

Lamby Way annual report January 2022 – December 2022

**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 2022:

1. Ongoing maintenance of all perimeter gas sampling points. Replacement of sample valves and wells ends as required, and continued vegetation clearance.
2. Introduction of grounds maintenance programme, additional clearance around sampling points to ensure safe access.
3. Works undertaken to improve pumping of leachate from the site, renewal of various pumps and further maintenance undertaken to the leachate treatment plant, 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	227.4	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 off site:	0
Disposed of to any onsite effluent treatment plant;	14,697 m3
Recalculated into the waste mass.	0 m3
Surface Water and / or groundwater:	Cubic metres / year
Disposed of off site;	Not measured
Disposed of to any onsite effluent treatment plant;	0
Landfill gas:	Normalised cubic metres/ year
Combustion in flares	295,728 m ³
Combustion in gas engines;	5,054,627 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 TO FOLLOW

(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 TO FOLLOW

(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

1. Six monthly calibration of G5000 Gas meter completed

Appendix 1 – Review of Results

Lamby Way: Data Report – 2022

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 2022 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 (C7) – Borehole is blocked by debris which cannot be extracted.

Groundwater borehole (C15) – Sampling not always possible due to borehole being intermittently dry.

Groundwater borehole (C20) – Borehole destroyed and sample cannot be extracted.

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

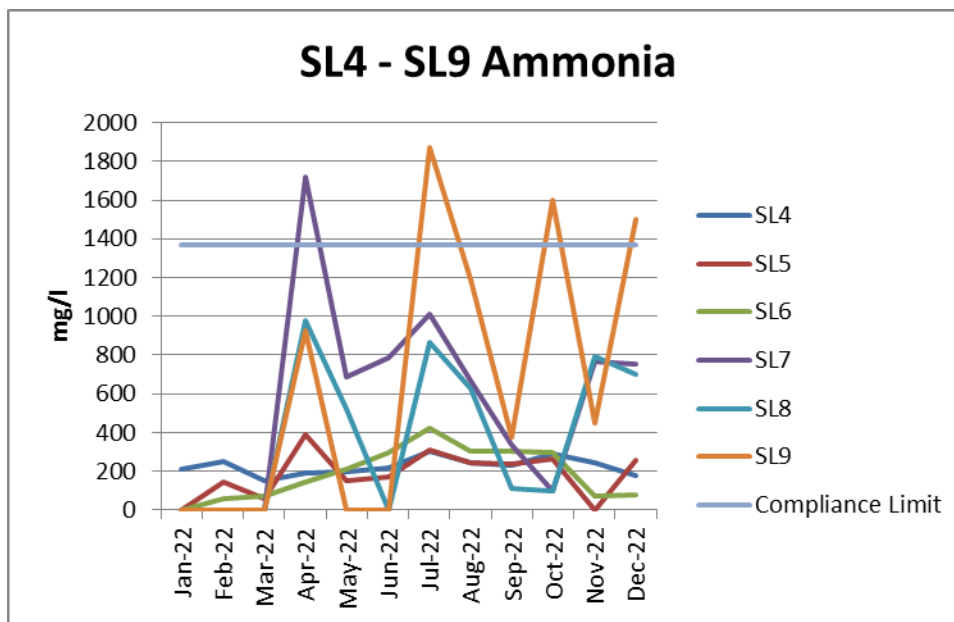
Leachate well (SL2) - Borehole is dry, no action possible. Situation will be monitored.

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.



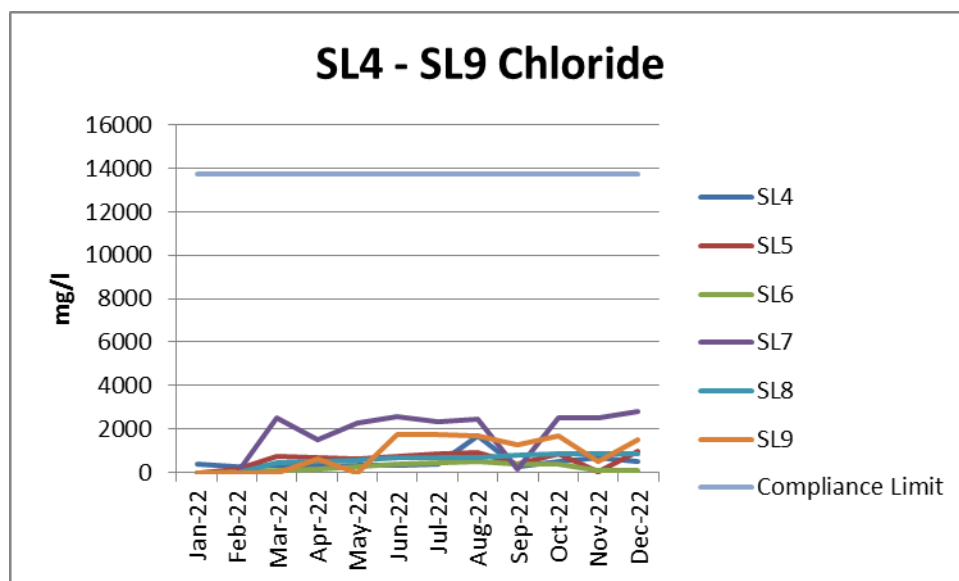
Monitoring points SL7 and SL9 breached the trigger level (1370 mg/l) in 2022.

SL7 breached the compliance limit in the month of April with a value of 1720 (mg/l).

SL9 breached the compliance limit in July (1870 mg/l), October (1600 mg/l) and in December (1500 mg/l).

Chloride

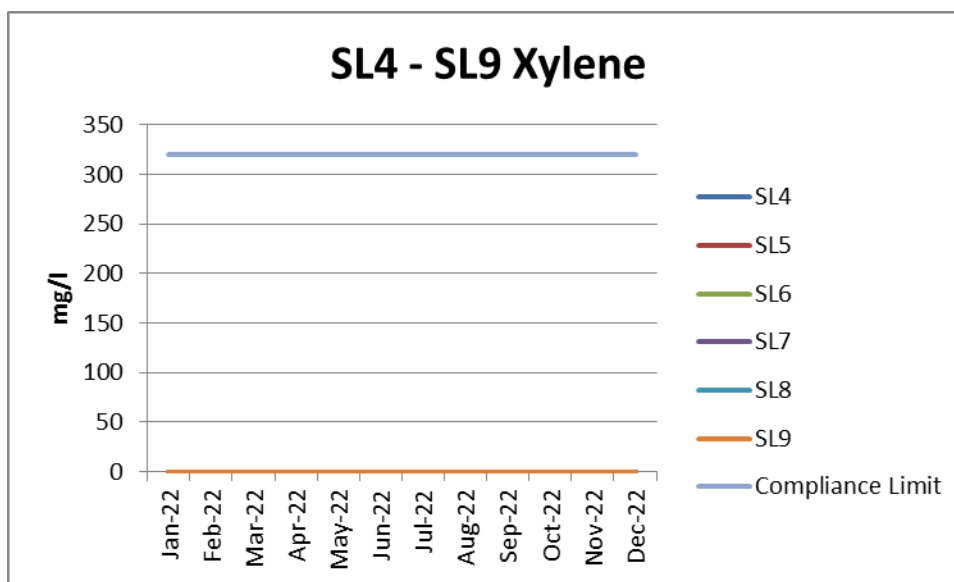
Chloride levels in a waste mass are closely linked to naturally occurring sea water. It is measured to determine if there is any ingress of sea water (or saline ground waters) into a waste mass.



There were no breaches of the trigger level (13713 mg/l) detected in 2022.

Xylene

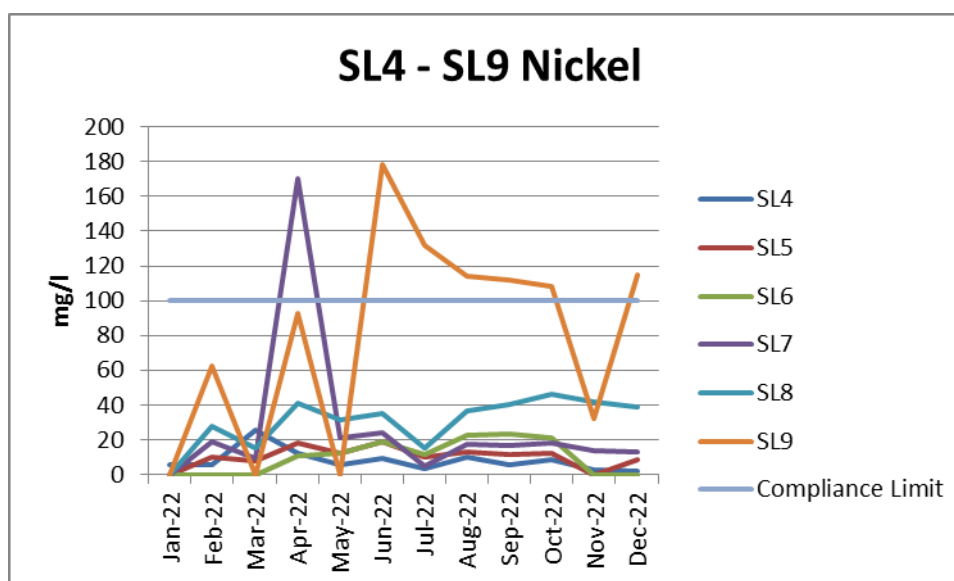
In the presence of Acidic conditions, Xylene can be the pre-cursor to more hazardous compounds of the Benzene family, especially in the presence of Chloride.



There were no breaches of the trigger level (320 mg/l) detected in 2022.

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.



Monitoring points SL7 and SL9 breached the trigger level (100 mg/l) in 2022.

SL7 breached the compliance limit in the month of April with a value of 170 mg/l.

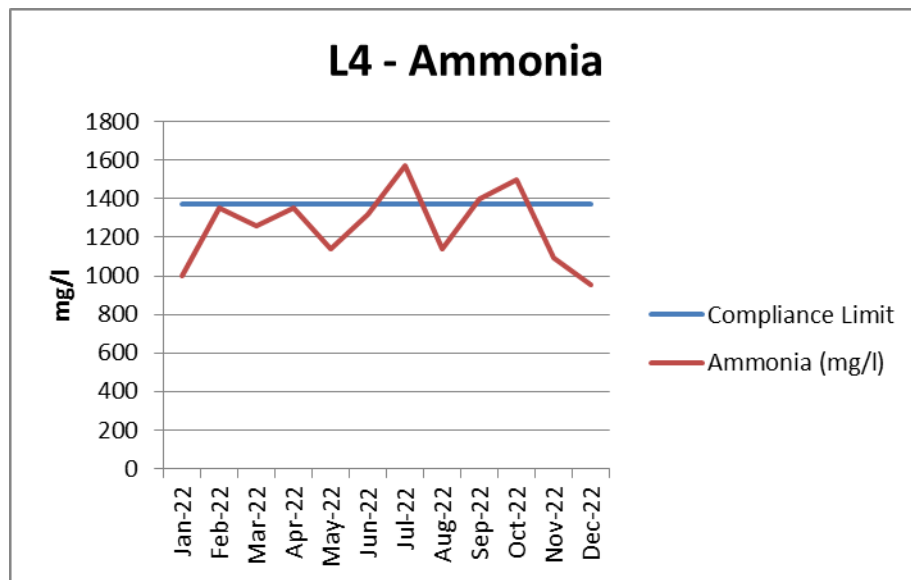
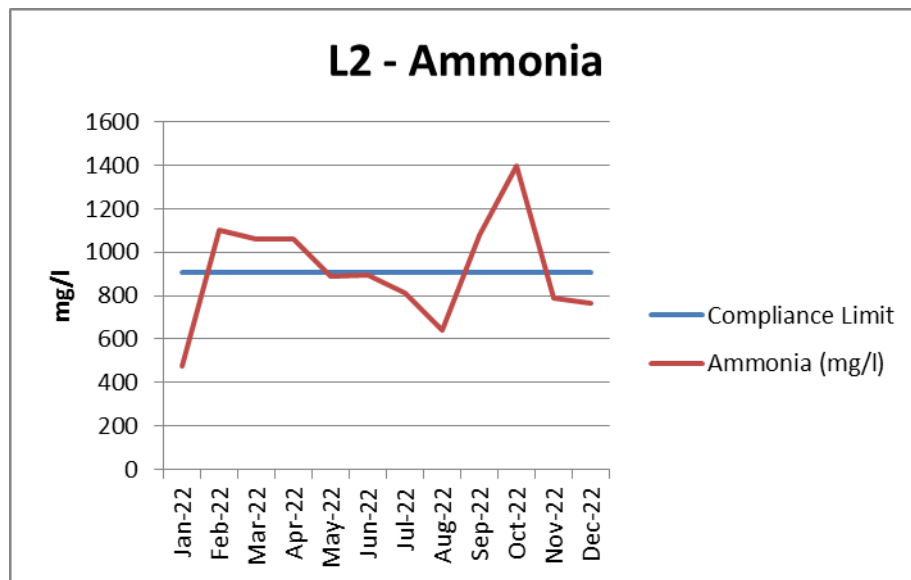
SL9 exceeded the compliance limit in June (178 mg/l), July (132 mg/l), August (114 mg/l), September (112 mg/l), October (108 mg/l) and in December (115 mg/l)

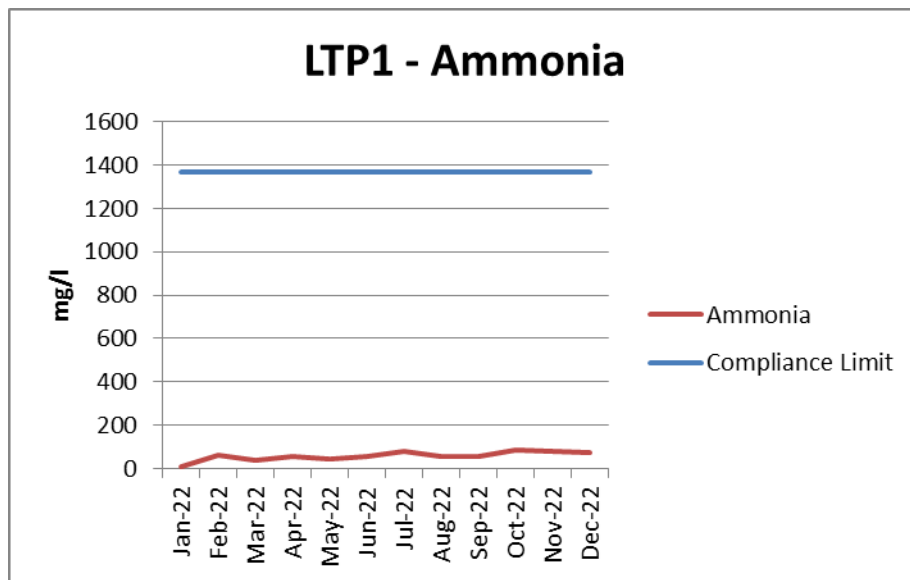
Leachate Data – (L2, L4, LTP1)

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

Ammoniacal Nitrogen (Ammonia)

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





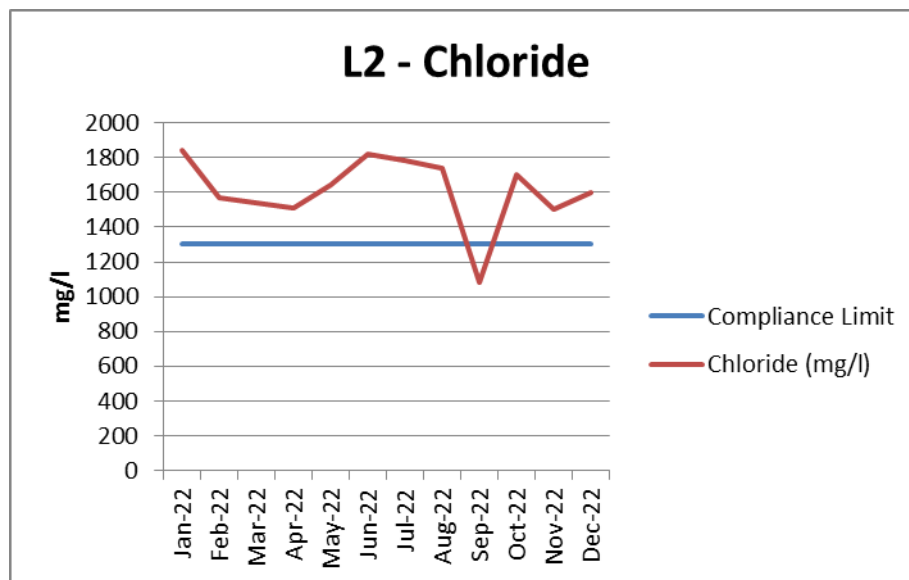
L2 exceeded the compliance limit in February (1,100 mg/l), March (1060 mg/l), April (1060 mg/l), September (1060 mg/l) and October (1400 mg/l).

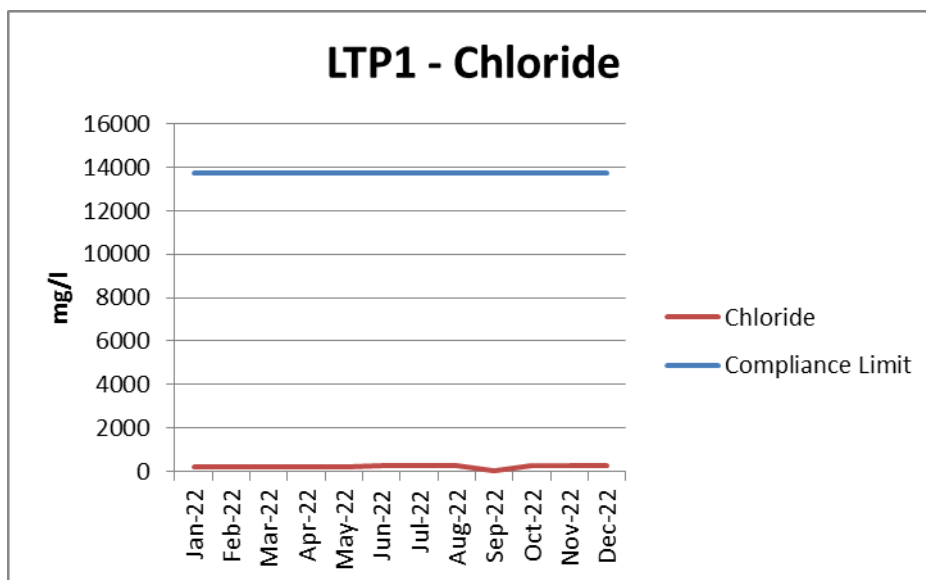
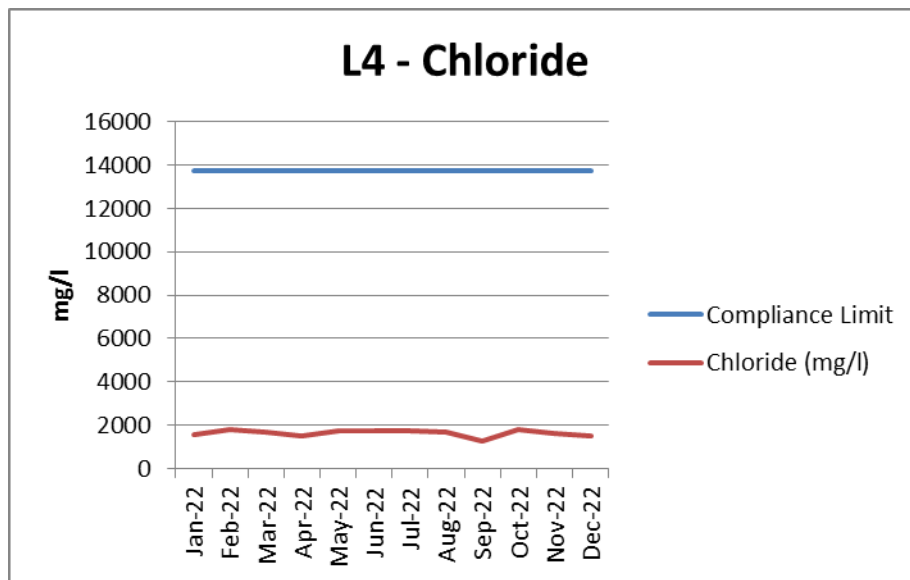
L4 exceeded the compliance limit in July (1570 mg/l), September (1400 mg/l) and in October (1500 mg/l).

There were no breaches from LTP1.

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.



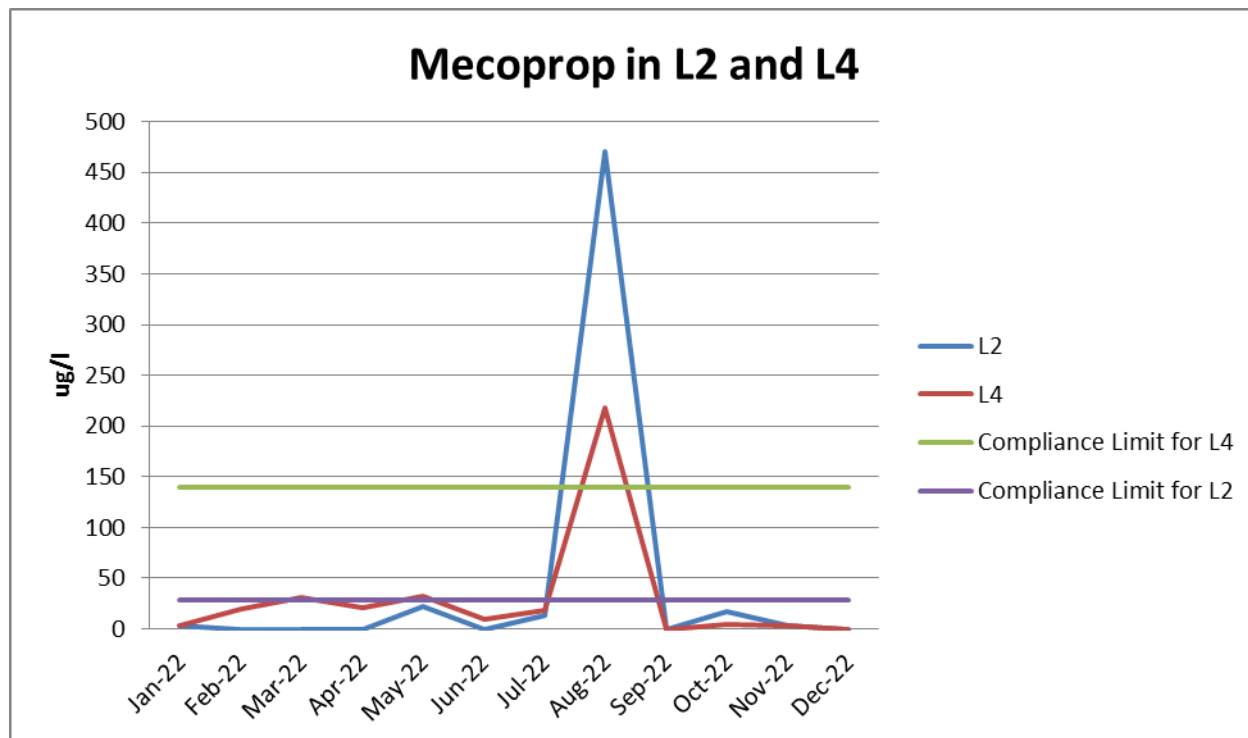


L2 had 11 breaches of the 1306mg/l trigger level, throughout the year.

There were no breaches for L4 or LTP1.

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.



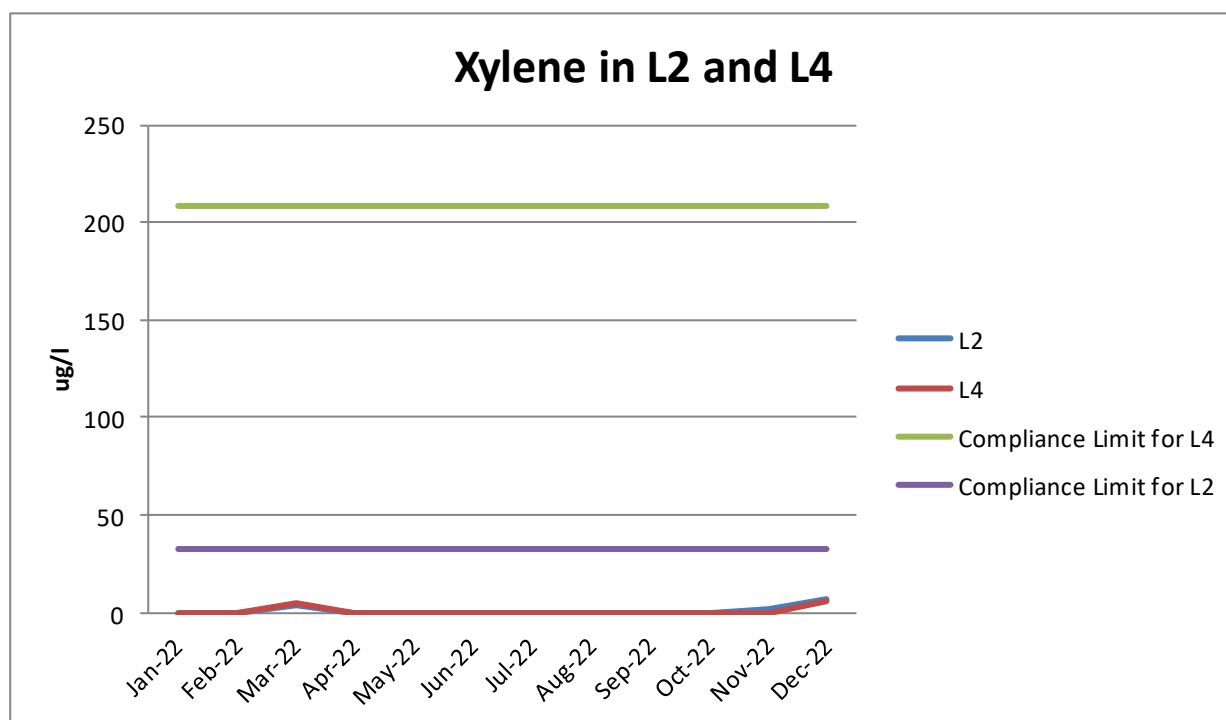
There are two trigger levels, 29ug/l for L2 and 140ug/l for L4 and LTP1.

L2 breached the trigger level once in August (470 mg/l).

L4 exceeded the trigger level in August (218 mg/l).

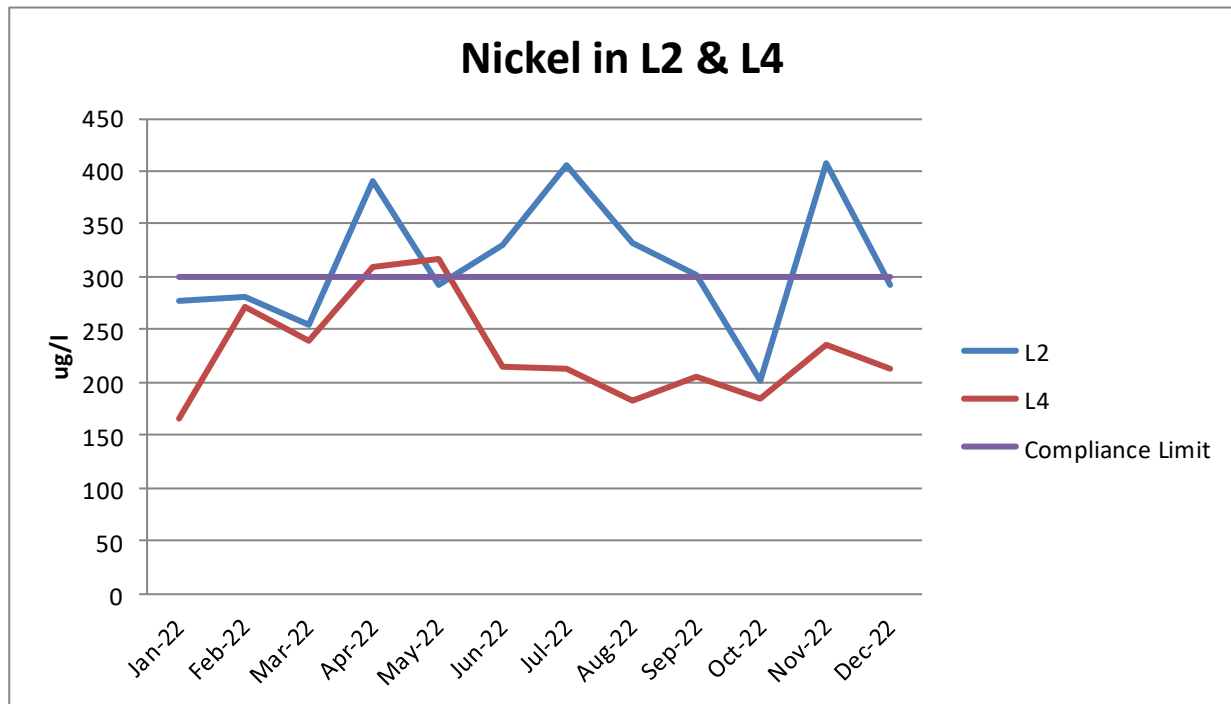
Mecoprop data from LTP1 is not reported as it is not required by the permit.

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 six breaches for L2 in the months of April (390 mg/l), June (330 mg/l), July (406 mg/l), August (332 mg/l), September (301 mg/l) and in November (407 mg/l).

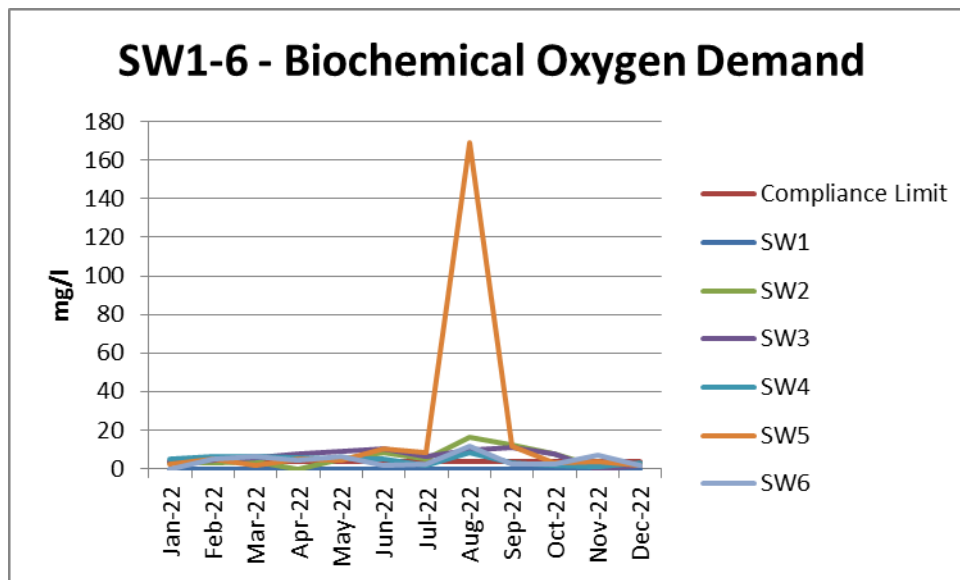
L4 exceeded the compliance limit in April (310 mg/l) and in May (316 mg/l).

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.

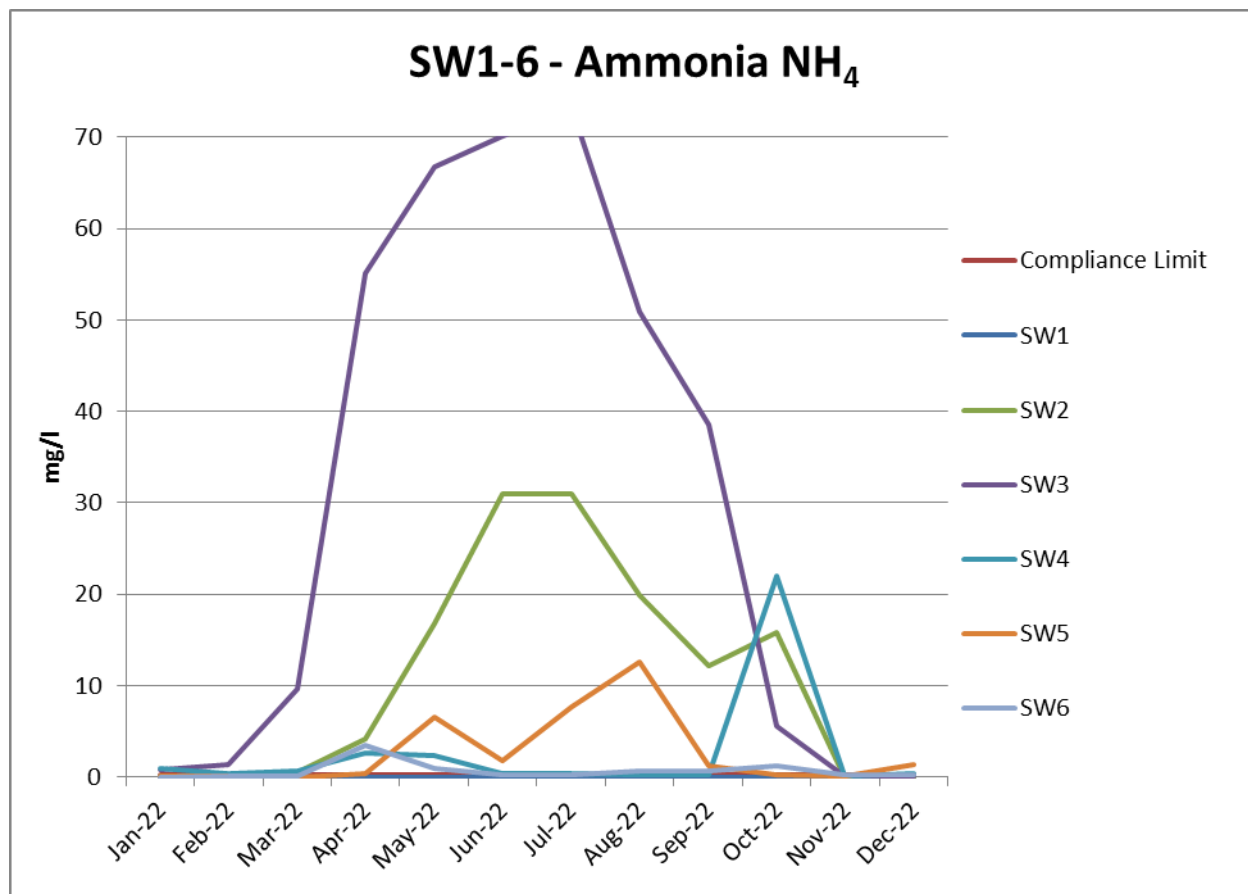


This graph shows the distribution of BOD data in surface water in 2022. In total there were 38 breaches of the 3.35mg/l limit with the following distribution.

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

SW1	N/A
SW2	7
SW3	10
SW4	7
SW5	8
SW6	6
	38

Ammoniacal Nitrogen (Ammonia)



There were 46 breaches of the 0.17mg/l limit in 2022.

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

SW1	N/A
SW2	8
SW3	10
SW4	11
SW5	8
SW6	9
	46

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 21 breaches of the trigger levels.

C2 exceeded the compliance limit in March (7.6 mg/l), April (2.9 mg/l) and June (2.1 mg/l).

C6 exceeded the compliance limit in June (7.5 mg/l) and May (7.8 mg/l).

C8 only breached the trigger level once in May (25.5 mg/l).

C12 exceeded the compliance limit in February (21.6 mg/l), April (24.7 mg/l), May (53.5 mg/l), July (24.5 mg/l), September (22.5 mg/l) and in December (20.0 mg/l).

C14 exceeded the compliance limit in February (26.9 mg/l), July (29.7 mg/l), September (26.5 mg/l), and in October (28.9 mg/l)

C16 remains to be inaccessible.

C18 only breached the trigger level once in September (26.4 mg/l).

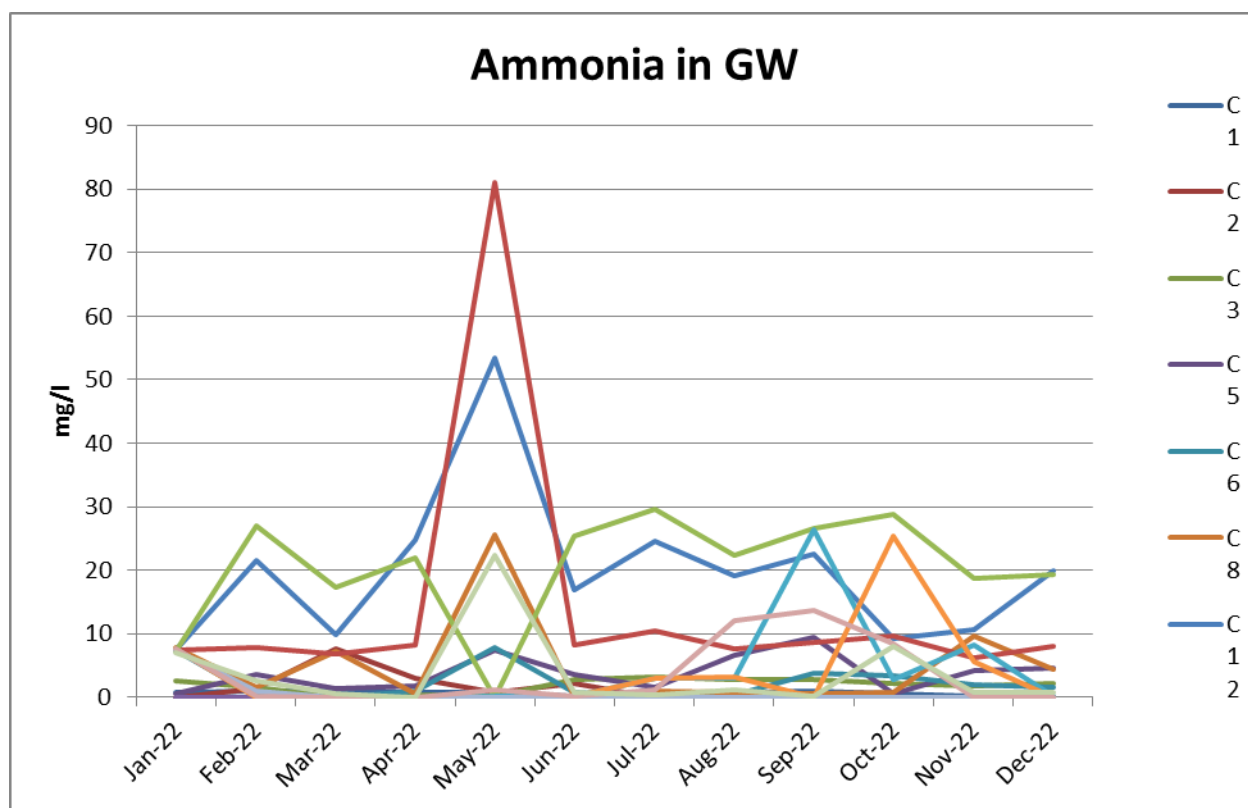
C19 only breached the trigger level once in October (25.3 mg/l).

C21 exceeded the compliance limit in August (12.1 mg/l) and September (13.7 mg/l).

C22 only breached the trigger level once in May (22.3 mg/l).

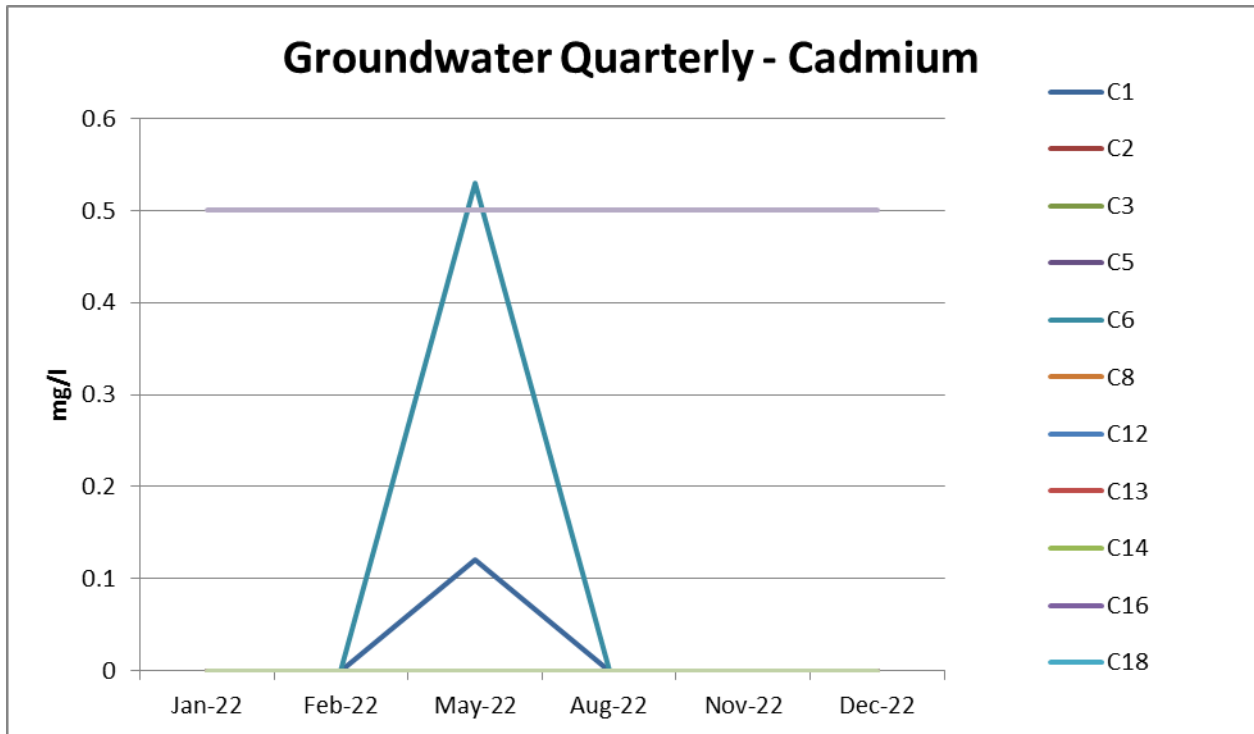
The distribution of breaches is shown below.

C2	3
C6	2
C8	1
C12	6
C14	4
C18	1
C19	1
C21	2
C22	1
	21



Cadmium

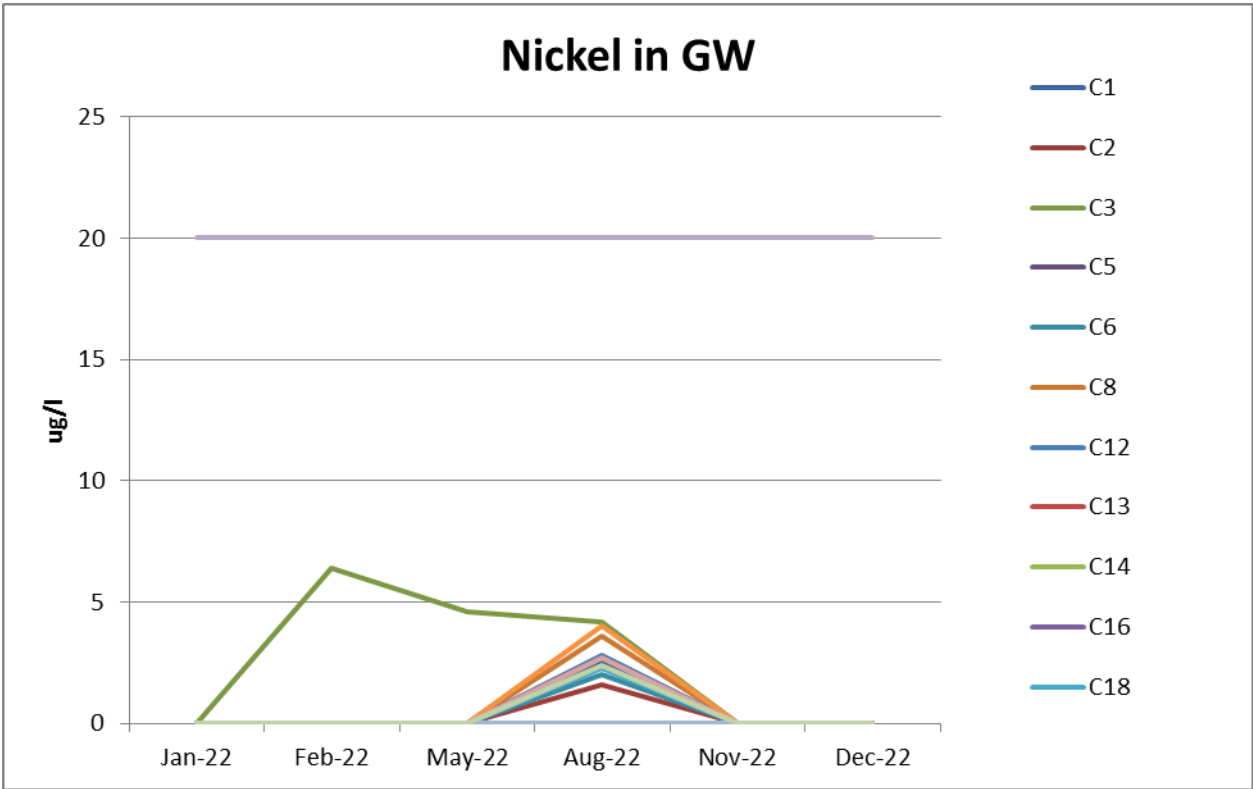
Cadmium can be found in low concentrations in rocks, coal, and petroleum and enters the ground and surface water when dissolved by acidic waters. It may enter the environment from industrial discharge, mining waste, metal plating, water pipes, batteries, paints and pigments, plastic stabilizers, and 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.



Only one monitoring point exceeded the compliance limit of 0.5 mg/l.

C6 breached the compliance limit with a value of 0.53 mg/l.

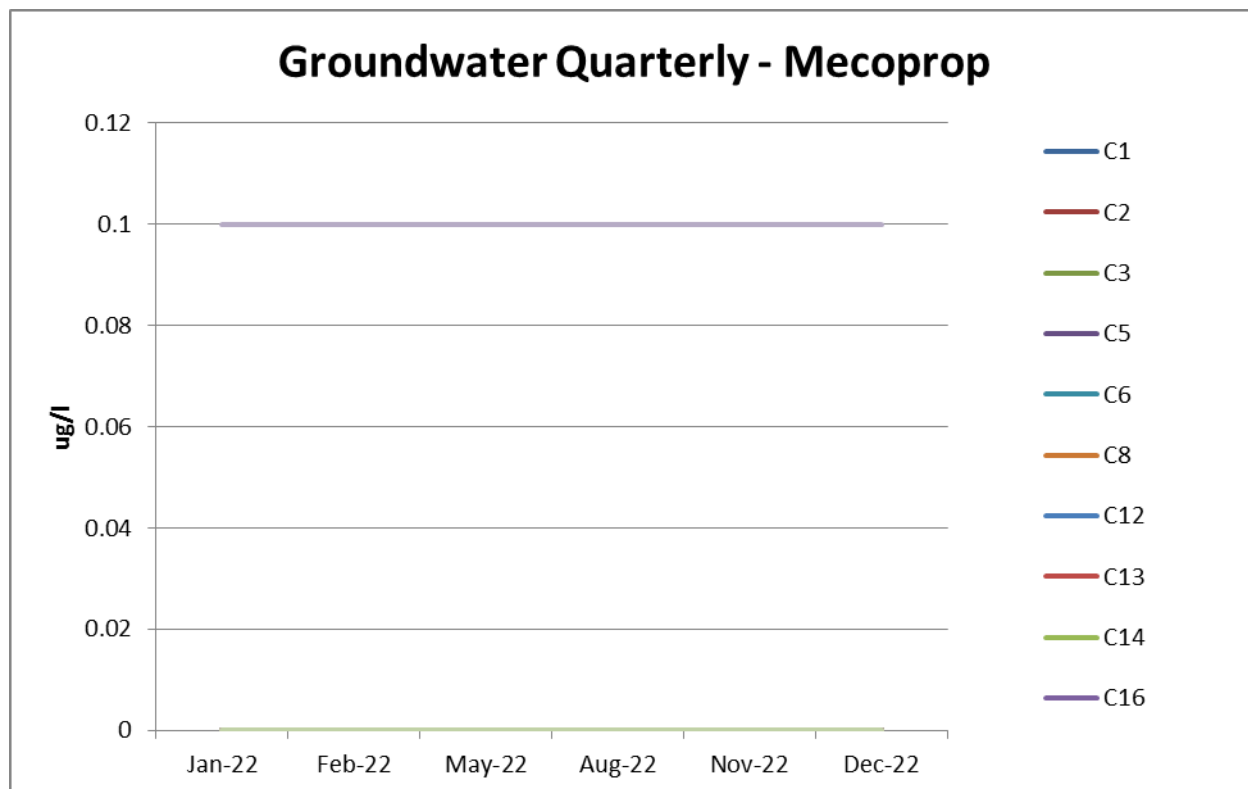
Nickel



The trigger level for Nickel is 20ug/l.

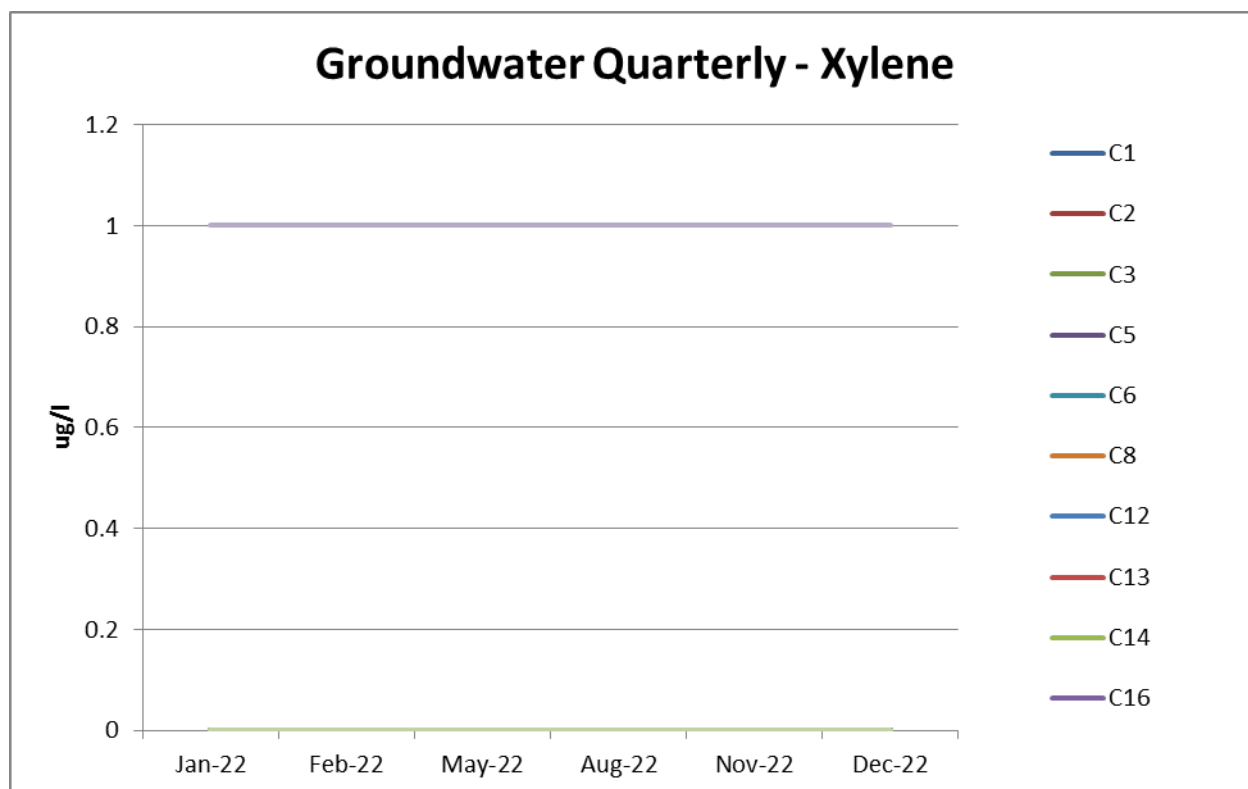
There were no breaches for Nickel in 2022.

Mecoprop



There were no breaches of the 0.1ug/l mecoprop trigger level. All results throughout the year (2022) were reported as <0.1ug/l.

Xylene

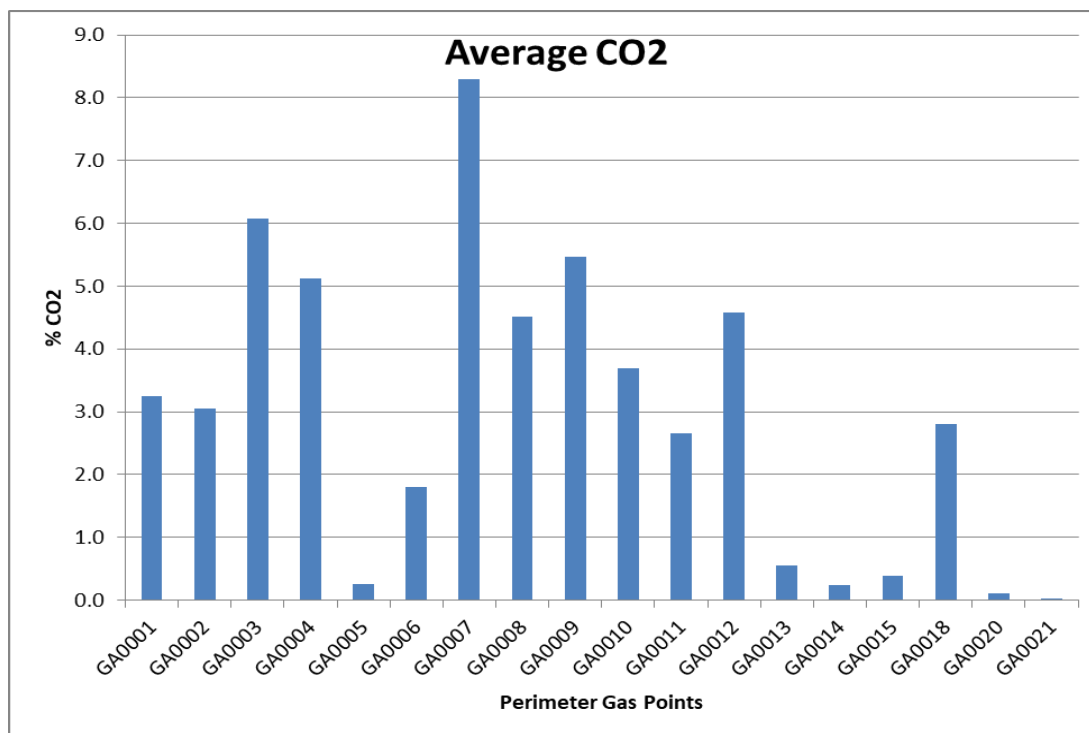


No breaches of the 1ug/l trigger level were detected in 2022. All results were below the detection limit and were reported as <0.1ug/l.

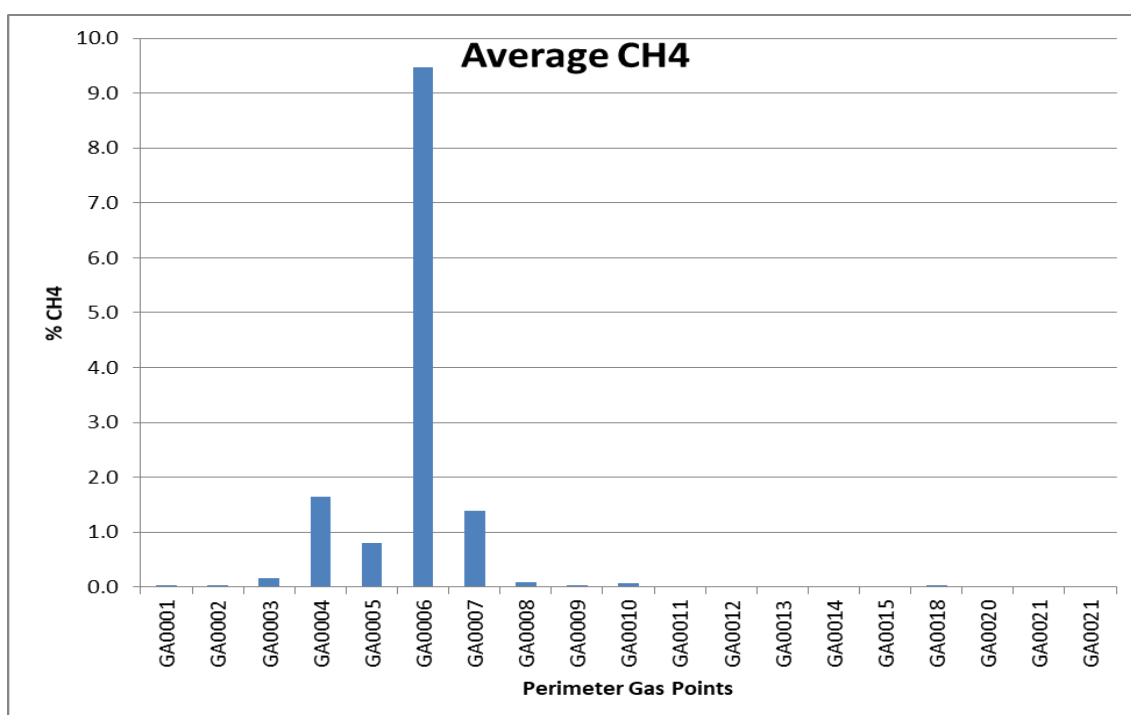
Perimeter Gas Data

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

Date	Meter Reading	Volumes Discharged
31/12/2021	389575	0
04/01/2022	389576	1
05/01/2022	389576	0
06/01/2022	389577	1
07/01/2022	389577	0
10/01/2022	389641	64
11/01/2022	389641	0
13/01/2022	389644	3
14/01/2022	389655	11
17/01/2022	389691	36
18/01/2022	389705	14
20/01/2022	389724	19
21/01/2022	389726	2
24/01/2022	389832	106
25/01/2022	389861	29
26/01/2022	389908	47
28/01/2022	390044	136
31/01/2022	390252	208
01/02/2022	390252	0
02/02/2022	390252	0
04/01/2022	390348	96
07/02/2022	390470	122
09/02/2022	390519	49
10/02/2022	390519	0
11/02/2022	390519	0
14/02/2022	390705	186
15/02/2022	390712	7
17/02/2022	390807	95
18/02/2022	390872	65
21/02/2022	390991	119
22/02/2022	391009	18
23/02/2022	391051	42
24/02/2022	391080	29
25/02/2022	391080	0
28/02/2022	391223	143
01/03/2022	391265	42
02/03/2022	391326	61
04/03/2022	391469	143
07/03/2022	391473	4
08/03/2022	391494	21
10/03/2022	391593	99
11/03/2022	391614	21

14/03/2022	391616	2
15/03/2022	391687	71
16/03/2022	391782	95
17/03/2022	391782	0
18/03/2022	391790	8
21/03/2022	391896	106
22/03/2022	391931	35
24/03/2022	392003	72
25/03/2022	392035	32
28/03/2022	392169	134
29/03/2022	392221	52
31/03/2022	392324	103
01/04/2022	392329	5
04/04/2022	392422	93
06/04/2022	392566	144
07/04/2022	392620	54
08/04/2022	392638	18
11/04/2022	392665	27
13/04/2022	392800	135
14/04/2022	392805	5
15/04/2022	392813	8
19/04/2022	392861	48
20/04/2022	392935	74
22/04/2022	392992	57
25/04/2022	393043	51
26/04/2022	393050	7
27/04/2022	393062	12
28/04/2022	393070	8
29/04/2022	393070	0
03/05/2022	393273	203
04/05/2022	393294	21
05/05/2022	393304	10
06/05/2022	393308	4
09/05/2022	393416	108
10/05/2022	393446	30
11/05/2022	393454	8
13/05/2022	393586	132
16/05/2022	393730	144
17/05/2022	393827	97
18/05/2022	393873	46
19/05/2022	393923	50
20/05/2022	393939	16
23/05/2022	394057	118
24/05/2022	394060	3
26/05/2022	394060	0
27/05/2022	394217	157
30/05/2022	394264	47
31/05/2022	394265	1
01/06/2022	394268	3
03/06/2022	394505	237
06/06/2022	394536	31

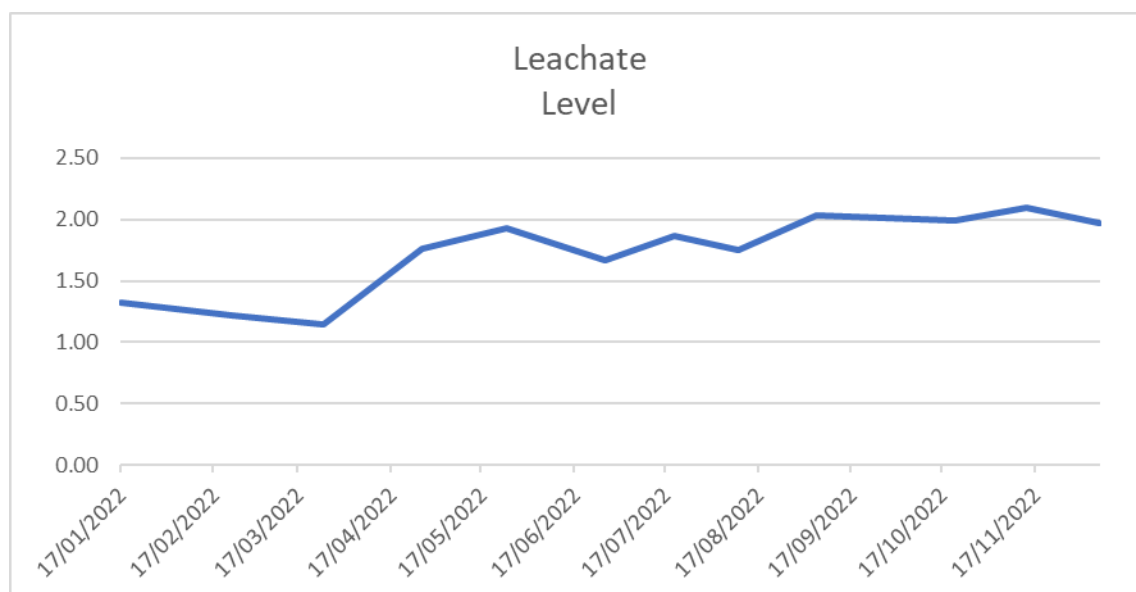
07/06/2022	394675	139
08/06/2022	394773	98
09/06/2022	394936	163
10/06/2022	394958	22
13/06/2022	394962	4
14/06/2022	394964	2
17/06/2022	394967	3
20/06/2022	394971	4
21/06/2022	394972	1
22/06/2022	394974	2
23/06/2022	394975	1
24/06/2022	394976	1
27/06/2022	394980	4
28/06/2022	394981	1
29/06/2022	394983	2
11/07/2022	394992	9
13.07.2022	394995	3
14/07/2022	395011	16
15/07/2022	395020	9
18/07/2022	395020	0
19/07/2022	395020	0
21/07/2022	395020	0
22/07/2022	395020	0
25/07/2022	395021	1
27/07/2022	395021	0
01/08/2022	395351	330
03/08/2022	395452	101
04/08/2022	395716	264
05/08/2022	395809	93
09/08/2022	395856	47
10/08/2022	395971	115
11/08/2022	396017	46
12/08/2022	396081	64
15/08/2022	396216	135
16/08/2022	396252	36
17/08/2022	396344	92
18/08/2022	396408	64
19/08/2022	396456	48
22/08/2022	396616	160
23/08/2022	396660	44
24/08/2022	396711	51
25/08/2022	396759	48
26/08/2022	396792	33
30/08/2022	396961	169
31/08/2022	397003	42
01/09/2022	397053	50
02/09/2022	397086	33
05/09/2022	397207	121
06/09/2022	397240	33
07/09/2022	397284	44
08/09/2022	397317	33

09/09/2022	397356	39
12/09/2022	397457	101
13/09/2022	397482	25
14/09/2022	397518	36
15/09/2022	397547	29
16/09/2022	397571	24
20/09/2022	397670	99
21/09/2022	397701	31
22/09/2022	397722	21
23/09/2022	397750	28
26/09/2022	397828	78
27/09/2022	397853	25
28/09/2022	397877	24
07/10/2022	398064	187
10/10/2022	398085	21
11/10/2022	398133	48
12/10/2022	398133	0
13/10/2022	398171	38
14/10/2022	398171	0
17/10/2022	398250	79
18/10/2022	398264	14
19/10/2022	398282	18
20/10/2022	398304	22
21/10/2022	398329	25
24/10/2022	398457	128
25/10/2022	398495	38
26/10/2022	398557	62
27/10/2022	398596	39
28/10/2022	398638	42
31/10/2022	398760	122
01/11/2022	398867	107
03/11/2022	398950	83
04/11/2022	399013	63
07/11/2022	399014	1
10/11/2022	399217	203
11/11/2022	399296	79
14/11/2022	399483	187
15/11/2022	399537	54
16/11/2022	399621	84
17/11/2022	399701	80
18/11/2022	399764	63
21/11/2022	399947	183
22/11/2022	400034	87
23/11/2022	400115	81
25/11/2022	400250	135
28/11/2022	400446	196
29/11/2022	400446	0
30/11/2022	400447	1
01/12/2022	400447	0
02/12/2022	400447	0
05/12/2022	400447	0

06/12/2022	400447	0
07/12/2022	400448	1
08/12/2022	400448	0
09/12/2022	400448	0
12/12/2022	400449	1
13/12/2022	400449	0
14/12/2022	400449	0
15/12/2022	400450	1
16/12/2022	400450	0
19/12/2022	400467	17
22/12/2022	401299	832
23/12/2022	401691	392
28/12/2022	403182	1491
29/12/2022	403424	242
03/01/2023	404269	845

Leachate head within Lamby Way 2022

Dip Date	Leachate Level
17/01/2022	1.32
23/02/2022	1.22
25/03/2022	1.15
27/04/2022	1.77
25/05/2022	1.93
27/06/2022	1.67
20/07/2022	1.87
10/08/2022	1.75
05/09/2022	2.03
21/10/2022	1.99
14/11/2022	2.10
08/12/2022	1.97



Weather conditions at Lamby Way 2022

The annual rainfall for Lamby Way is shown below in mm

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
100	57	84	60	58	66	70	76	96	114	103	105	989