

Lamby Way annual report January 2023 – December 2023

**With reference to section 4.2 of Lamby Way Landfill site permit Variation
notice UP3130MA of permit JP3239ST**



Lamby Way Landfill Site

Variation Notice UP3130MA

2022 Annual Report as per Schedule 4.2 sub section 4.2.1

(a) Review of result - See Appendix 1

(b) Annual Improvement targets

Since 1st January 2023:

1. Refurbishment of permitter gas boreholes sample points to ensure adequate protection and safe access.
2. Refurbishment works to Ground Water Boreholes, including drilling of replacement boreholes where boreholes were no longer serviceable, providing improved access.
3. Works undertaken to improve pumping of leachate from the site, further maintenance undertaken to the leachate treatment plant, and installation of remote telematics, providing more consistent throughput.

(c) Energy consumption of site as set out in schedule 5 Table S5.3

(d) Water consumption of site as set out in schedule 5 Table S5.3

Table S5.3 Performance Parameters				
Parameter		Frequency of assessment	Annual total	Unit
Potable water use		Annual	N/A	Cubic meters
Energy used (including for leachate treatment)		Annual	651.36	MWh electricity
Non potable water		Annual	N/A	Cubic meters

(e) Annual production / treatment as set out in schedule 5 Table S5.2

Table S5.2 Annual Production /Treatment	
Leachate:	Cubic metres/ year
Disposed of offsite:	0
Disposed of to any onsite effluent treatment plant;	33,277 m3
Recalculated into the waste mass.	0 m3
Surface Water and / or groundwater:	Cubic metres / year
Disposed of offsite;	Not measured
Disposed of to any onsite effluent treatment plant;	0
Landfill gas:	Normalised cubic metres/ year
Combustion in flares	493,257 m ³
Combustion in gas engines;	4,396,089 m ³
Other methods of gas utilisation	N/A

(f) Details of any contamination or decontamination of the site

- No waste has been rejected from site – Landfill is closed
- No known acts of vandalism and/or unauthorised activity are known to have caused the introduction of any unauthorised materials.
- No fuel or oil spills have been reported. The site maintains a good supply of spill kits in the event that they are required.
- Surface water inspections have not produced any recordings of visible oils and greases in Surface Water sampling manholes.

(g) Topographical survey required by condition 3.6.3

See Appendix 4.0 - Drawing – ‘Lamby Way Landfill Site – Topographical Plan’

(h) Volumetric difference (m3) between most recent topographical survey and previous annual topographical survey i.e. additional volume of landfill void that is occupied by waste.

See attached plan – No additional waste as site Closed.

(i) Assessment of settlement behaviour difference (m3) between most recent topographical survey and previous annual topographical survey for areas that did not receive waste between surveys.

See attached plan

(j) Calculation of remaining capacity (m3) derived from the pre-settlement contours and the most recent topographical survey.

n/a – Landfill closed, no further tipping possible

See additional map *Annual report section (i)*

(k) Compliance testing undertaken within this period

- a. Six monthly calibration of G5000 Gas meter completed

Appendix 1 – Review of Results

Lamby Way: Data Report – 2023

Monitoring data for the Lamby Way landfill from January 2022 to December 2022 at Lamby Way Landfill site.

Data included for Perimeter Gas, Leachate, Groundwater and Surface water in accordance with Schedule 4 – Emissions & Monitoring plans for permit variation number UP3130MA.(Variation Notice UP3130MA 2023 Annual Report as per Schedule 4.2 sub section 4.2.1).

Summary of missing Data.

Some of the sampling locations at Lamby Way are not accessible, the details of which are shown below along with proposed / implemented resolutions.

Groundwater borehole (C17) – Borehole destroyed and sample cannot be extracted.

Leachate well (SL1) - Borehole is dry, no action possible. Situation will be monitored.

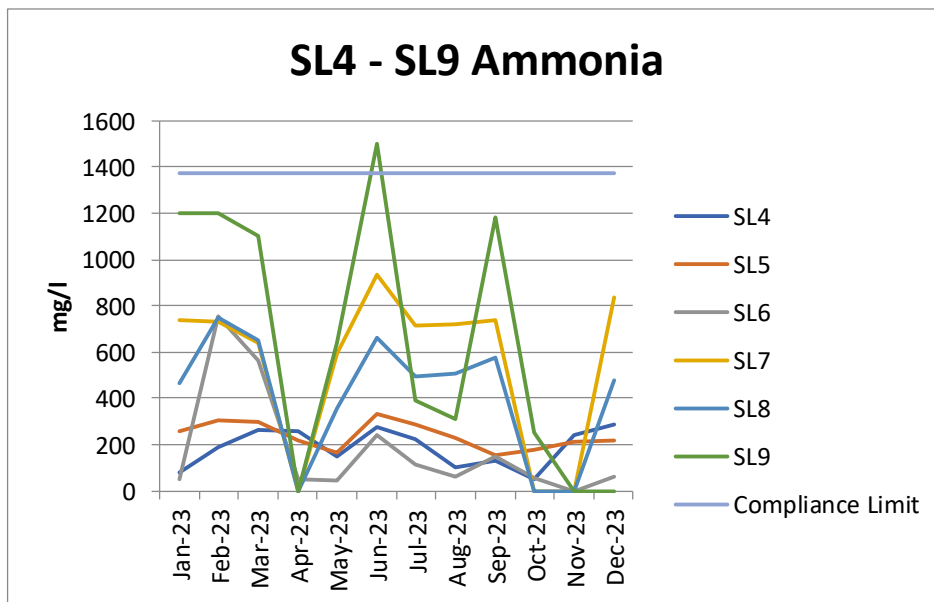
Leachate well (SL2) - Borehole is dry, no action possible. Situation will be monitored.

Leachate well (SL3) - Borehole is blocked below surface, reason unknown.

Leachate Data (SL4– SL9)

Ammoniacal Nitrogen (Ammonia)

Ammoniacal nitrogen ($\text{NH}_3\text{-N}$) is a measure commonly used for testing the quantity of Ammonium ions, derived naturally via organic processes, in water or waste liquids. It is a measure used mainly for quantifying values in waste treatment and water purification systems, as well as a measure of the health of natural and manmade water reserves.

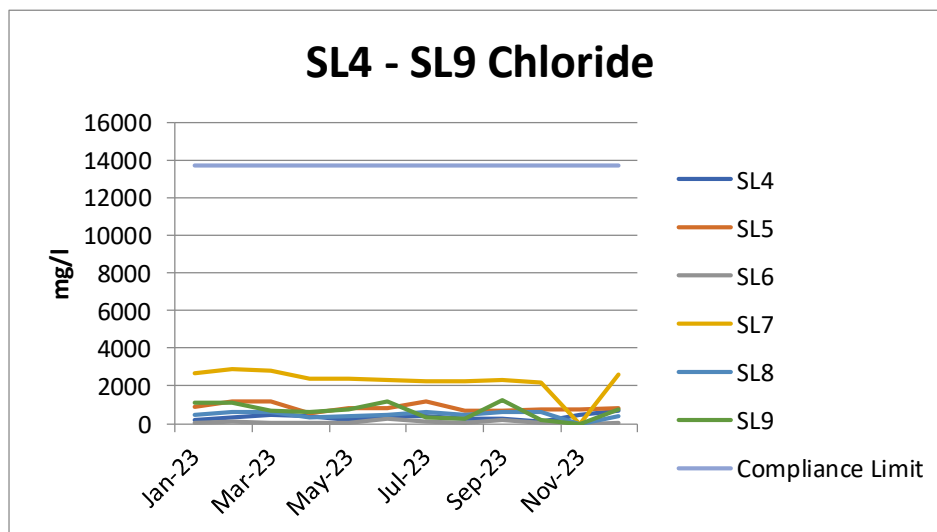


Monitoring points SL9 breached the trigger level (1370 mg/l) in 2023.

SL9 breached the compliance limit in the month of June with a value of 1500 (mg/l).

Chloride

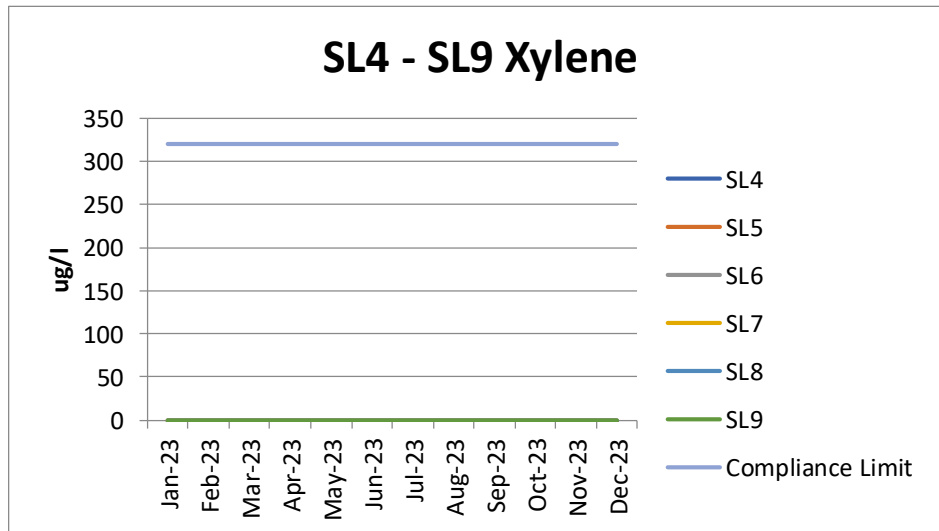
Chloride levels in a waste mass are closely linked to naturally occurring sea water. It is measured to determine if there is any ingress of sea water (or saline ground waters) into a waste mass.



There were no breaches of the trigger level (13713 mg/l) detected in 2023.

Xylene

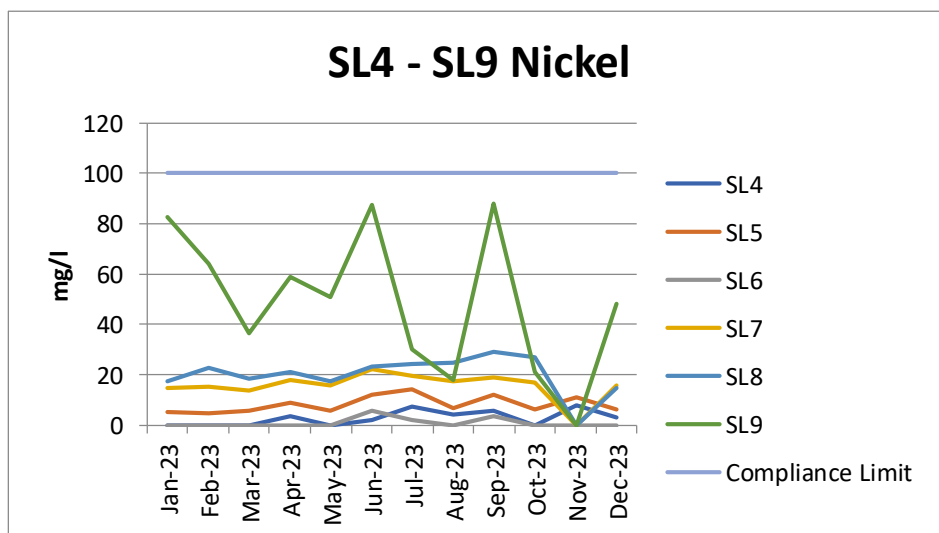
In the presence of Acidic conditions, Xylene can be the pre-cursor to more hazardous compounds of the Benzene family, especially in the presence of Chloride.



There were no breaches of the trigger level (320 mg/l) detected in 2023.

Nickel

Nickel occurs naturally in soils, groundwater, and surface water. As with most heavy metals, nickel can damage the heart and liver of animals exposed to large amounts over a prolonged period of time.



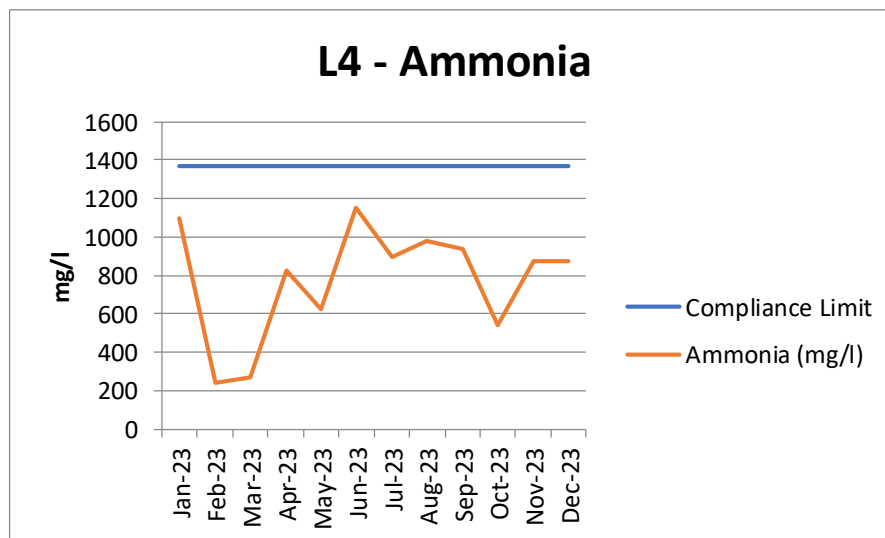
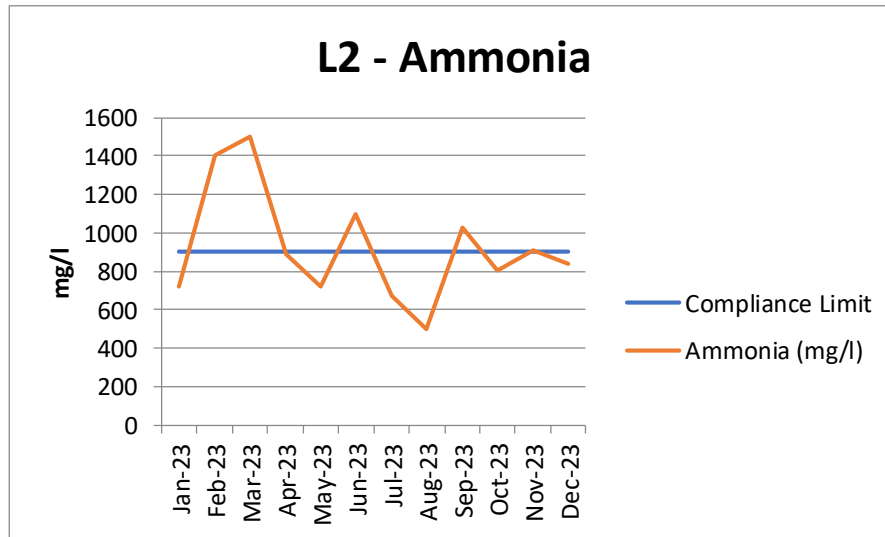
There were no breaches of the compliance limit (100mg/l) detected in 2023.

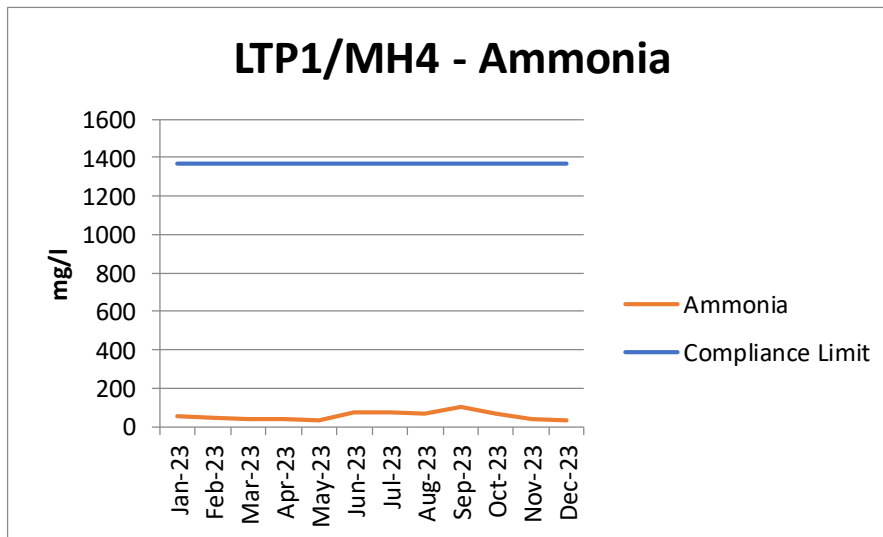
Leachate Data – (L2, L4, LTP1)

Lamby Way leachate is sampled from three locations, L2, L4 and LTP1/MH4.

Ammoniacal Nitrogen (Ammonia)

The ammoniacal nitrogen trigger level for L2 is 904 mg/l and the trigger level for L4 and LTP1/MH4 is 1370 mg/l.





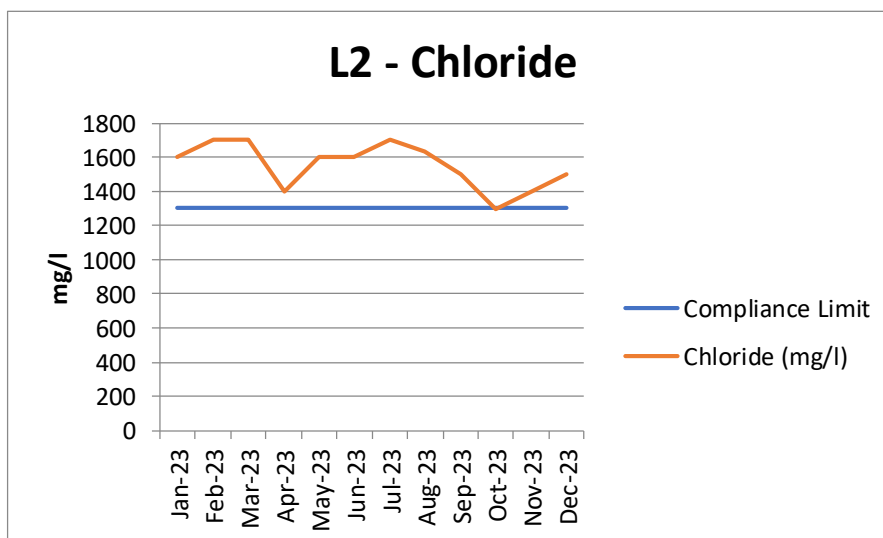
L2 exceeded the compliance limit in February (1,400mg/l), March (1500mg/l), June (1100mg/l), September (1030mg/l) and November (910mg/l).

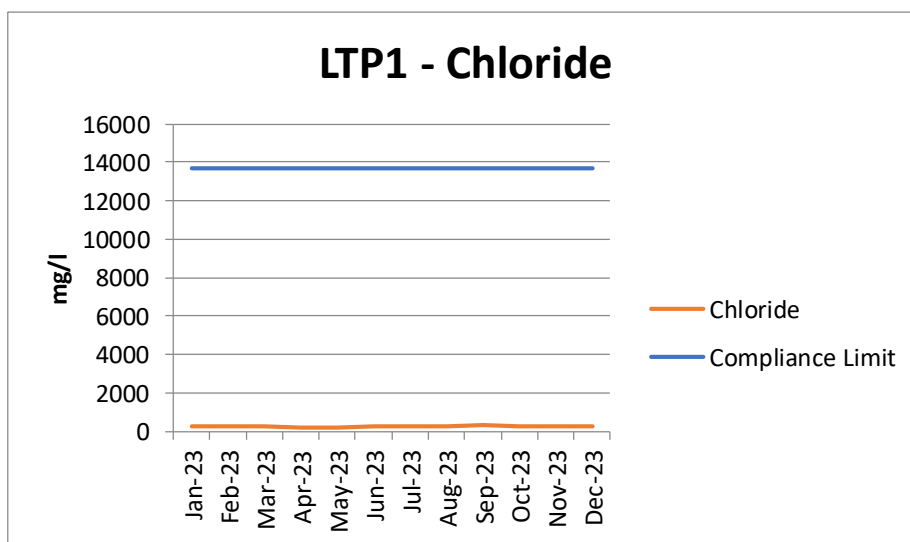
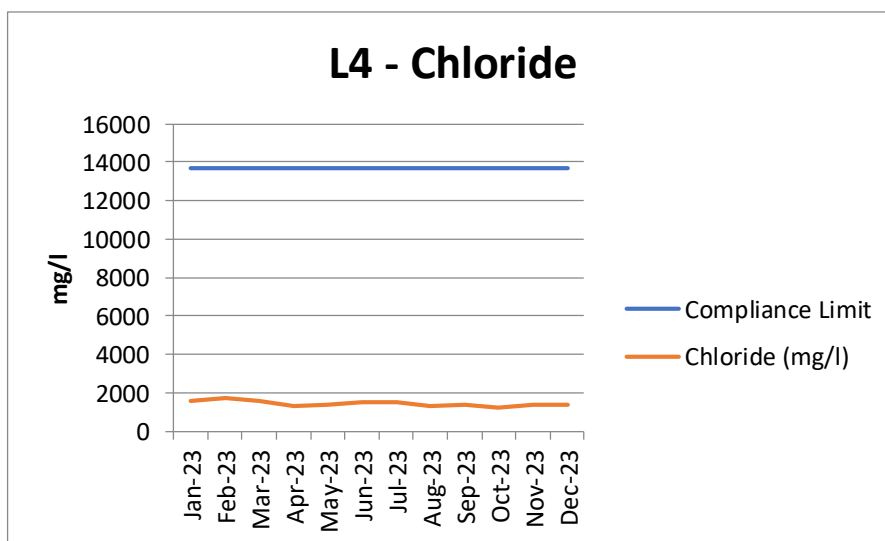
There were no breaches from L4

There were no breaches from LTP1/MH4.

Chloride

There are different trigger levels in place for L2 (1306 mg/l) and L4 (13713 mg/l). There is no trigger level for LTP1/MH4.



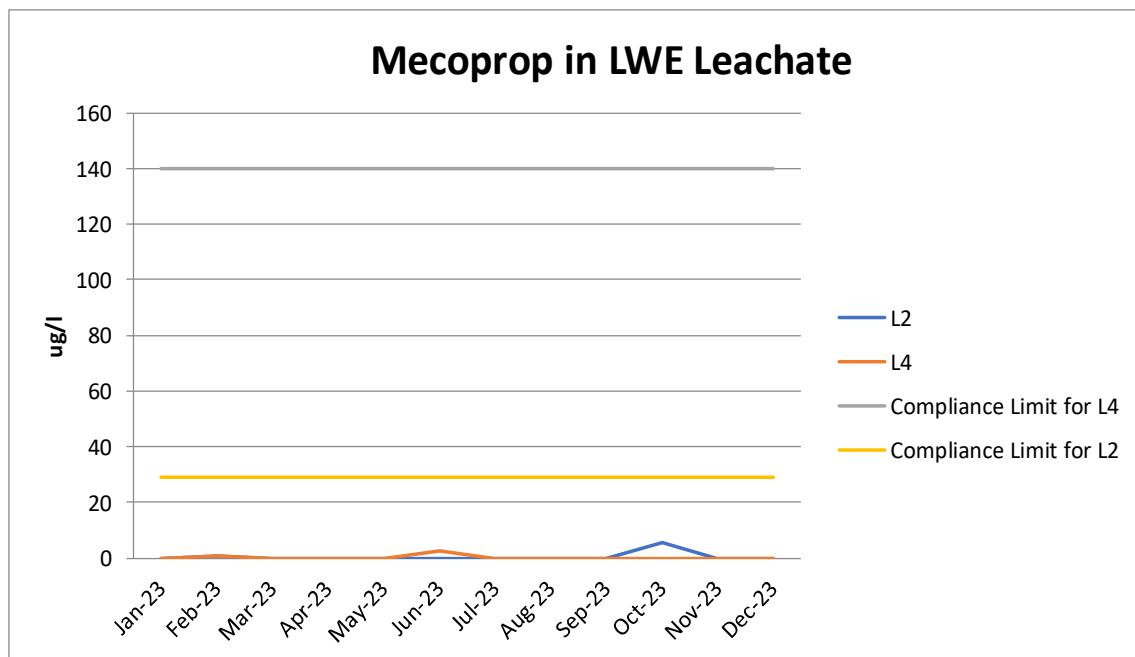


L2 had 11 breaches of the 1306mg/l trigger level, throughout the year.

There were no breaches for L4 or LTP1/MH4.

Mecoprop

Mecoprop or Methylchlorophenoxypropionic acid (MCP) is a common general use herbicide found in many household weed killers and "weed-and-feed" type lawn fertilizers.



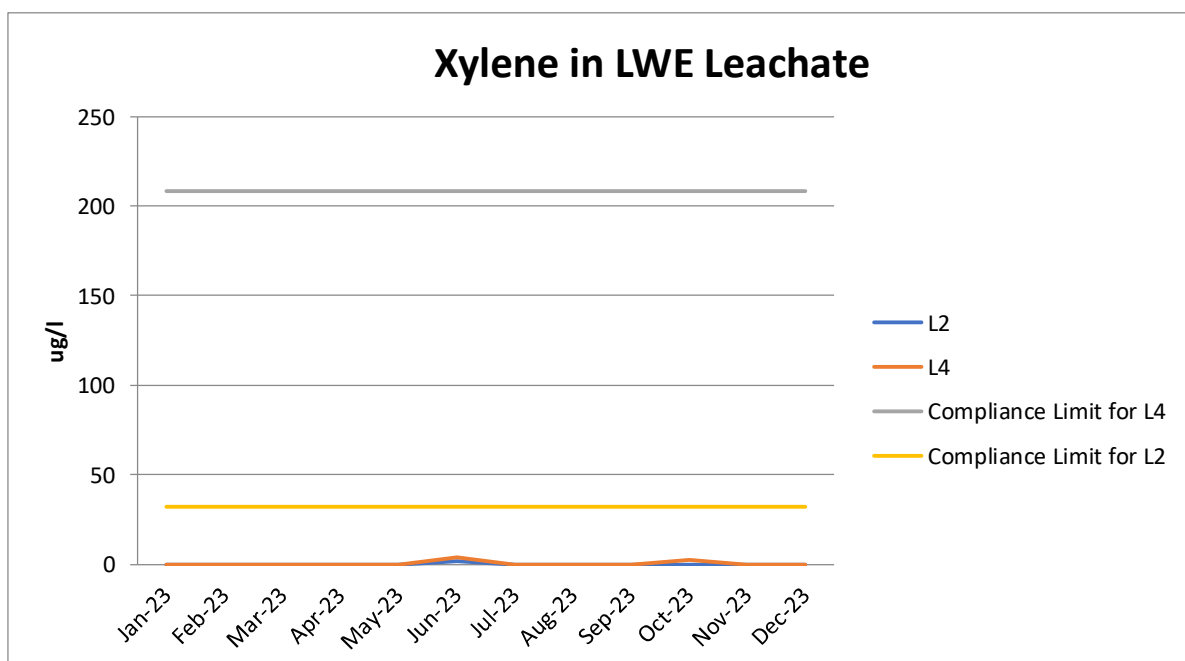
There are two trigger levels, 29ug/l for L2 and 140ug/l for L4 and LTP1/MH4.

L2 did not breach the compliance limit in 2023.

L4 did not breach the compliance limit in 2023.

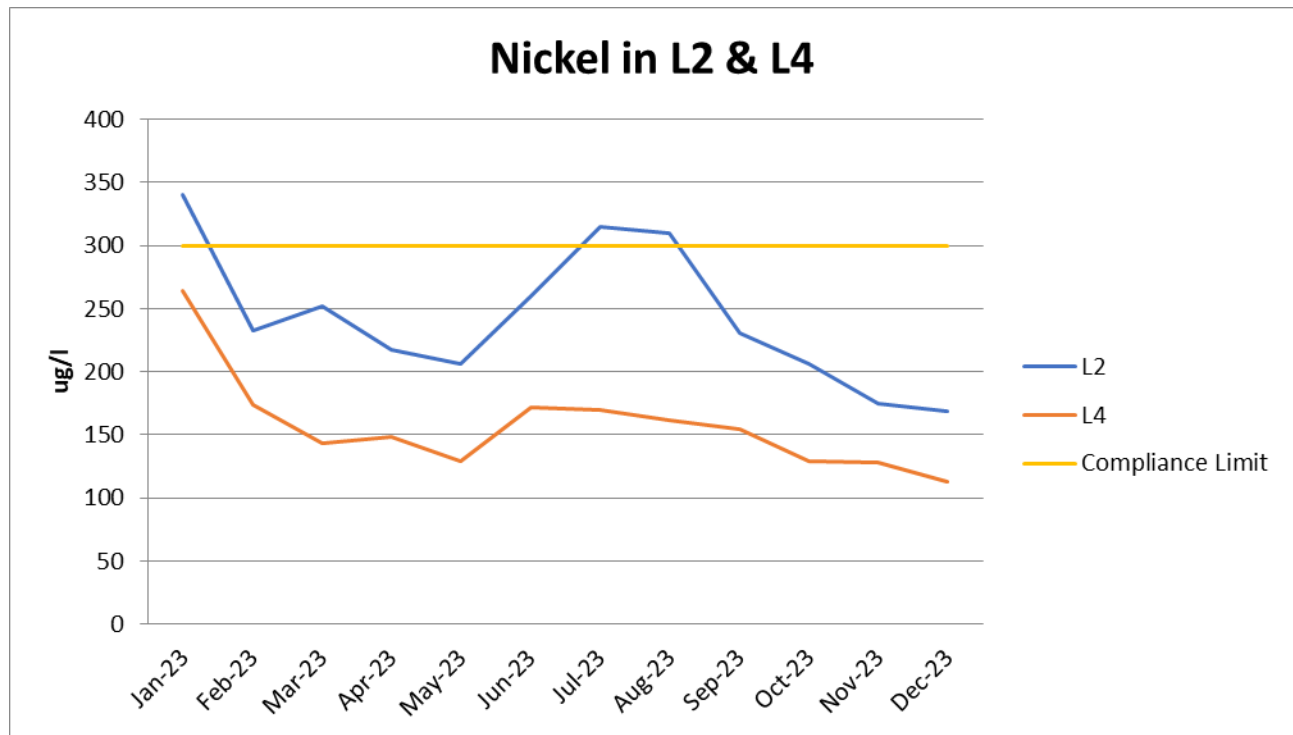
Mecoprop data from LTP1/MH4 is not reported as it is not required by the permit.

Xylene



There was no breach of the 32ug/l trigger level for L2 and no breaches of the 208ug/l trigger for L4.

Nickel



The trigger level for Nickel at these locations is 300ug/l.

There were three breaches for L2 in the months of January (340mg/l), June, July (315mg/l) and August (310mg/l).

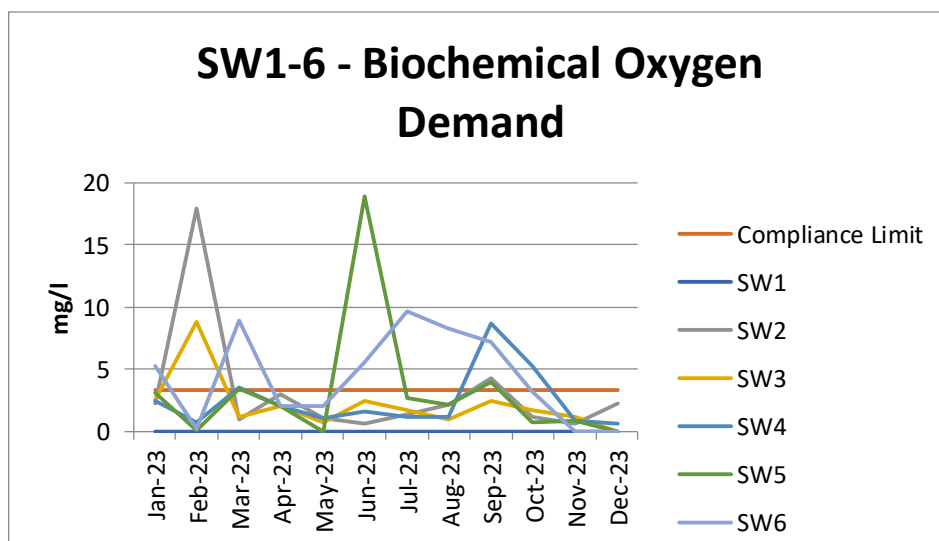
L4 did not exceeded the compliance limit 2023.

Surface Water (SW1-SW6)

There are 6 surface water monitoring points, designated SW1 to SW6.

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand (or BOD) is the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period. The term also refers to a chemical procedure for determining this amount. This is not a precise quantitative test, although it is widely used as an indication of the organic quality of water. The BOD value is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C.

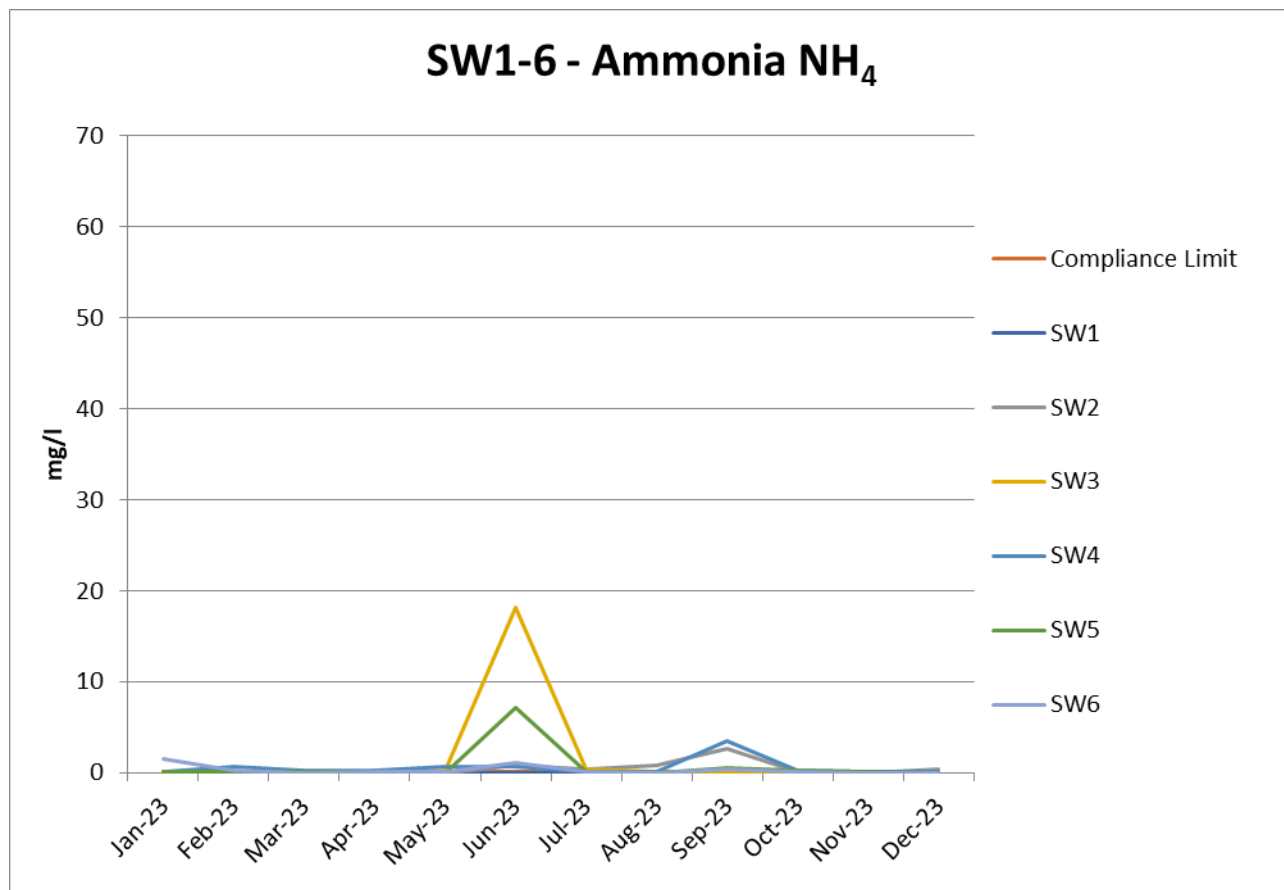


This graph shows the distribution of BOD data in surface water in 2022. In total there were 38 breaches of the 3.35mg/l limit with the following distribution.

Note: SW1 could not be obtained. SW6 could not be attained in the month of January due to access restrictions.

SW1	N/A
SW2	2
SW3	1
SW4	3
SW5	3
SW6	6
	15

Ammoniacal Nitrogen (Ammonia)



There were 25 breaches of the 0.17mg/l limit in 2023.

SW1	N/A
SW2	6
SW3	6
SW4	7
SW5	3
SW6	3
	25

Ground Water (C1-C22)

Ammoniacal Nitrogen (Ammonia)

The trigger levels for the GW boreholes are shown below.

C1	Am Ni	N/A
C2	Am Ni	2.09 mg/l
C3	Am Ni	8.94 mg/l
C4	Am Ni	11.4 mg/l
C5	Am Ni	20.87 mg/l
C6	Am Ni	5.02 mg/l
C8	Am Ni	12.07 mg/l
C10	Am Ni	22.62 mg/l
C12	Am Ni	19.49 mg/l
C14	Am Ni	25.88 mg/l
C16	Am Ni	12.62 mg/l
C18	Am Ni	18.39 mg/l
C19	Am Ni	19.03 mg/l
C20	Am Ni	15.4 mg/l
C21	Am Ni	9.65 mg/l
C22	Am Ni	12.10 mg/l

In total there were 16 breaches of the trigger levels.

C2 exceeded the compliance limit in April (4.3mg/l), July (3.0mg/l), September (9.6mg/l) and in October (7.9mg/l).

C12 exceeded the compliance limit in February (23.6 mg/l), June (25.1 mg/l), September (20.0mg/l), October (24.0 mg/l) and in November (21.1mg/l).

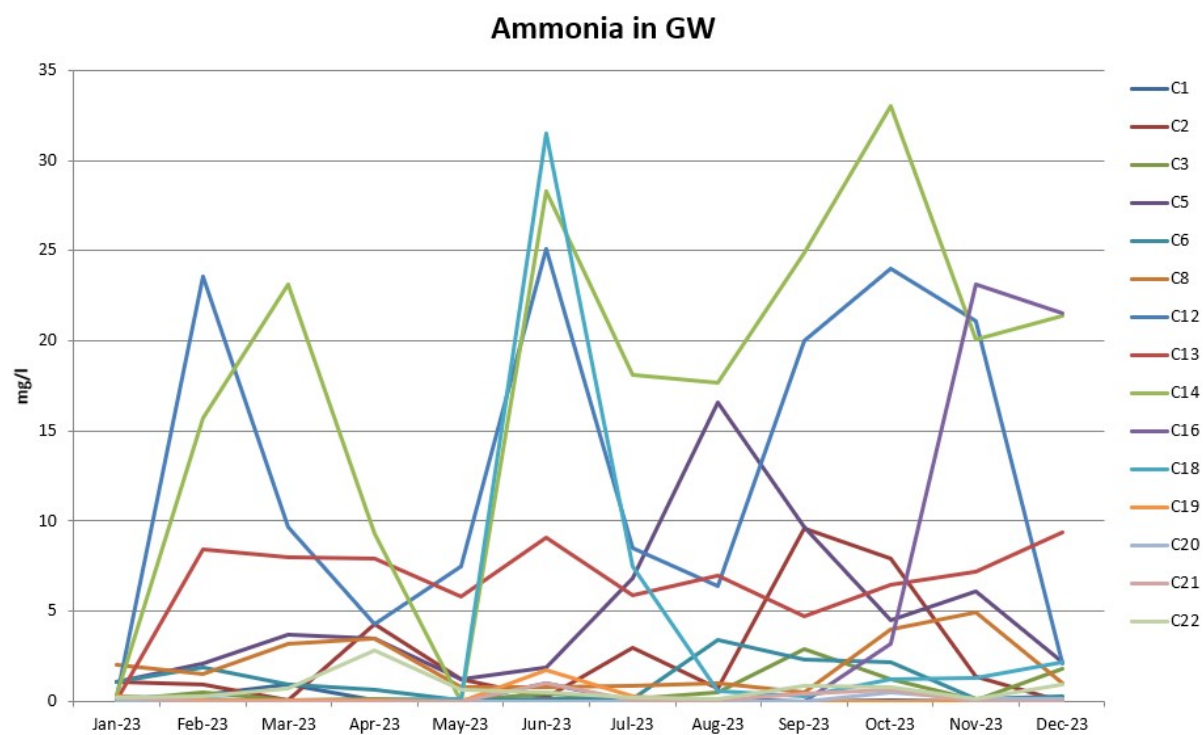
C14 breached the trigger level in June (28.3mg/l) and in October (33.0mg/l).

C16 exceeded the compliance limit in November (23.1mg/l) and in December (21.5mg/l).

C18 only breached the trigger level once in June (31.5 mg/l).

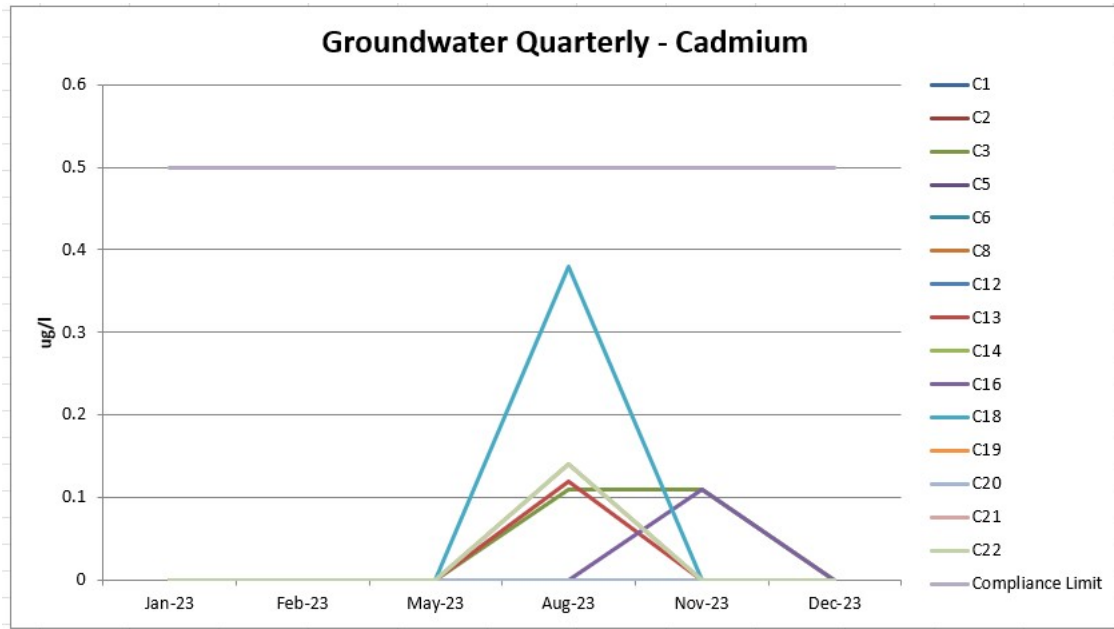
The distribution of breaches is shown below.

C2	3
C12	2
C14	1
C16	6
C18	4
	16



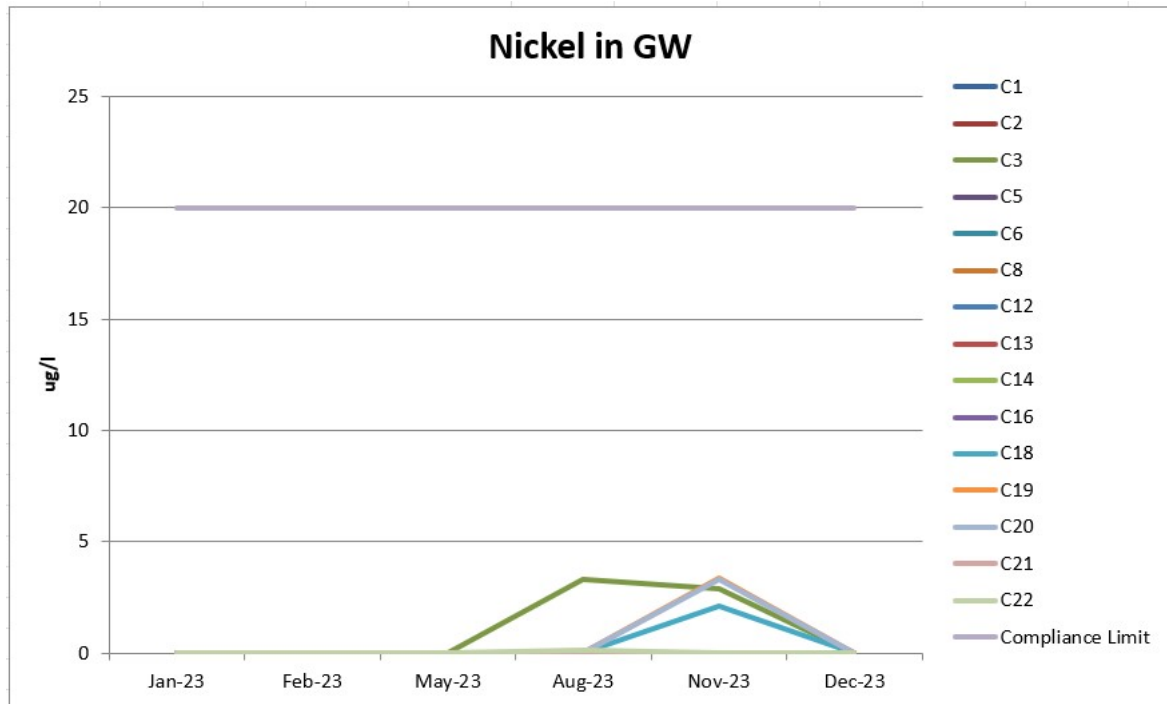
Cadmium

Cadmium can be found in low concentrations in rocks, coal, and petroleum and enters the ground and surface water when dissolved by acidic waters. It may enter the environment from industrial discharge, mining waste, metal plating, water pipes, batteries, paints and pigments, plastic stabilizers, and landfill leachate. Cadmium replaces zinc bio chemically in the body and can cause severe health implications such as high blood pressure, liver and kidney damage, and anaemia. It is toxic to aquatic organisms.



The compliance limit of 0.5 ug/l of Cadmium was not exceeded throughout 2023.

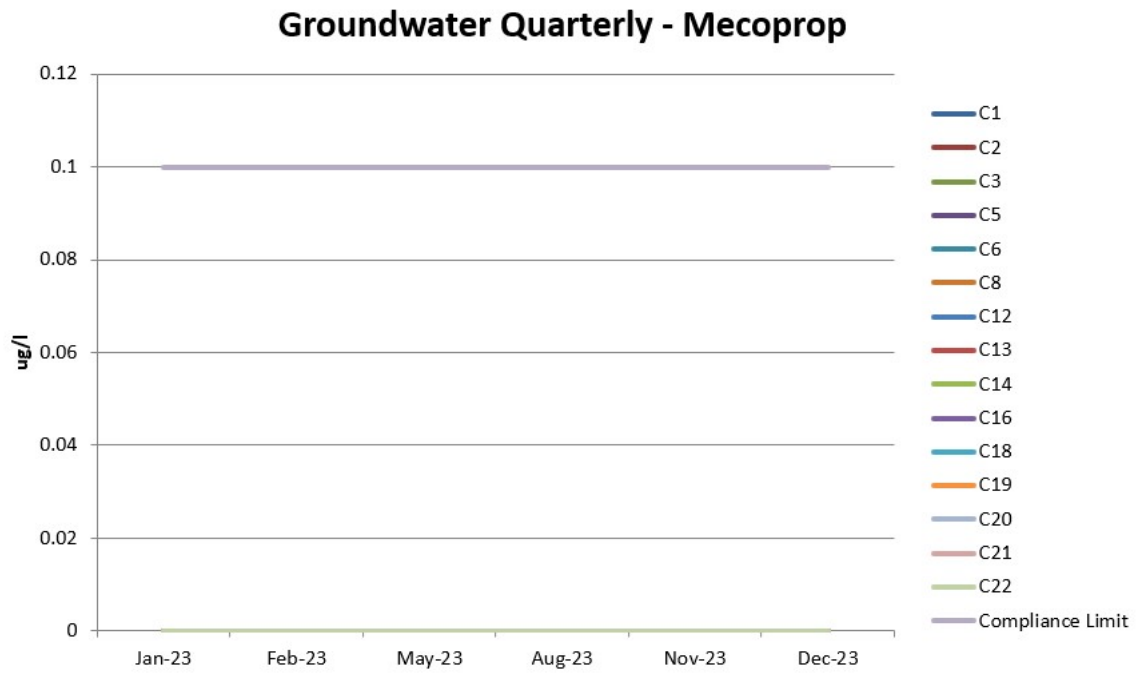
Nickel



The trigger level for Nickel is 20ug/l.

There were no breaches for Nickel in 2023.

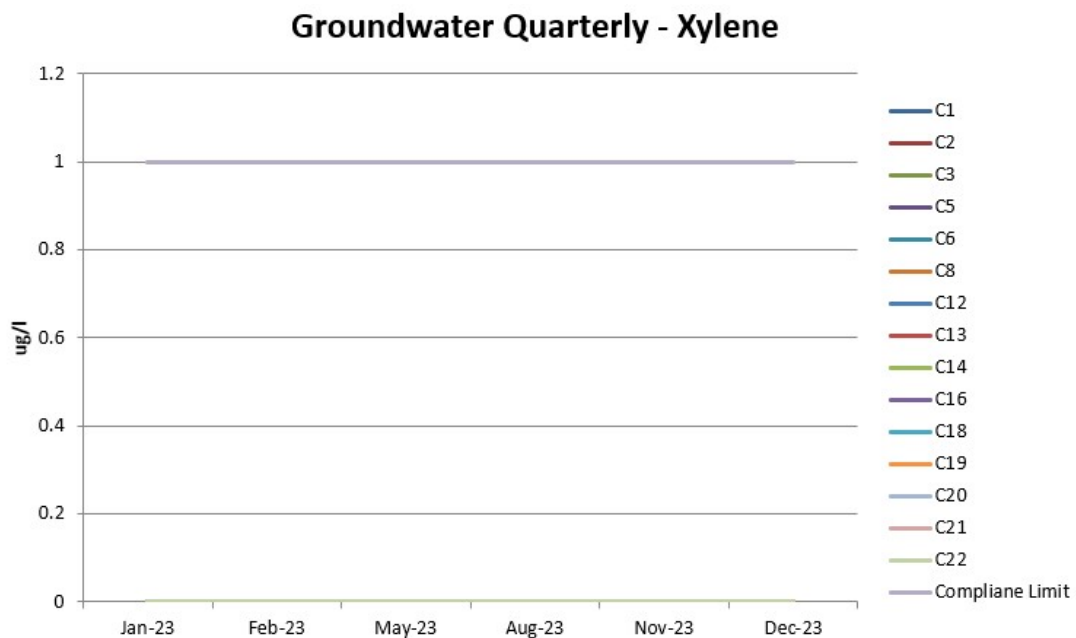
Mecoprop



There were no breaches of the 0.1ug/l mecoprop trigger level. All results throughout the year (2023) were reported as <0.1ug/l.

Xylene

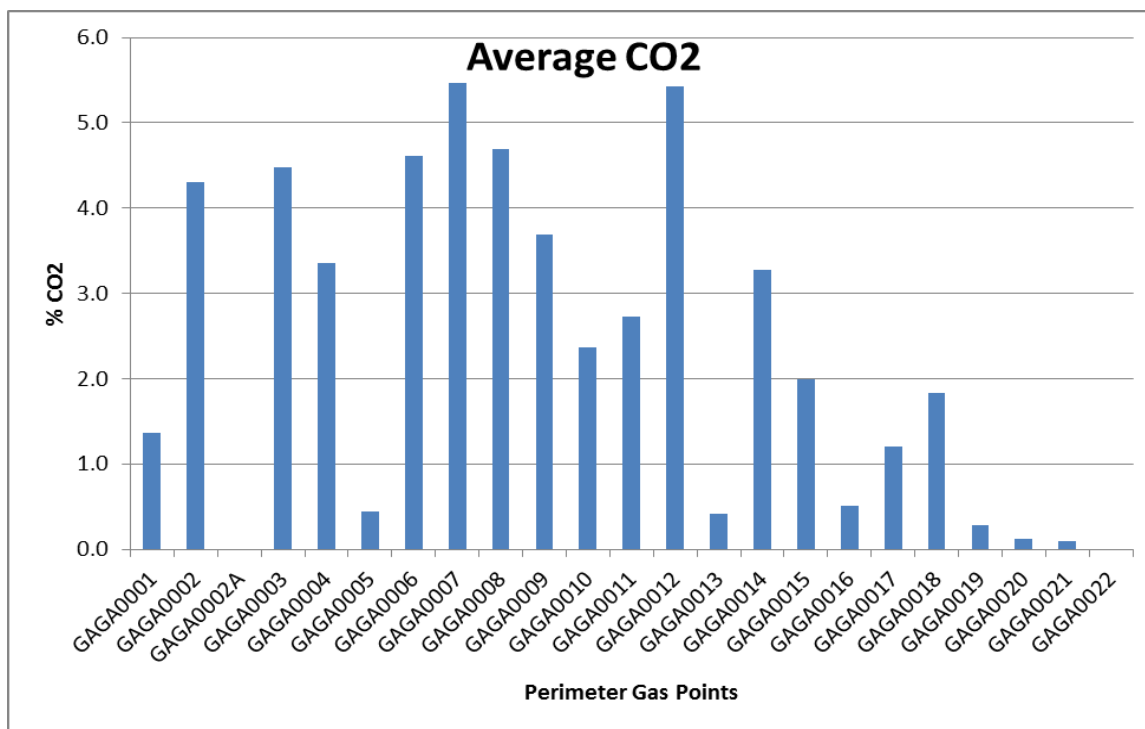
No breaches of the 1ug/l trigger level were detected in 2023. All results were below the detection limit and were reported as <0.1ug/l



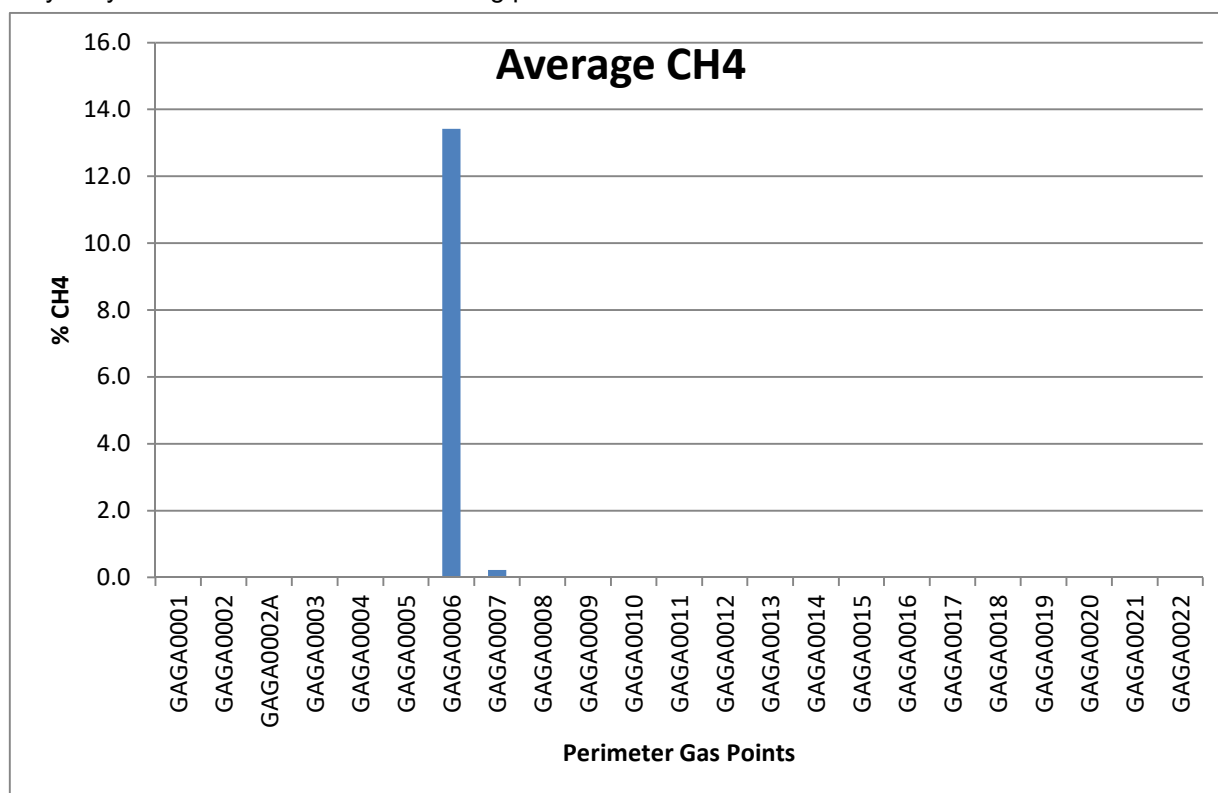
Perimeter Gas Data

The highest volumes of CO₂ are detected within G7, located on the eastern perimeter of Lamby Way Landfill site. Points G5, G13, G14, G15, G20 and G21 remain on average low CO₂ concentrations, with other points having on average elevated levels.

Points G16, G19 and G22 – G23 have been lost due to damage / vegetation. G17 was partly blocked for the first half of the year.



The highest volumes of CH₄ are detected within G4, G5, G6 and G7, located on the eastern perimeter of Lamby Way Landfill site. All other monitoring points remain low concentrations of CH₄.



Leachate Volumes (M)

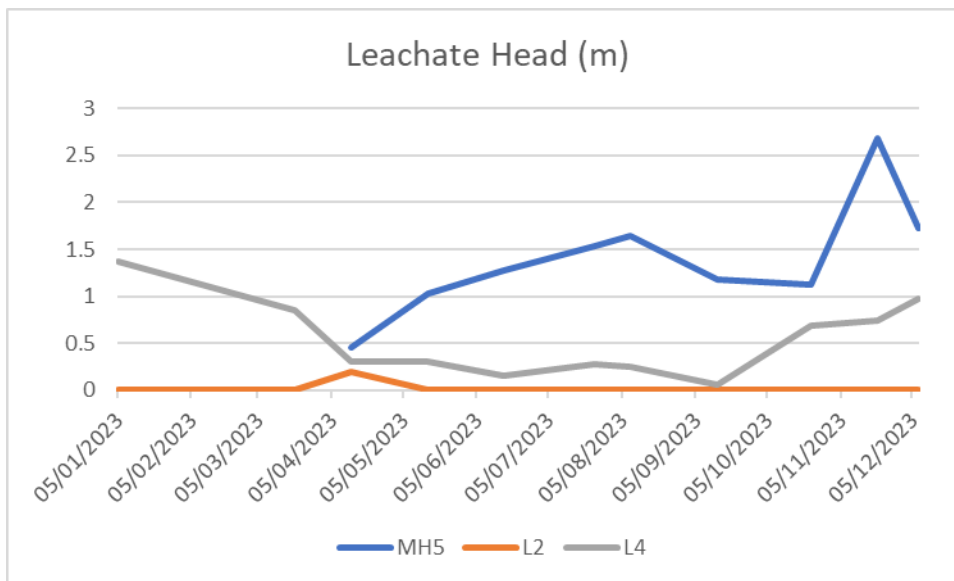
Date	Meter Reading	Volumes Discharged
03/01/2023	404269	
06/01/2023	404781	512
11/01/2023	405727	946
16/01/2023	406922	1195
19/01/2023	407370	448
23/01/2023	407817	447
26/01/2023	408252	435
30/01/2023	408893	641
31/01/2023	409009	116
07/02/2023	410250	1241
10/02/2023	410788	538
14/02/2023	411110	322
16/02/2023	411319	209
27/02/2023	412164	845
08/03/2023	413865	1701
09/03/2023	414070	205
12/05/2023	422884	8814
22/05/2023	423933	1049
30/05/2023	424410	477
05/06/2023	424735	325
12/06/2023	425136	401
19/06/2023	425453	317
26/06/2023	425726	273
10/07/2023	426275	549
17/07/2023	426477	202
24/07/2023	426705	228
31/07/2023	427071	366
07/08/2023	427444	373
14/08/2023	427755	311
21/08/2023	427994	239
28/08/2023	428155	161
04/09/2023	428212	57
11/09/2023	428275	63
18/09/2023	428346	71
25/09/2023	428403	57
02/10/2023	428458	55
09/10/2023	428480	22
30/10/2023	430312	1832
06/11/2023	430364	52
13/11/2023	430389	25
20/11/2023	430414	25
27/11/2023	430443	29
30/11/2023	430457	14
01/12/2023	430791	334
04/12/2023	431790	999
06/12/2023	432136	346

11/12/2023	433363	1227
18/12/2023	434448	1085
02/01/2024	437546	3098

Total 33,277

Leachate head within Lamby Way

Leachate Head			
	MH5	L2	L4
05/01/2023		0.00	1.37
20/03/2023		0.00	0.85
13/04/2023	0.46	0.20	0.3
15/05/2023	1.03	0.00	0.3
16/06/2023	1.28	0.00	0.16
24/07/2023	1.53	0.00	0.28
08/08/2023	1.64	0.00	0.25
14/09/2023	1.18	0.00	0.06
23/10/2023	1.12	0.00	0.68
20/11/2023	2.68	0.00	0.74
07/12/2023	1.72	0.00	0.97



Weather conditions at Lamby Way 2023

The annual rainfall for Lamby Way is shown below in mm

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
191	25	221	119	53	15	186	94	107	178	202	159	1,550