 p.m.	B2	0	1.5	0	19.7	18
17/01/2022	2:30:00 p.m.	B3s	0.04	0.04	0	21	18
17/01/2022	2:31:00 p.m.	Xs1	0.01	0.03	0	20.8	18
17/01/2022	2:32:00 p.m.	Xs2	0	0.17	0	20.5	18
17/01/2022	2:32:00 p.m.	Xd1	0.01	0.04	0	21	18

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