Wollongong Waste & Resource Recovery Park (Whytes Gully Waste Disposal Depot)

Environment Protection Licence 5862

Annual Report

Period 29 May 2015 – 28 May 2016

Reference Z16/136023

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ABBREVIATIONS

Al	Aluminium
ANZECC	Australian and New Zealand Environment Conservation Council
Ar	Arsenic
Ba	Barium
Ca	Calcium
$CaCO_3$	Calcium Carbonate
Cd	Cadmium
CH_4	Methane
Cl	Chloride
Co	Cobalt
Cr	Chromium
Cu	Copper
DC	Development Consent
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
F	Fluoride
K	Potassium
LEMP	Landfill Environmental Management Plan
Mg	Magnesium
Mn	Manganese
Na	Sodium
NH_3	Ammonia
NO_3	Nitrate
NO_2	Nitrite
ppm	Parts per Million
SO_4	Sulfate
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WWARRP	Wollongong Waste And Resource Recovery Park (Whytes Gully)
Zn	Zinc

1 INTRODUCTION

1.1 BACKGROUND

The City of Wollongong is located 80 kilometres south of Sydney and is Australia's 9th largest city. The Wollongong City Council (Council) governance area occupies a relatively narrow coastal strip bordered by the Royal National Park to the north, the Windang Bridge and Yallah to the south, the Tasman Sea to the east and the escarpment to the west.

Council owns and operates the Wollongong Waste and Resource Recovery Park (the Site), which is located on Reddalls Road at Kembla Grange. The Site is situated south west of Wollongong's central business district on approximately 50 hectares and is comprised of Lots 50, 52 and 53 of DP 1022266 and Lot 2 of DP 240557.

Council holds an Environmental Protection Licence (EPL) number 5862, for "Waste Disposal – Application to Land" for the Site. Council currently operates in accordance with the sites Landfill Environmental Management Plan (LEMP) and in accord with the requirements of the Sites EPL and Development Consent (DC).

1.2 OBJECTIVES OF THE ANNUAL REPORT

Condition R1.8 of the EPL specifies that Council must provide an Annual Report to accompany the Annual Return for the Site. The objective of this report is to provide that review.

1.3 SITE HISTORY

Whytes Gully was developed in the early 1980's as the principal landfill site for Wollongong's domestic and commercial waste streams. Initially, the 'western gully' section was landfilled. The western gully is unlined by modern standards and was used from 1982 to 1993. Initially coal wash refuse was used to provide daily cover, then around 1988/89 steel furnace slag was introduced because of its stability in wet weather and Council's inability to source local clean fill in sufficient quantities. The leachate collection from the western gully is through a series of rock drains at the centre of each lift. The rock drains connect with a riser and the leachate flows from riser to riser, and then to the leachate collection well at the base of the western gully. The western gully section of the landfill has been capped with clay to varying depths between 1m and 4m.

The 'eastern gully' section development received consent in 1992/93, following extensive public consultation. The eastern gully section is lined with a single layer of HDPE smooth liner, over a subsoil drainage layer of 5mm gravel and a corrugated groundwater drainage system. The eastern gully was excavated to rock and was developed in two stages, beginning with the first stage 80 to 100m above the slope from the current toe of the landfill embankment. The leachate is drained from the first stage of the eastern gully via a 300mm corrugated drainage pipe at the base and a 300mm thick sand layer above the liner.

The second stage of the eastern gully operates in front and above the first stage, with extended leachate drains and HDPE liner. From 2014 to 2016 the eastern gully has undergone extensive surface reshaping

works in order to reduce rainwater infiltration, increase surface water diversion, ensure consistent cover depths and to prepare the surface for the new landfill cell base liner.

The new stage 3 landfill development commenced with construction below the eastern gully in August 2013, with the first cell 1A completed in 2014. Waste commenced being placed in Cell 1A in March 2015. Council has since constructed Cell 1B (2015) and commenced filling. Cell 2 is currently being designed for programed construction in 2017.

Leachate is collected from all landfilled areas at the site and treated in a 3 stage process. The leachate is initially collected in a primary holding pond that uses a biological process and aeration to strip the leachate of ammonia. The leachate is then pumped to a smaller pond with a larger surface area to increase the speed of this process on a batch by batch basis. From the smaller pond the leachate is then pumped to a sequential batch reactor that in conjunction with a filtration system eliminates the residual contaminants in the leachate suitable for acceptance by sewer under the sites Trade Wastewater Agreement with Sydney Water.

1.4 RELEVANT DOCUMENTS

This annual report refers to and / or draws upon information and data from the following documents;

- Whytes Gully Waste Disposal Facility – Annual Return for Period 29 May 2014 to 28 May 2015. By Wollongong City Council July 2015
- Whytes Gully Waste Disposal Facility – Annual Return for Period 29 May 2013 to 28 May 2014. By Wollongong City Council July 2014
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2012 to 31 May 2013. By Wollongong City Council July 2013
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2011 to 31 May 2012. By Wollongong City Council July 2012
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2010 to 31 May 2011. By Wollongong City Council July 2011.
- Whytes Gully Waste Disposal Facility – Annual Report for Period 01 June 2009 to 31 May 2010. By GHD July 2010.

2 KEY LICENCE ISSUES

2.1 ENVIRONMENTAL PROTECTION LICENCE ANNUAL RETURNS

The Environment Protection Authority (EPA) has issued an *Environmental Protection Licence* (Licence No. 5862) for the landfill and related operations on the Whytes Gully site. The licence, issued under the *Protection of the Environment Operations Act 1997,* requires an annual return and report to be submitted to the EPA, including;

a) Statement of compliance (on approved EPA form).

b) Monitoring and complaints summary (on approved EPA form).

c) Tabulated results of all monitoring data required to be collected by the licence.

d) A graphical presentation of the data for at least three years (if available).

e) Notations made regarding any statistically significant variations or anomalies.

f) An analysis and interpretation of all monitoring data.

g) An analysis of and response to any complaints received.

h) Identification of any deficiencies in environmental performance and remedial action taken or proposed to be taken.

i) Recommendations on improving the sites environmental performance.

The EPL Annual Returns for 2008 to 2015 reporting periods were reviewed to provide a background to this report. These Annual Returns can be summarised as follows:

01 June 2008 to 31 May 2009

B1. Pollution complaints - Nine
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Ten non compliances.
C2. Details of non-compliance

1. *Stormwater pH measurement > 8.5*
2. *Four missed stormwater conductivity measurements*
3. *Stormwater suspended solids > 50mg/L twice*
4. *Four missed potassium groundwater measurements*
5. *One missed groundwater redox, coliforms and dissolved oxygen measurements*
6. *Three missed groundwater alkalinity measurements*
7. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium tests*
8. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*
9. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*
10. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*

01 June 2009 to 31 May 2010

B1. Pollution complaints - Twelve

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Five non compliances.

C2. Details of non-compliance

1. *Two missed stormwater temperature measurements*
2. *Missed stormwater filterable iron measurement*
3. *One round of groundwater monitoring missed*
4. *One round of groundwater monitoring missed*
5. *One round of landfill gas monitoring missed*

01 June 2010 to 31 May 2011

B1. Pollution complaints – Twelve

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Zero non-compliance.

C2. Details of non-compliance – N/A

01 June 2011 to 31 May 2012

B1. Pollution complaints – Forty Eight

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Zero non-compliance.

C2. Details of non-compliance – N/A

01 June 2012 to 31 May 2013

B1. Pollution complaints – Fifty nine

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Zero non-compliance.

C2. Details of non-compliance – N/A

29 May 2013 to 28 May 2014

B1. Pollution complaints – forty eight

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Two penalty notices issued.

C2. Details of non-compliance – Both penalty notices issues were associated with processes that Council did not undertake in accordance with the Whytes Gully Environment Protection Licence conditions. The first penalty notice was associated with excavating into waste to dispose of large flood related debris. Any waste excavation requires EPA pre-approval. The second penalty notice was associated with a major construction contractor not complying with the defined approved odour management plan for the works undertaken. Specifically, the maximum trench distance for the installation of a gas

drainage pipe was exceeded. Both of these circumstances have been identified by the EPA as generating odour.

29 May 2014 to 28 May 2015

B1. Pollution complaints – Ten
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Zero
C2. Details of non-compliance – n/a

29 May 2015 to 28 May 2016 (current report)

B1. Pollution complaints – Thirty Eight
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – One
*C2. Details of non-compliance – In August 2015 during a significant rainfall event, surface water overflowed from the Whytes Gully site sediment ponds. The value of suspended solids measured 116 mg/L which is higher than that specified in the EPL of 50 mg/*L.

Other Disclosure - One Official Caution dated 21 March 2016 was received during the reporting period for failing to identify the 2013-14 issued penalty notices within the Statement of Compliance section of the 2013-14 Annual Environment Management Report

The EPL has had several variations applied to it in recent years. These changes include:

- Approval granted to dispose of waste in Cell 1B on 01 September 2015
- Approval granted to dispose of waste in Cell 1A on 28 October 2014.
- Site boundaries updated to excise the previous Solid Waste to Energy Recovery Facility from the landfill licence to allow Visy to gain their own licence for the retrofit of the building as a Materials Recovery Facility. Also addition of a Potential Offensive Odour clause and analytical unit measures amended on 08 July 2014.
- Wording amendments and consolidation of various clauses as well as monitoring point updates in 23 August 2013.
- Inclusion of further enhanced and upgraded environment sampling points on 23 August 2013 for the Stage 3 (new landfill cell development).
- Overhauled and reformatted licence resulting from Council's request to modernise environmental testing requirements and to formally recognise the increased environmental sampling points and standards adopted by Council for the site. The request formed Annexure B of the 2010/2011 Annual Environmental Management Report and was formally approved and adopted by the EPA on 16 April 2012.
- Tidy up of various incremental site changes including lot and boundary amendments, sampling point review and update including location detail, removal of redundant trial and

reporting details and various other updates in line with EPA reformatting and internal software and consistency changes 16 April 2012.

- Addition of pollution studies and reduction programs added on 28 November 2008.
- Scheduled Activity and Waste Classification structure changed on 17 October 2008.
- Reformatted licence including specification for cover material, litter control and other operational processes 20 November 2007.
- Clarification of water pollution prevention requirements on 11 October 2005.

3 REVIEW OF LANDFILL MONITORING DATA

3.1 SURFACE WATER MONITORING

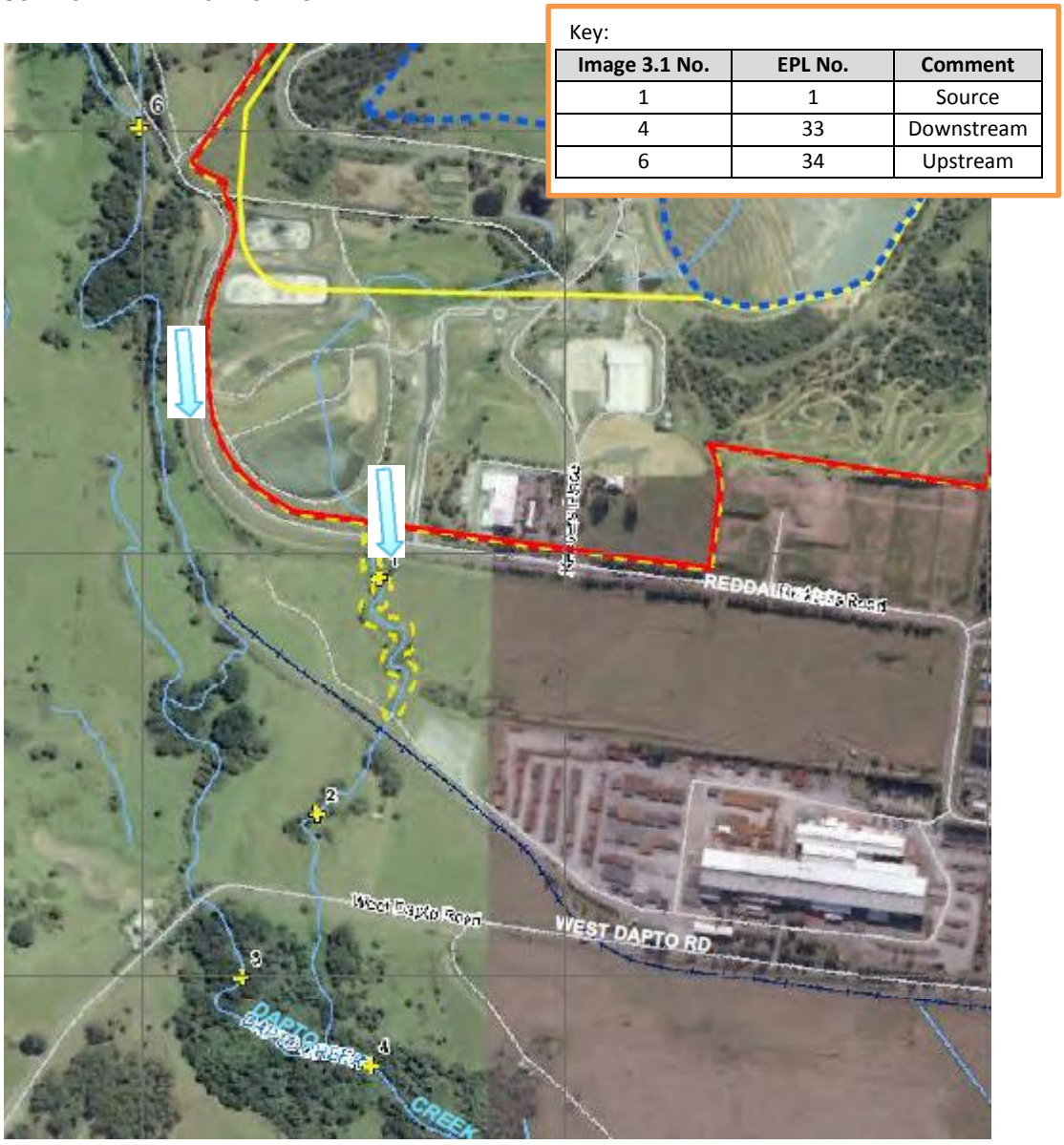


Image 3.1: Surface Water Flow Paths and EPL Sample Point Locations.

3.1.1 Tabulated Results (Annual Sample)

As per the sites EPL, a single annual sample and sampling of each stormwater overflow event was undertaken with the following results:

Table 3.1.1.1 Annual stormwater monitoring results for the reporting period

	Mar 2016	EPA Monitoring Location		
Analyte	**Units**	**1**	**33**	**34**
Alkalinity	mg/L	455	207	183
Ammonia	mg/L	0.22	<0.01	0.05
Calcium	mg/L	190	46	51
Chloride	mg/L	649	57	52
Conductivity	µS/cm	3060	652	618
Dissolved O_2	mg/L	2.99	1.45	3.7
Iron	mg/L	<0.05	0.52	0.05
Fluoride	mg/L	0.5	0.2	0.2
Magnesium	mg/L	102	22	23
Nitrate	mg/L	0.29	<0.01	0.04
Potassium	mg/L	14	4	3
Sodium	mg/L	342	53	43
Sulfate	mg/L	114	<1	31
Temperature	°C	24	26.6	25
TOC	mg/L	11	9	3
TP	mg/L	<0.05	<0.05	<0.05
TSS	mg/L	93	36	10
pH	pH	7.6	7.4	7.6

3.1.2 Tabulated Results (Discharge or Overflow Events)

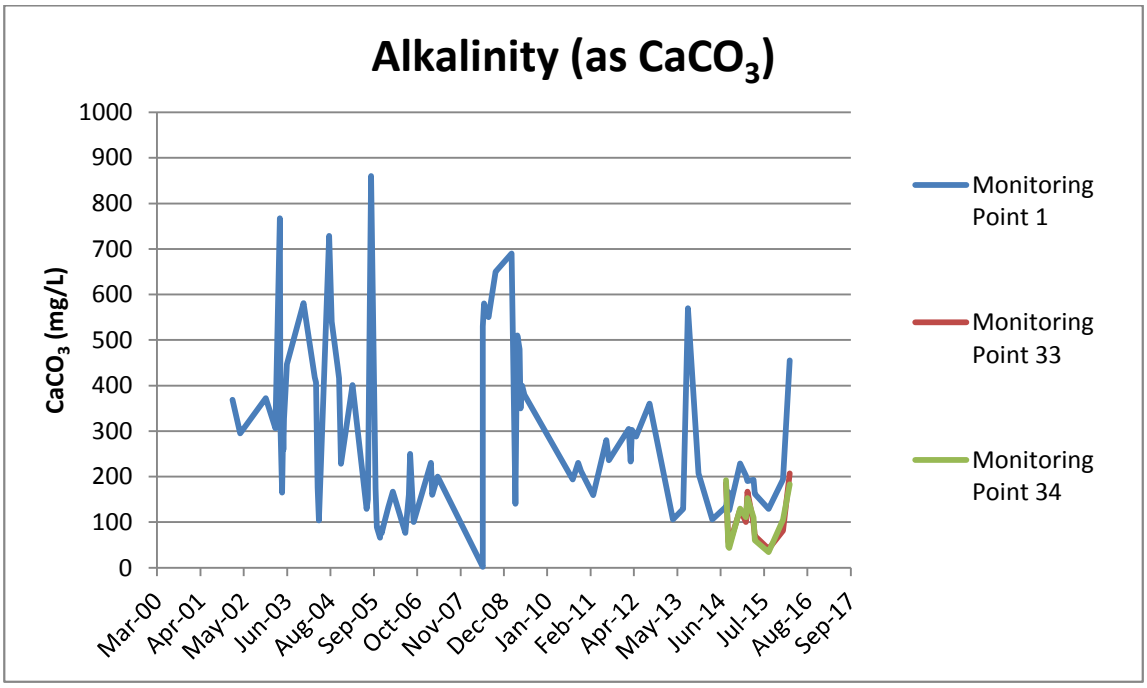
Additionally, overflow events were also sampled as per the sites EPL. With the following results:

Table 3.1.2.1 Overflow stormwater monitoring results for the reporting period

Analyte	Units	EPA Monitoring Point 1		EPA Monitoring Point 33		EPA Monitoring Point 34	
		25/8/2015	5/1/2016	25/8/2015	5/1/2016	25/8/2015	5/1/2016
Alkalinity	mg/L	129	194	41	81	34	105
Ammonia	mg/L	1.92	0.1	0.26	0.02	0.03	0.03
Calcium	mg/L	24	30	11	23	11	32
Chloride	mg/L	37	126	16	35	14	37
Conductivity	µS/cm	508	829	224	349	171	394
Dissolved O_2	mg/L	9.46	8.09	9.69	7.84	11	8.99
Iron	mg/L	0.19	<0.05	0.5	0.13	0.57	0.14
Fluoride	mg/L	0.3	0.4	0.1	0.2	0.1	0.2
Magnesium	mg/L	14	21	6	11	5	15
Nitrate	mg/L	2.62	0.44	1.33	0.33	<1.15	0.45
Potassium	mg/L	12	17	5	4	3	4
Sodium	mg/L	58	122	19	35	15	33
Sulfate	mg/L	20	32	11	28	12	30
Temperature	°C	13.7	21.2	13.3	20.3	12.6	19.2
TP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TOC	mg/L	12	16	8	5	7	6
TSS	mg/L	**116**	18	47	42	46	6
pH	pH	8.2	8	7.8	7.3	7.7	7.9

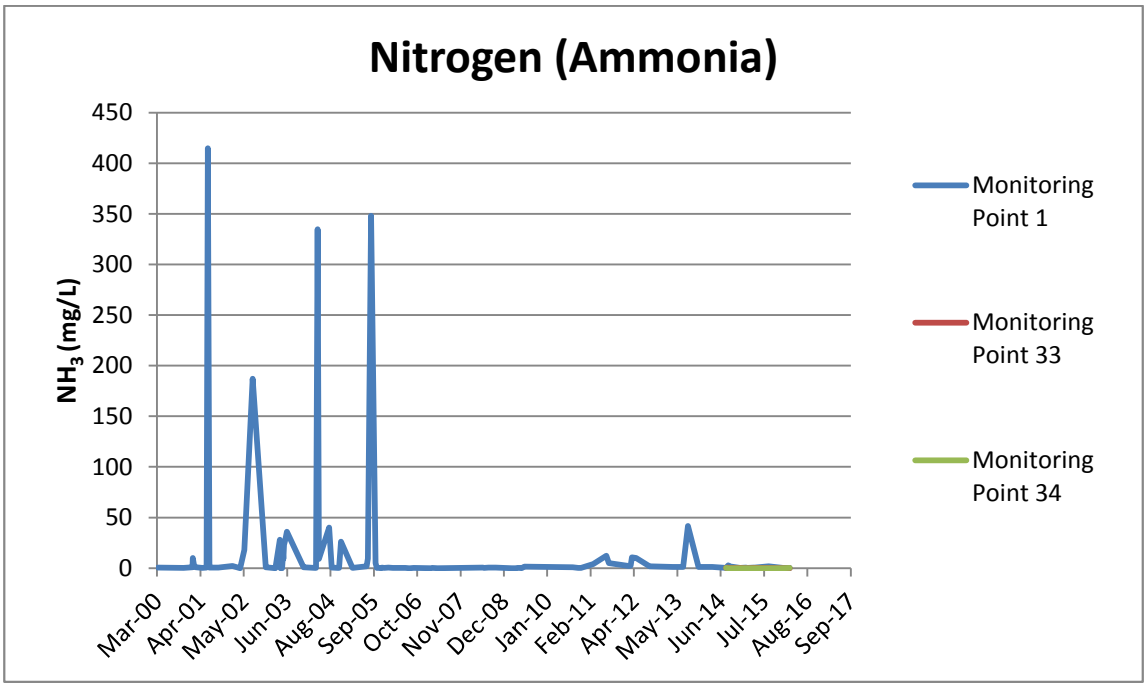
3.1.3 Data Presentation

Figure 3.1.3.1 Alkalinity results presentation



Alkalinity is a measure of waters capacity to resist changes in pH that would make the water more acidic (reduce pH). Therefore alkalinity is inextricably linked to pH values and should be further analysed if pH problems were evident. However, pH values have been maintained within the normal range for water bodies (6.5-8.5).

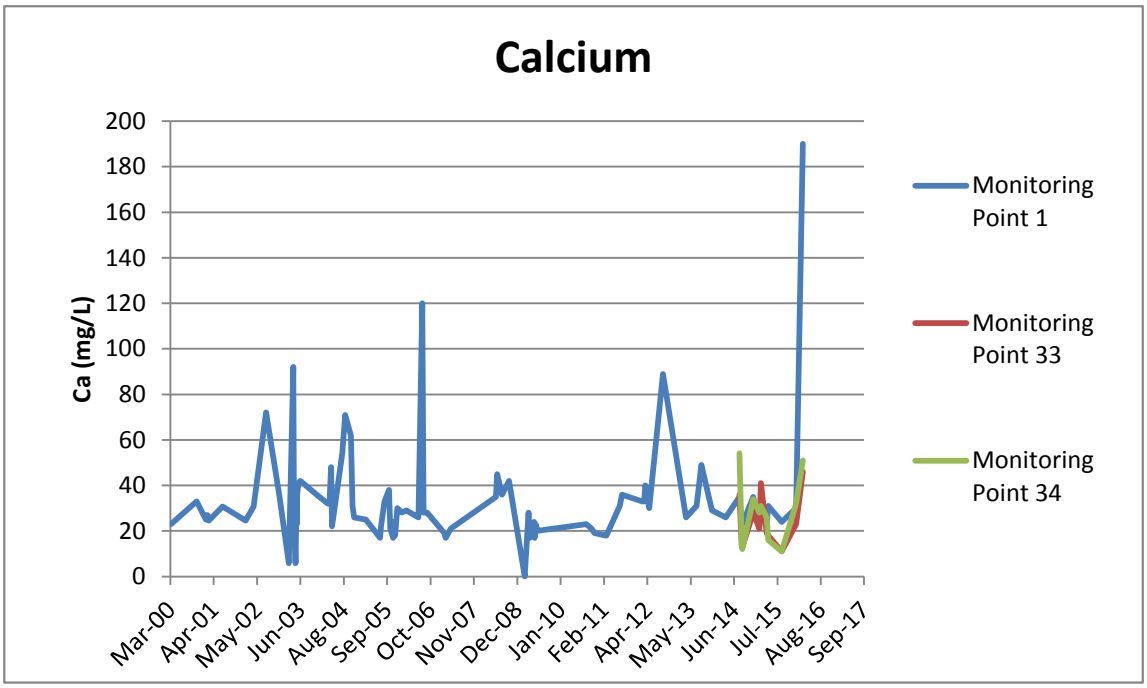
Figure 3.1.3.2 Ammonia results presentation



Ammonia is a by-product of the decomposition of organic matter. Therefore, increased ammonia levels can be a good indicator of environmental contamination sourced from landfill leachate. The

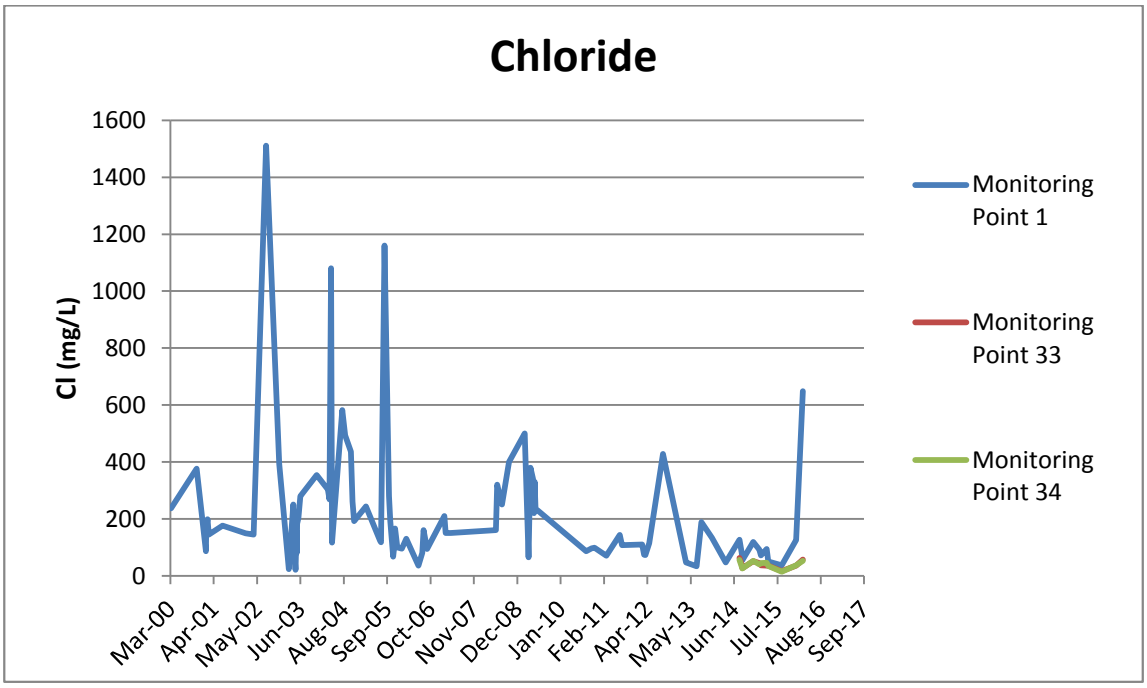
low ammonia levels indicated suggests that leachate does not appear to be infiltrating the stormwater pond.

Figure 3.1.3.3 Calcium results presentation



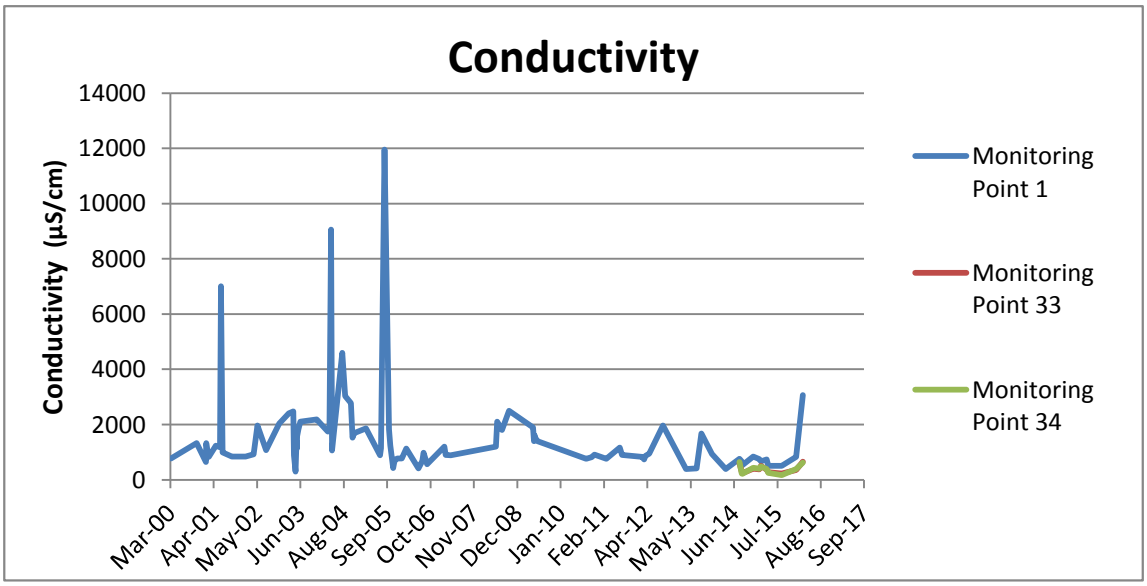
Calcium is an abundant element that is generally found in water through the erosion of rocks. However it is also common in construction materials, such as cement, brick lime and concrete. In March 2016 the annual (not an overflow event) sample resulted in an elevated result for calcium of 190 mg/L which is approximately three times the background trend. As Whytes Gully does not accept construction and demolition waste materials, there are very few anthropogenic sources of calcium into the sediment ponds. However, there has been a large amount of construction and accordingly large volumes of construction materials have been imported to the Site during the reporting period. It is most likely that the result is attributed to some of this construction material. Three follow up samples (reported in the 2016-17 reporting period) have been taken and each indicates that calcium levels in the sediment pond have since returned to historic levels.

Figure 3.1.3.4 Chloride results presentation



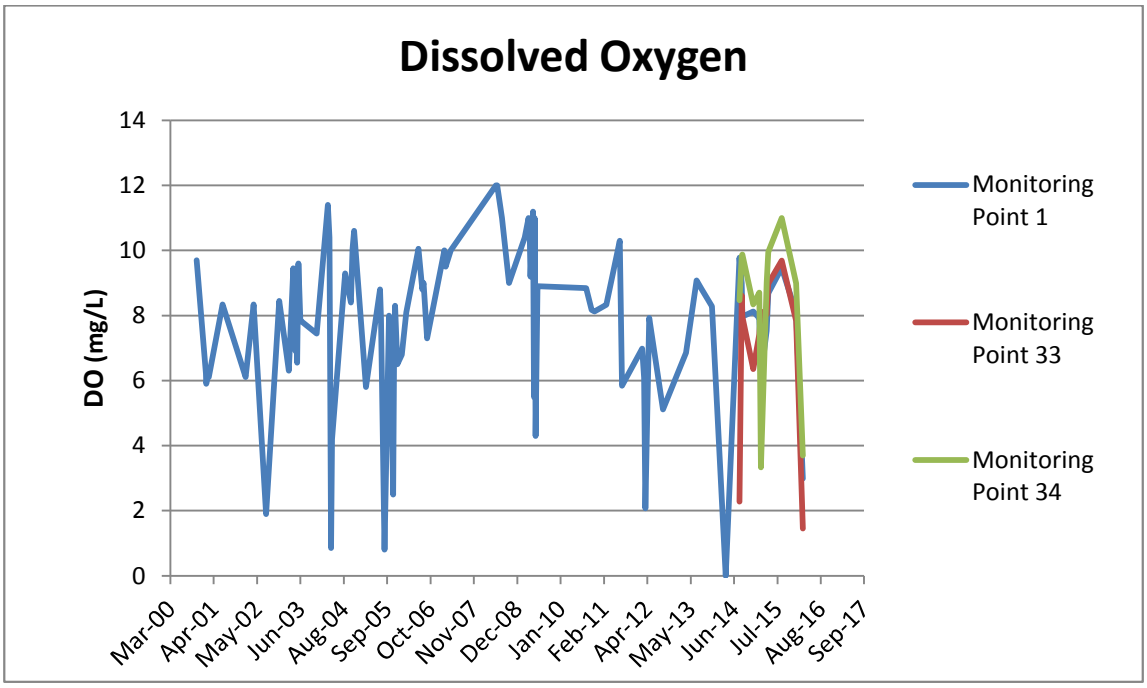
Chloride is present in landfill leachate and is therefore considered to be an indicator of uncontrolled leachate release. The chloride levels in the stormwater pond are consistent with historical results.

Figure 3.1.3.5 Conductivity results presentation



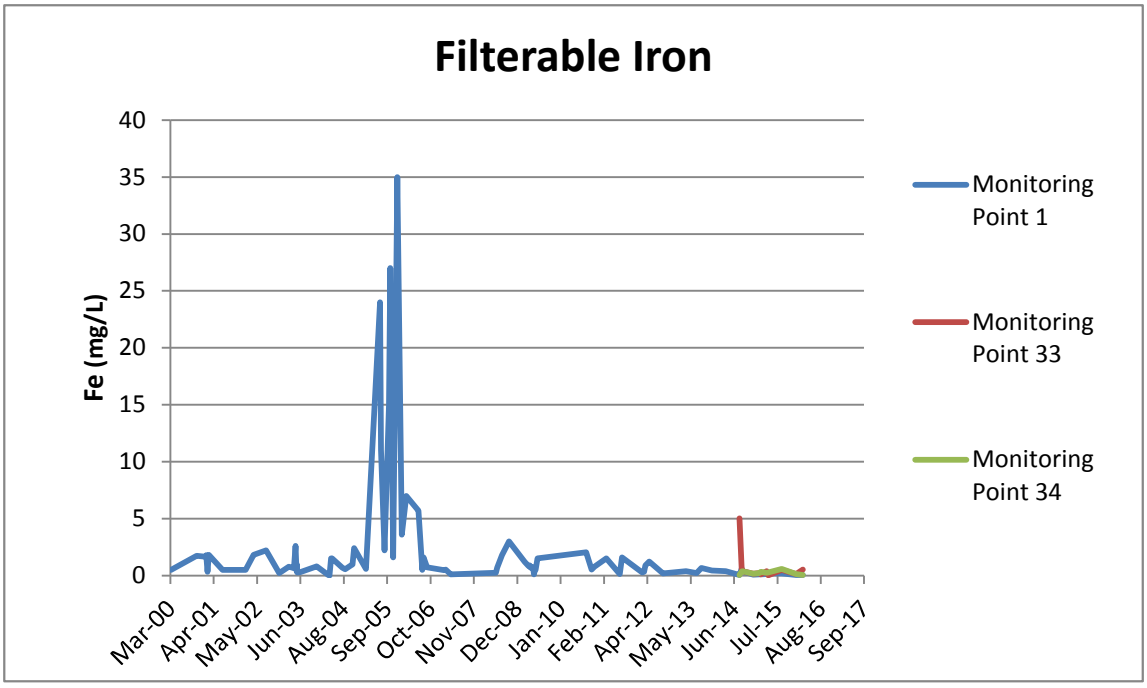
Conductivity is a measure of the waters ability to pass electrical current, usually though positively or negatively charged inorganic dissolved solids. It therefore indirectly measures the presence of inorganic materials including calcium, bicarbonate, nitrogen, phosphorus, iron, sulphur and other ions dissolved in a water body. Low levels of inorganic materials have been found in the sediment pond during the reporting period. The 3,060 µS/cm result corresponds with the solitary calcium result discussed underneath Table 3.1.3.3.

Figure 3.1.3.6 Dissolved oxygen results presentation



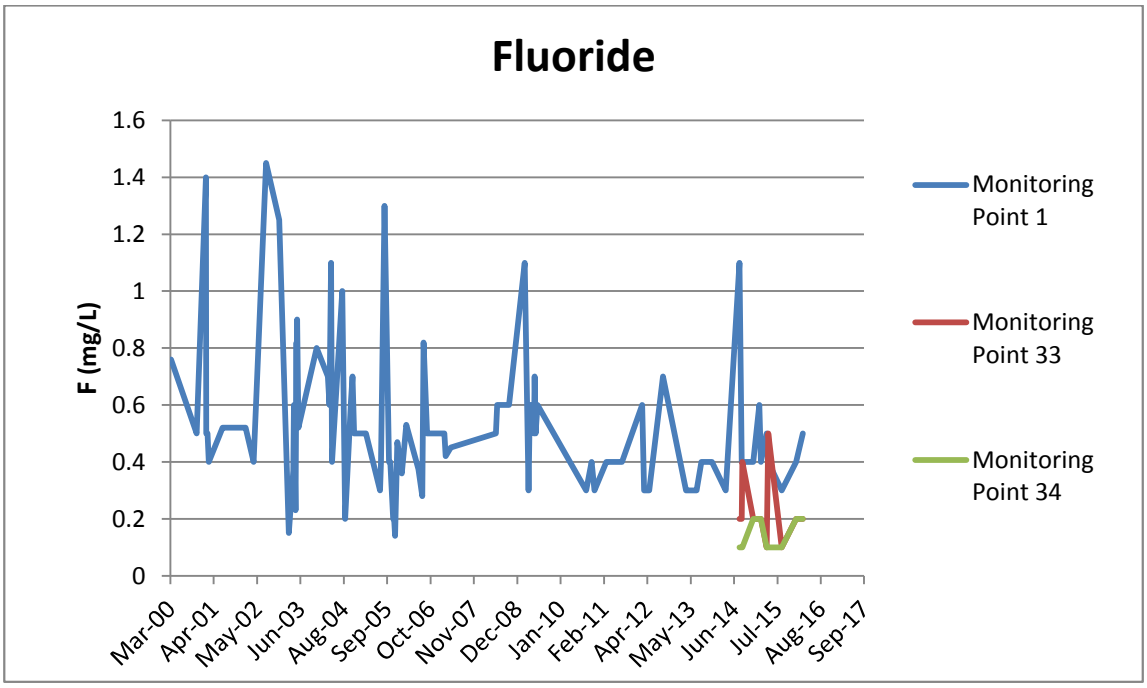
Dissolved oxygen levels can be depleted by biological activity associated with the nitrification process common in landfill leachate. Dissolved oxygen levels have historically fluctuated in the sediment pond. More recent sampling of upstream and downstream locations indicate that the fluctuations experienced over the reporting period are typical of the water body and not impacted by the sediment ponds at the Site.

Figure 3.1.3.7 Filterable iron results presentation



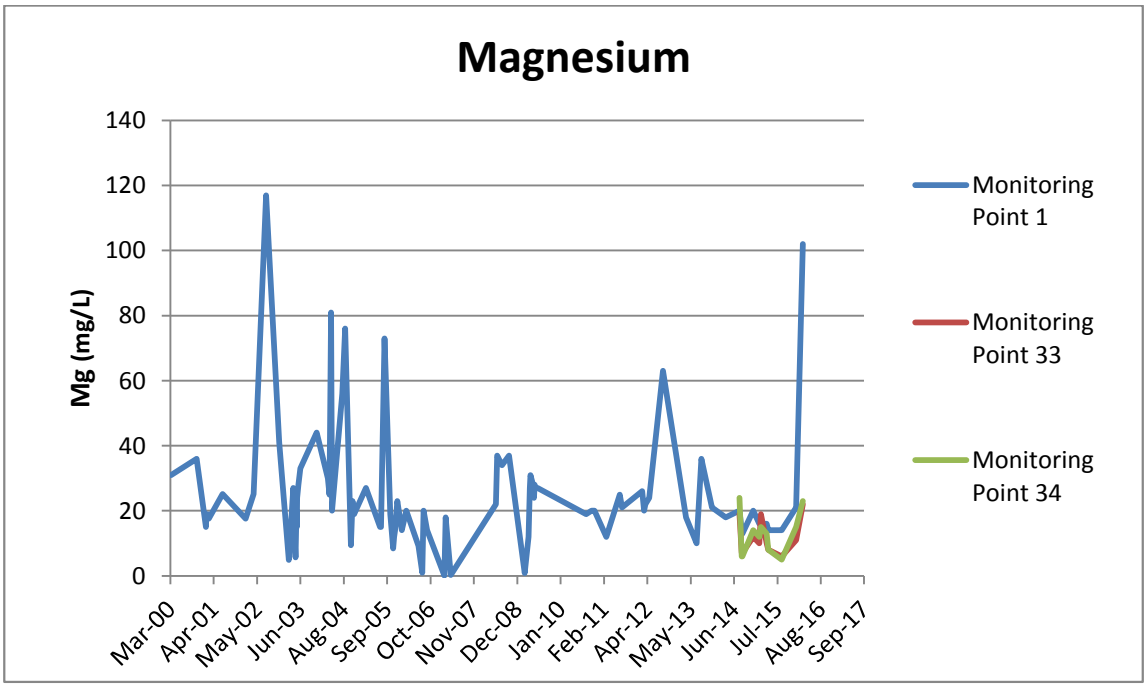
Filterable iron has continued to trend at very low levels, especially with regard to the reporting period.

Figure 3.1.3.8 Fluoride results presentation



Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L. The level of fluoride found in the stormwater detention pond is therefore by comparison relatively low and displays a consistent trend over the twelve year sampling period. Fluctuations evident are very low actual levels, up to 0.6 mg/L.

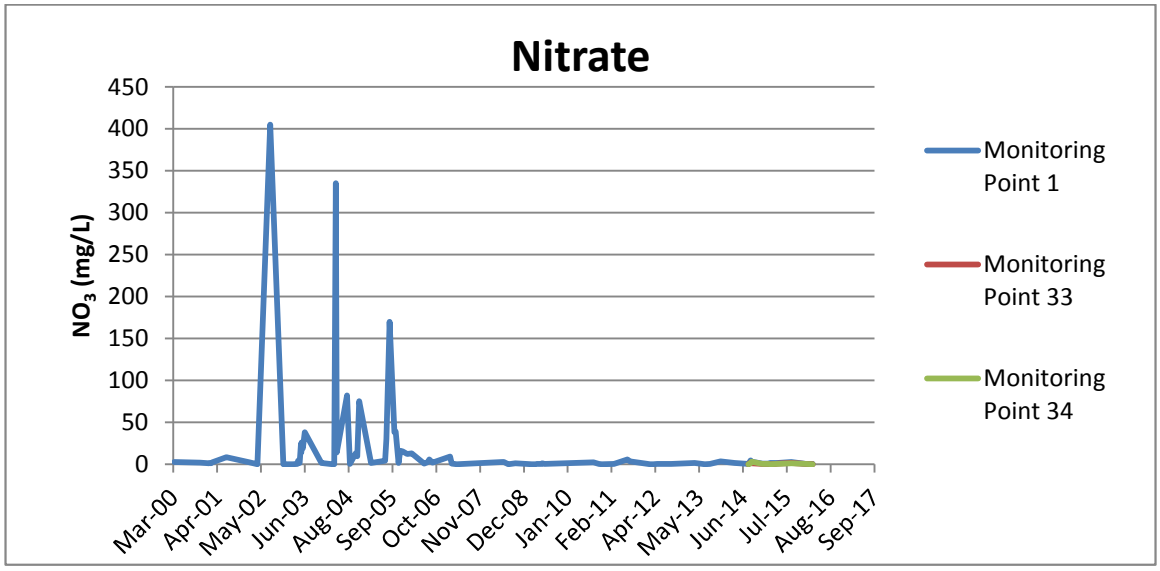
Figure 3.1.3.9 Magnesium results presentation



There has been a substantial spike in Magnesium which is similarly linked with the spike in Calcium (another inorganic dissolved solid common in building and construction materials). This spike was likely contributed to by the large amount of construction and accordingly large volumes of construction materials have been imported to the Site during the reporting period. Three follow up

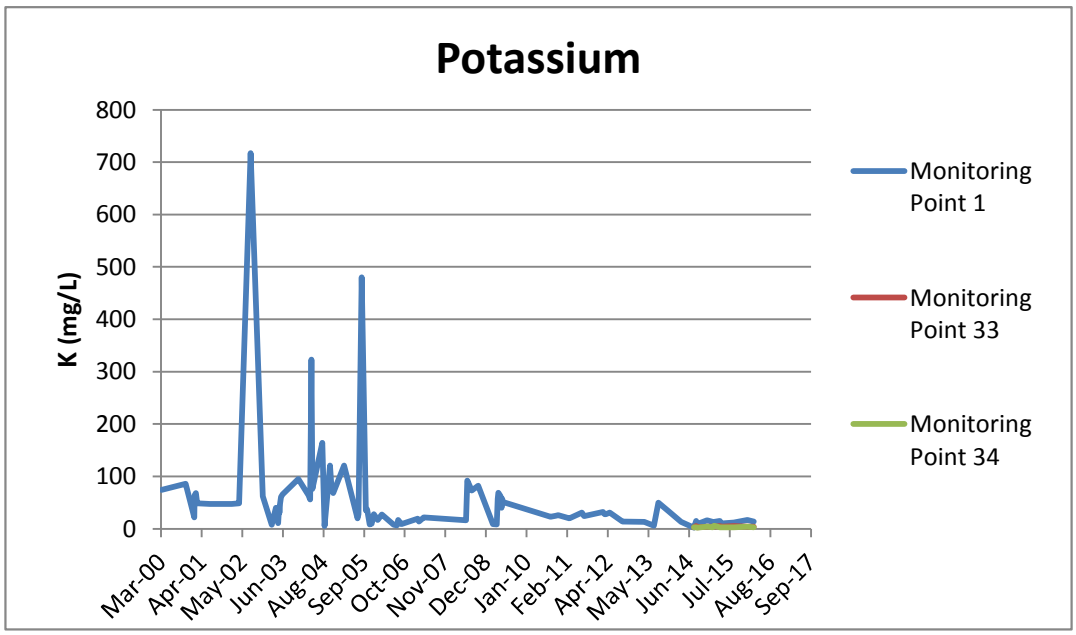
samples (to be reported in the 2016-17 reporting period) have been taken and each indicates that calcium levels in the sediment pond have since returned to historic levels. Note that the 102mg/L result was a scheduled annual sample, not an overflow sample.

Figure 3.1.3.10 Nitrate results presentation



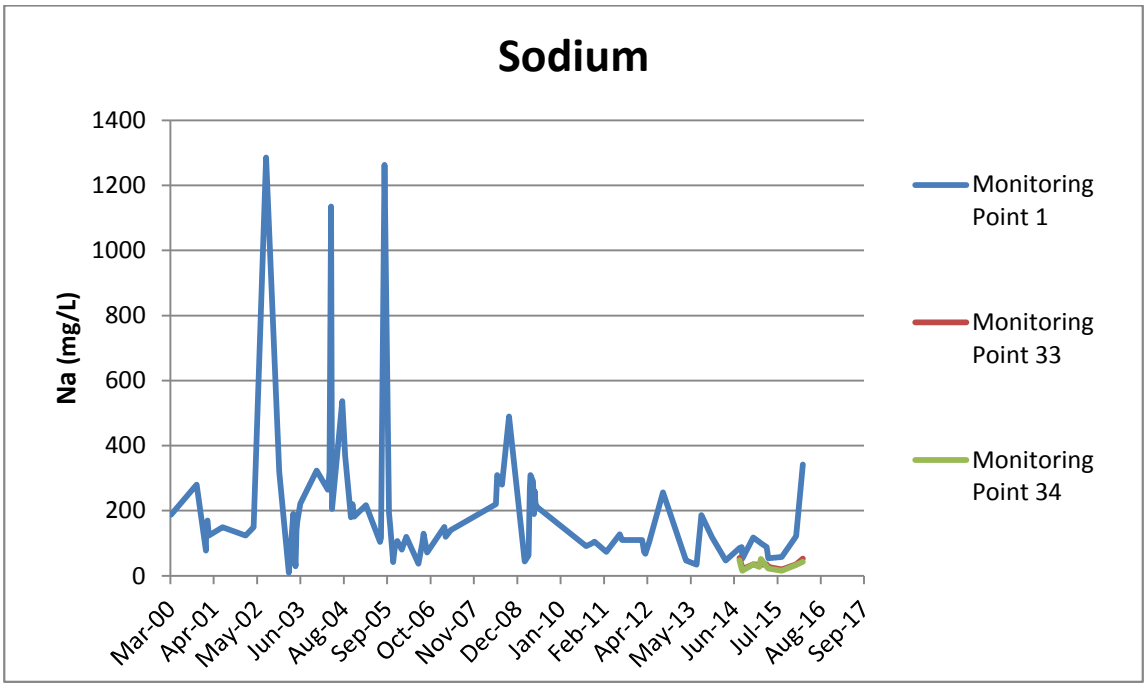
Nitrate and nitrite are naturally occurring ions that are part of the nitrogen cycle that includes the decomposition of organic matter, such as what takes place in landfills. The World Health Organisation suggests that nitrate concentration in surface water is normally between up to 18 mg/L. The samples analysed during the reporting period indicate that landfill leachate is unlikely to be intersecting with the sediment ponds.

Figure 3.1.3.11 Potassium results presentation



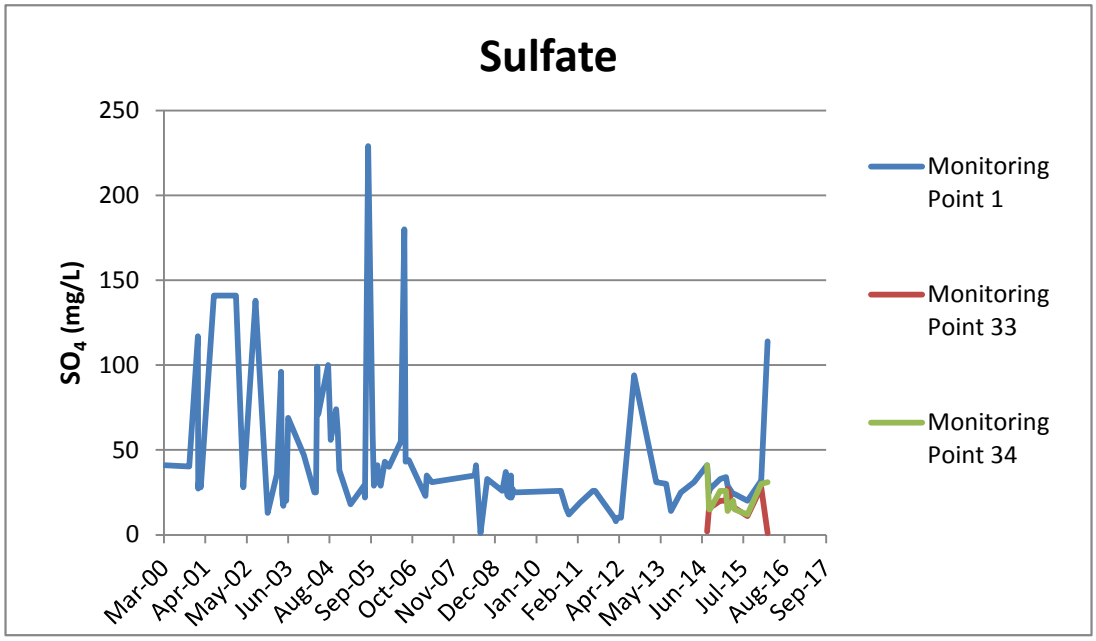
Potassium concentrations have been in line with recent trends and with the naturally occurring groundwater levels of these analytes around the site. Elevated potassium concentrations are typically associated with weathering of rocks.

Figure 3.1.3.12 Sodium results presentation



Sodium is common in water bodies due to its high solubility and abundance in rocks and soils. Sodium can provide a potential indicator of groundwater contamination by landfill leachate. Sodium has displayed a relatively high result of 342 mg/L in the scheduled annual sample round of testing. Three follow up samples (to be reported in the 2016-17 reporting period) have been taken and each indicates that sodium levels in the sediment pond have since returned to historic levels.

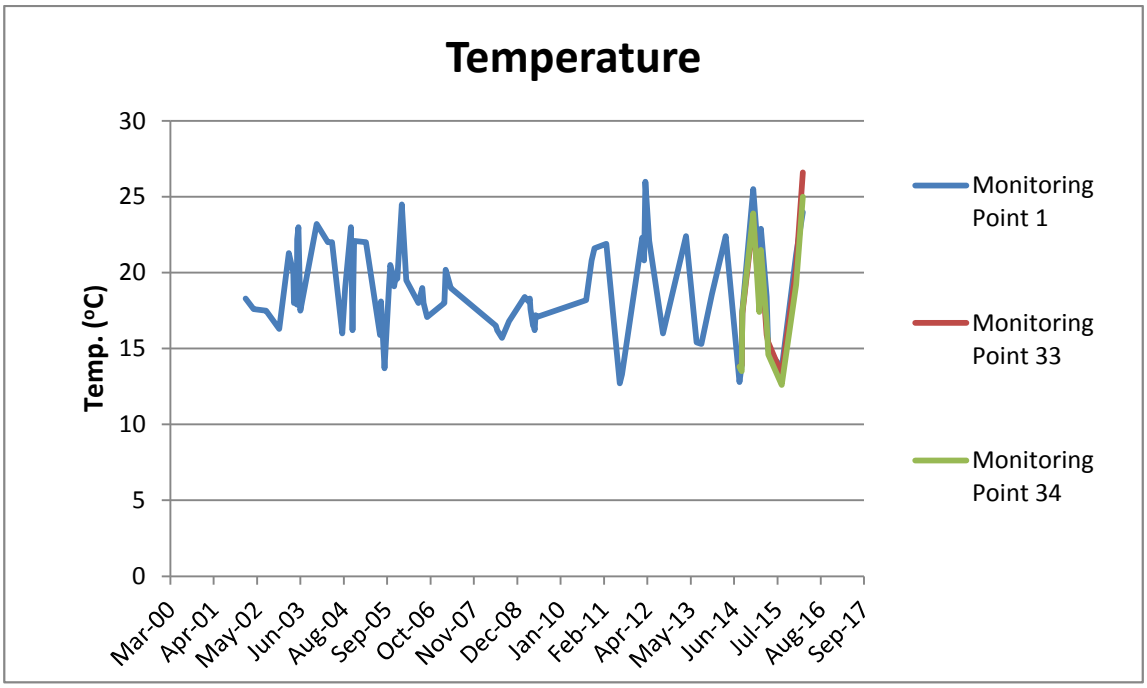
Figure 3.1.3.13 Sulfate results presentation



The *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the stormwater detention pond are in line with the historical levels and are better than the drinkable water standard. Inorganic ions such as sulfate provide a potential indicator of groundwater contamination by landfill leachate. A sudden increase in these ions can

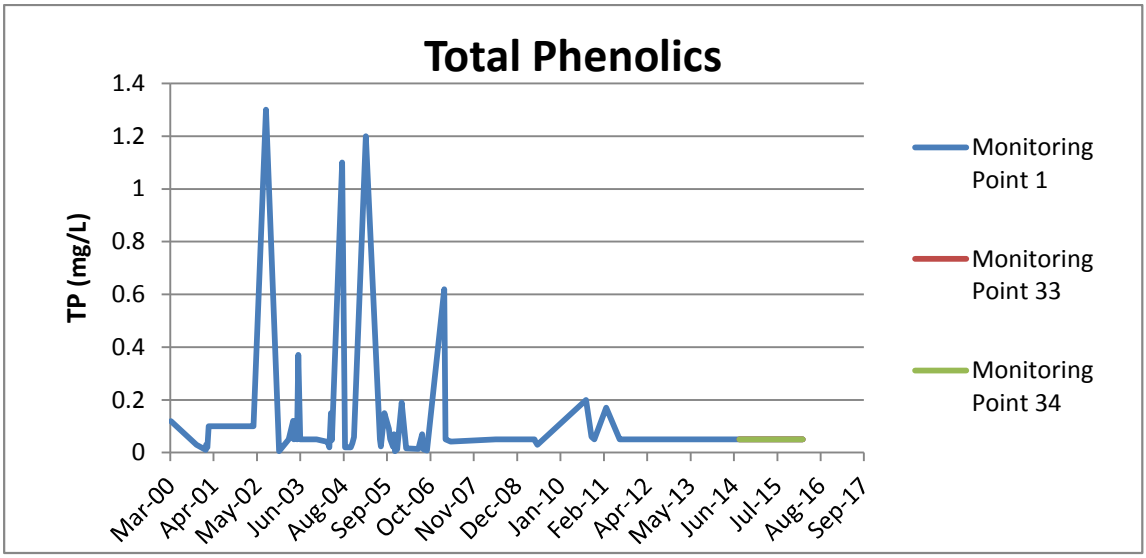
act as early warning system. The 114 mg/L result from the annual round of sampling was the highest resultsince 2006. Three follow up samples (to be reported in the 2016-17 reporting period) have been taken and each indicates that sulfate levels in the sediment pond have since returned to historic levels.

Figure 3.1.3.14 Temperature results presentation



Temperature, as expected has generally been indicative of the season in which the stormwater detention pond has been sampled and mirrors the external environment results upstream and downstream.

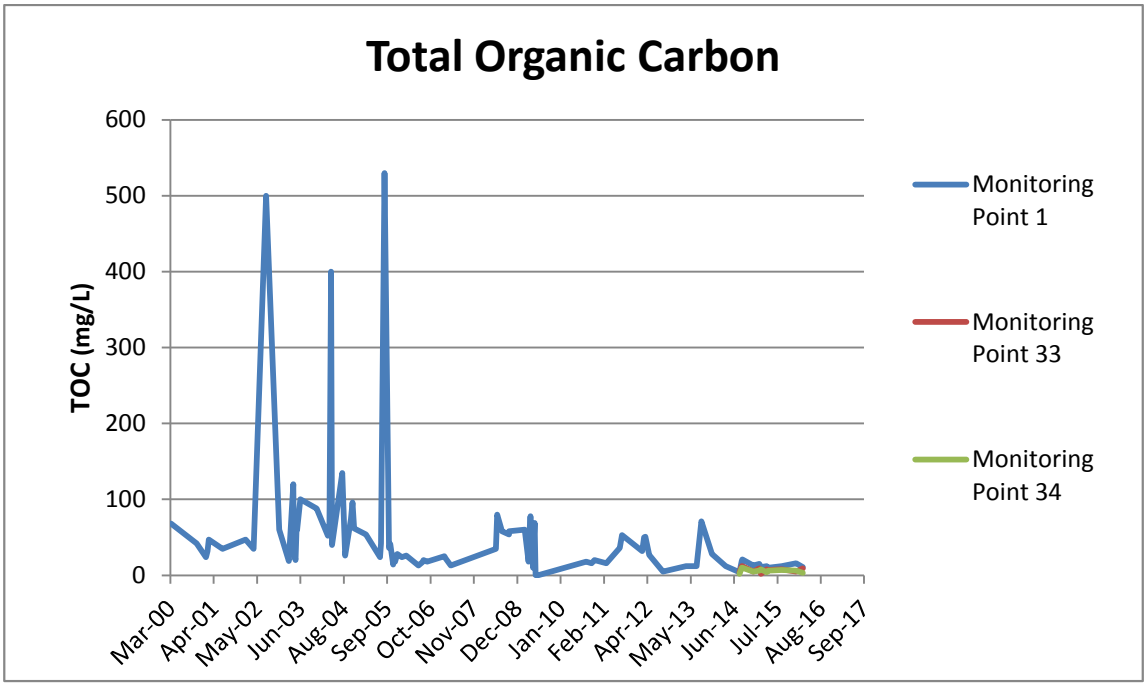
Figure 3.1.3.15 Total phenolics results presentation



Total phenols are widely used in the manufacture of resins, plastics, insecticides, explosives, dyes, and detergents. It is also used as a raw material for the production of medicinal drugs such as aspirin. Recent trend results for total phenols have been extremely low and more often than not,

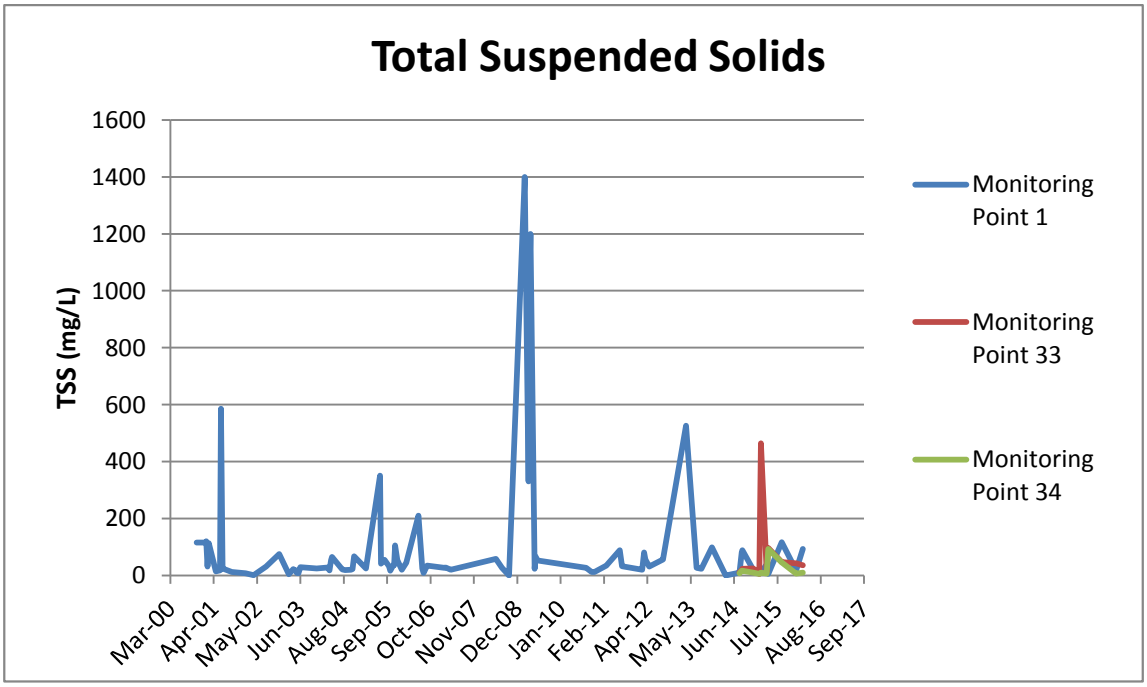
below detectable limits in the stormwater detention pond. In fact, all samples taken during the reporting period were below detectable limits.

Figure 3.1.3.16 Total organic carbon results presentation



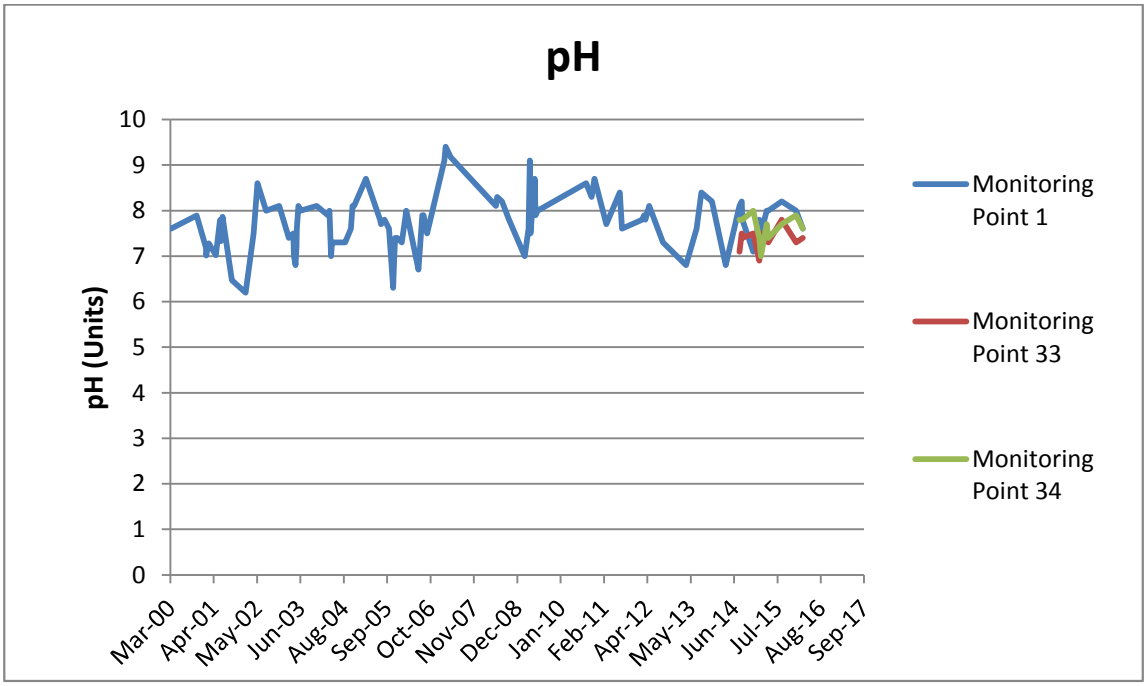
Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of water contamination by natural compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained consistently stable over the last ten years and at very low levels during the reporting period.

Figure 3.1.3.17 Total suspended solids results presentation



Samples for Total Suspended solids indicate that during the reporting period indicate that there has been a single non-compliance on 25 August 2015 with a result of 116 mg/L. A full summary of this event can be found in Section 4.1 Deficiency Identification and Remediation.

Figure 3.1.3.18 pH results presentation



Samples during the reporting period for pH show that the values have between the normal ranges of 6.5 – 8.5.

3.1.4 Surface Water Results Interpretation

Whilst the majority of analytical samples taken during the reporting period indicate low contamination levels in the sediment ponds, there has been a non-compliance with Environment Protection Licence requirements associated with higher than acceptable suspended solids exiting the site during a heavy rainfall event. Whilst not a chemical or biological contamination issue, the result shows that the sediment ponds need additional care and maintenance moving forward. Section 4.1 Deficiency Identification and Remediation further explains the improvements to be implemented as a result of the non-compliance.

Additionally, the March 2016 Annual Sample of the sediment pond displayed elevated calcium, chloride, magnesium and sulfate levels compared to the historic trends. The potential cause and rectification is discussed further in Section 4.1 Deficiency Identification and Remediation.

3.2 GROUNDWATER MONITORING

Site investigations resulting from Council's Environment Application lodged with the State Government on 01 April 2012, have confirmed a predominant approximate south-southwest groundwater flow direction. The groundwater flow direction should be used to contextualise monitoring well locations and any elevated results, please refer to the sites Environmental Monitoring Locations located in Annexure A of this document.

3.2.1 Tabulated Results

Table 3.1.1.1 Quarterly analyte testing results for 21 August 2015 *Note: Well destroyed

Analyte		Monitoring Points																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	1130	752	377	458	302	445	230	50	Dry	528	513	258	643	489	248	777
Calcium	mg/L	*	340	383	107	93	73	249	33	7	Dry	76	136	63	202	110	96	137
Chloride	mg/L	*	911	996	464	470	16	395	31	28	Dry	311	528	163	630	422	326	850
Conductivity	µS/cm	*	5190	5160	2780	2880	606	2390	507	260	Dry	1750	3080	1220	3960	2680	1670	4870
Magnesium	mg/L	*	187	191	67	81	22	85	21	4	Dry	63	97	38	144	83	51	140
Nitrogen	mg/L	*	0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	Dry	0.01	0.01	0.66	<0.01	<0.01	0.01	0.06
Potassium	mg/L	*	3	2	<1	<1	<1	<1	<1	<1	Dry	1	<1	2	2	1	2	<1
Sodium	mg/L	*	661	512	443	474	36	198	78	40	Dry	385	471	159	463	372	205	877
Water Level	m	*	4.85	0.5	1.72	2.24	10.98	7.69	7.28	10.85	Dry	2.64	2.13	3.27	4.07	6.2	2.92	1.52
Sulfate	mg/L	*	188	221	178	215	18	144	34	14	Dry	116	214	95	306	148	26	313
TDS	mg/L	*	3310	3450	1610	1680	377	1610	297	191	Dry	1280	1810	716	2450	1560	991	2940
TOC	mg/L	*	<1	<1	<1	<1	<1	<1	<1	<1	Dry	4	<1	4	4	<1	<1	<1
pH	pH	*	6.7	7.2	6.7	7.1	7	7	7.2	5.8	Dry	7	6.8	6.2	6.7	7	7.3	6.8

Table 3.1.1.2 Quarterly analyte testing results for 16 November 2015 *Note: Well destroyed

Analyte		Monitoring Points																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	998	639	327	393	261	376	343	37	Dry	347	457	226	564	435	219	702
Calcium	mg/L	*	294	327	96	80	62	198	42	6	Dry	26	118	60	183	92	84	118
Chloride	mg/L	*	1050	1180	563	586	18	446	56	35	Dry	47	612	182	786	511	396	971
Conductivity	µS/cm	*	5390	5370	2830	3080	526	2330	852	233	Dry	787	3200	1080	4100	2640	1740	4990
Magnesium	mg/L	*	196	211	60	70	19	72	28	3	Dry	13	86	35	148	76	47	127
Nitrogen	mg/L	*	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	Dry	0.05	0.01	0.66	<0.01	0.02	<0.01	0.06
Potassium	mg/L	*	3	2	1	<1	<1	<1	<1	<1	Dry	2	<1	2	1	<1	1	<1
Sodium	mg/L	*	623	497	405	444	30	188	127	38	Dry	160	417	151	451	349	192	796
Water Level	m	*	4.9	0.37	1.65	2.15	11.6	7.49	7.61	11	Dry	2.5	2	3.13	3.99	6.24	2.74	1.36
Sulfate	mg/L	*	175	216	177	231	20	122	48	15	Dry	23	197	93	318	122	28	310
TDS	mg/L	*	3490	4140	1490	1680	690	1680	605	152	Dry	512	1850	657	2640	1540	1140	2890
TOC	mg/L	*	5	4	1	2	3	2	2	2	Dry	10	2	2	2	<1	1	5
pH	pH	*	6.8	6.7	6.9	7	7.2	7	7.4	6	Dry	6.9	7	6.3	6.8	7.1	7.2	6.9

Table 3.1.1.3 Quarterly analyte testing results for 5 February 2016 *Note: Well destroyed

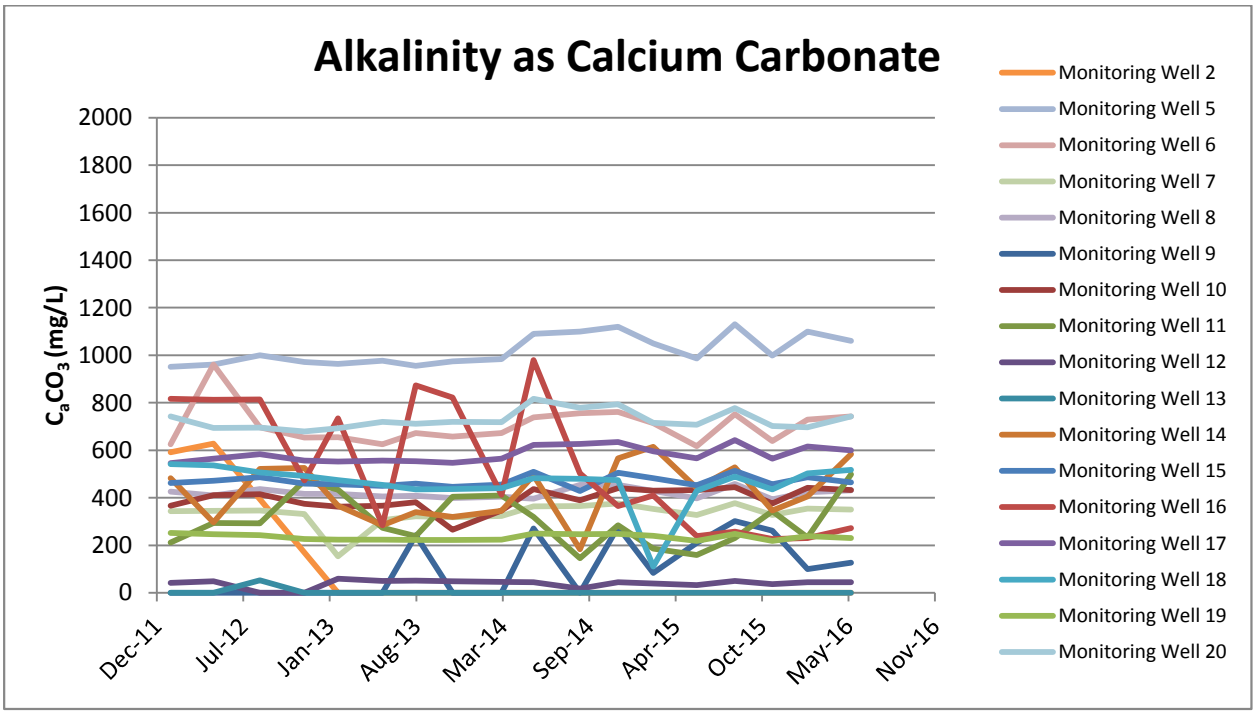
Analyte		Monitoring Points																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	1100	729	355	423	100	442	233	44	Dry	406	486	230	616	502	238	697
Calcium	mg/L	*	302	376	107	89	21	184	36	5	Dry	48	124	64	198	110	91	120
Chloride	mg/L	*	1060	1180	586	590	15	378	42	18	Dry	38	637	240	815	543	414	953
Conductivity	µS/cm	*	5550	5540	2820	3040	288	2330	944	220	Dry	864	3200	1310	4160	2550	1740	4160
Magnesium	mg/L	*	188	214	62	78	7	64	23	2	Dry	21	87	39	151	86	47	121
Nitrogen	mg/L	*	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	0.04	<0.01	0.66	<0.01	<0.01	<0.01	0.07
Potassium	mg/L	*	3	2	<1	<1	<1	<1	<1	<1	Dry	4	1	2	2	1	1	<1
Sodium	mg/L	*	575	500	408	459	21	173	81	30	Dry	124	403	152	451	373	180	728
Water Level	m	*	4.89	0.38	1.64	2.2	2.0	7.4	7.43	10.5	Dry	2.44	1.95	2.97	3.98	6.27	2.74	1.24
Sulfate	mg/L	*	168	194	164	210	11	120	38	16	Dry	19	192	74	303	140	26	276
TDS	mg/L	*	3880	1730	1810	222	1480	408	341	563	Dry	563	1950	728	2650	1760	1090	2880
TOC	mg/L	*	5	4	<1	2	2	<1	1	2	Dry	9	2	7	<1	2	<1	3
pH	pH	*	6.6	6.9	6.8	7.2	6.6	7	7.4	5.9	Dry	7	7	6.4	6.9	7	7.2	7

Table 3.1.1.4 Quarterly analyte testing results for 16 May 2016 *Note: Well destroyed

Analyte		Monitoring Points																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	1060	742	351	431	127	433	499	44	Dry	583	485	272	600	517	231	743
Calcium	mg/L	*	290	354	90	75	67	196	56	8	Dry	137	113	72	180	122	89	119
Chloride	mg/L	*	1080	1240	563	568	20	443	101	17	Dry	676	610	265	818	627	401	968
Conductivity	µS/cm	*	5320	5420	2780	2960	699	2240	1340	268	Dry	3720	3060	2280	4080	3300	1760	5040
Magnesium	mg/L	*	185	208	56	73	24	68	36	4	Dry	108	83	39	146	98	46	127
Nitrogen	mg/L	*	0.08	0.01	<0.01	0.01	<0.01	0.04	<0.01	<0.01	Dry	<0.01	0.02	0.77	<0.01	<0.01	0.01	0.12
Potassium	mg/L	*	2	1	<1	<1	<1	<1	<1	<1	Dry	<1	1	2	<1	<1	1	<1
Sodium	mg/L	*	639	533	433	506	36	194	199	34	Dry	484	444	174	476	455	200	843
Water Level	m	*	5.09	0.69	1.86	2.4	12.2	7.68	7.93	11.5	Dry	2.82	2.28	3.5	4.28	6.39	3.11	1.54
Sulfate	mg/L	*	166	196	153	197	17	126	65	12	Dry	211	179	56	292	205	23	251
TDS	mg/L	*	3450	3650	1560	1710	524	1550	748	192	Dry	2060	1810	812	2540	1930	1010	2900
TOC	mg/L	*	9	4	1	1	2	1	1	1	Dry	2	3	4	2	<1	<1	9
pH	pH	*	6.6	6.6	6.8	6.9	7.1	1	7.2	6.1	Dry	6.8	7.1	6.2	6.7	6.8	7	6.6

3.2.2 Data Presentation – Quarterly Monitoring

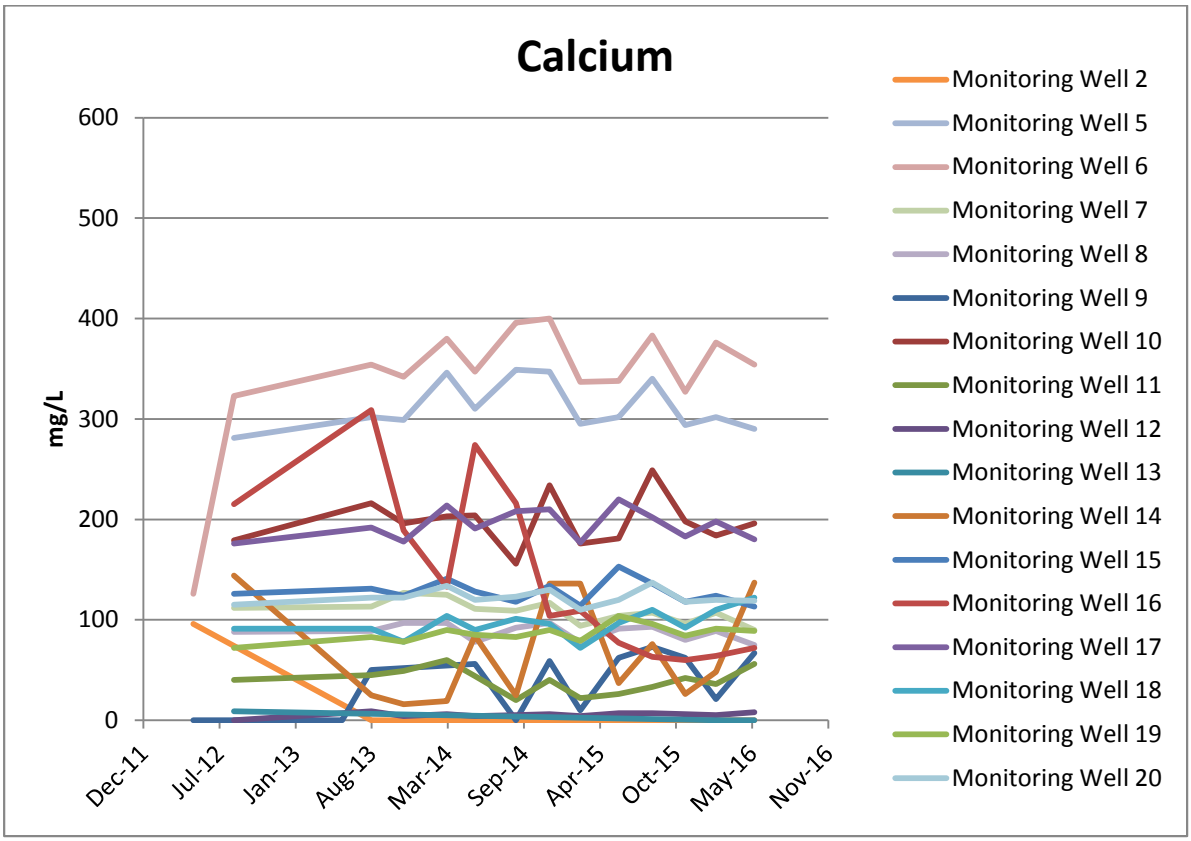
Figure 3.2.2.1 Alkalinity results presentation



Increased alkalinity levels can be caused by many chemical processes including the denitrification process common in landfill leachate. Denitrification is the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form. Under anoxic conditions microorganisms consume the oxygen in the nitrate and liberate the nitrogen. This process produces calcium carbonate as a by-product. The stability of the calcium carbonate in the groundwater monitoring wells over the sample period shows that it is unlikely that the denitrification process caused by leachate ingress is taking place in the groundwater around the site. Nonetheless, the calcium carbonate levels are relatively high and quite "hard" in plumbing terms and continued monitoring is necessary to scrutinise for any increased value trends. It should be noted that many natural groundwater sources often contain much higher alkalinity levels than this site.

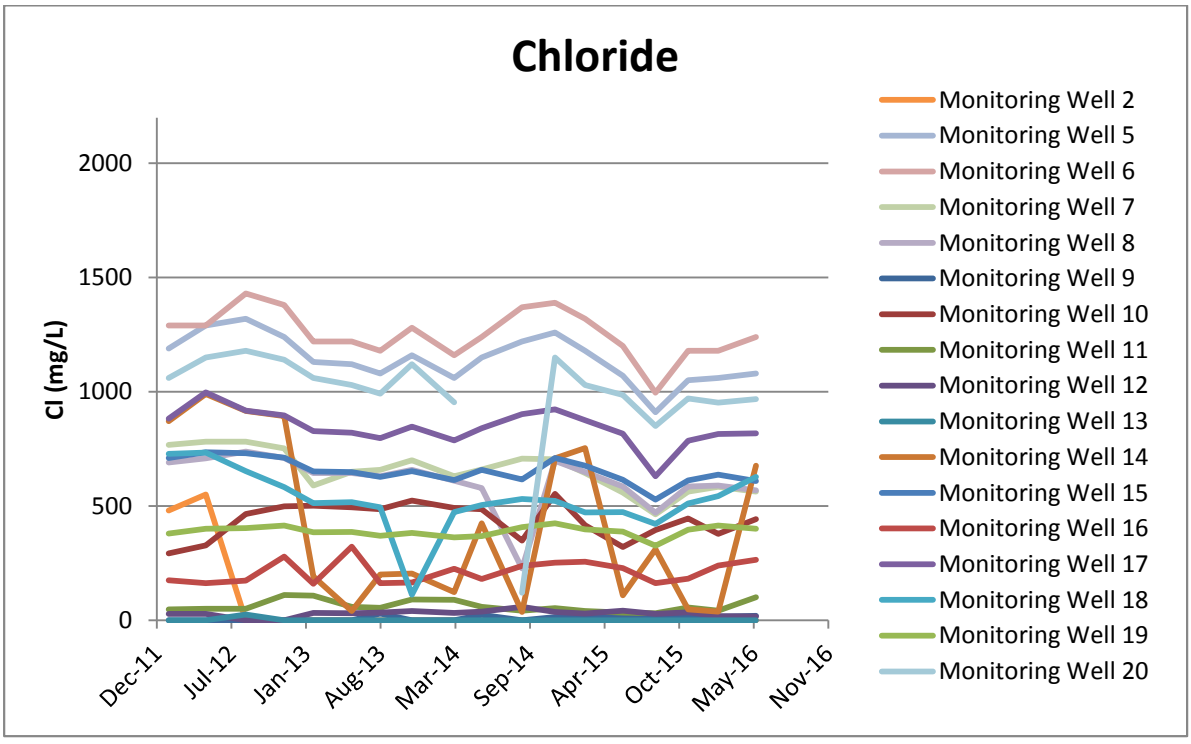
Monitoring well 16 has demonstrated the most significant fluctuations. However, the trend is overall indicating a reduction in alkalinity which is a positive result.

Figure 3.2.2.2 Calcium results presentation



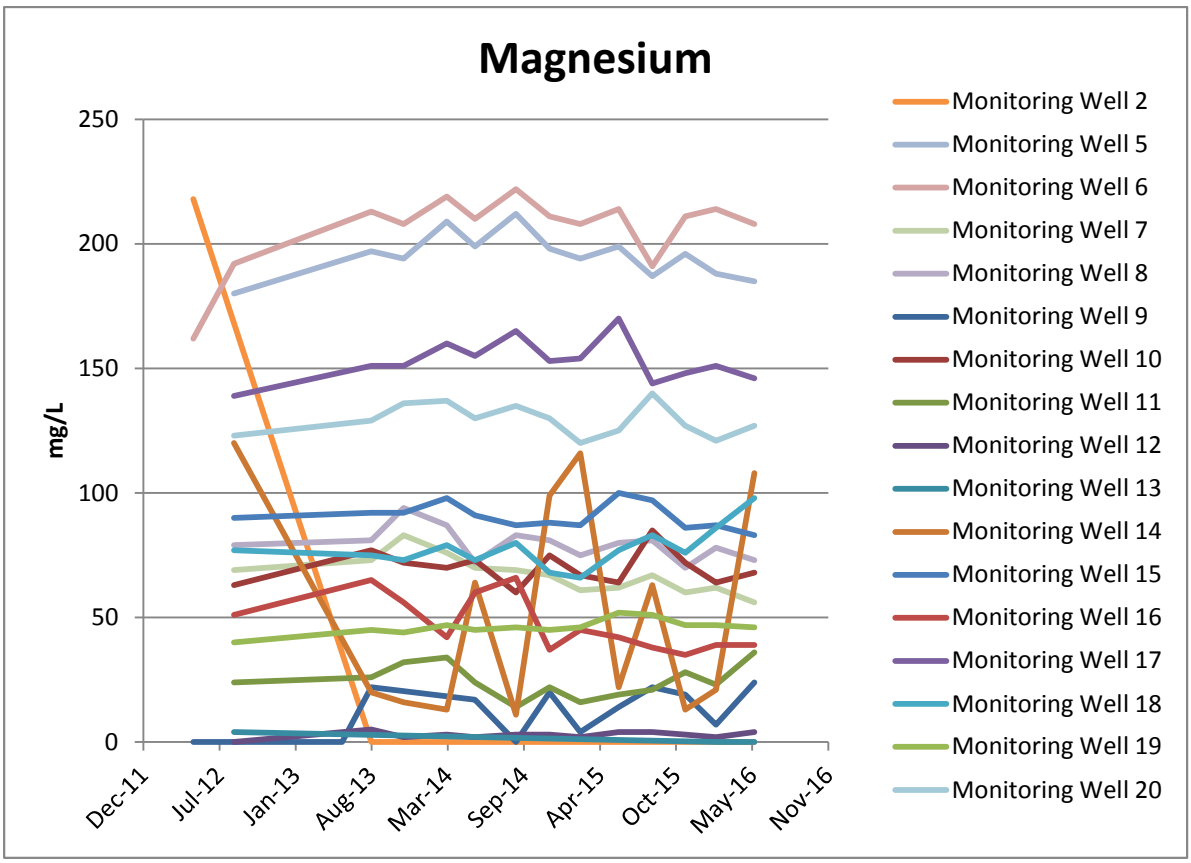
The groundwater monitoring wells show a consistent trend for calcium levels. The calcium levels sampled would be considered "hard" water in the region of 120-180mg/L. This is consistent with the presented results for alkalinity.

Figure 3.2.2.3 Chloride results presentation



The trends realised through chloride monitoring have been in line with the historical levels over the data range available. Large quantities of inorganic ions such as chloride can be an indicator of leachate contamination of groundwater. A sudden increase in these ions can act as early warning system. The sampling history for chloride suggests that no significant spikes have occurred that are not within historical fluctuation levels and therefore leachate is not indicated in the groundwater network.

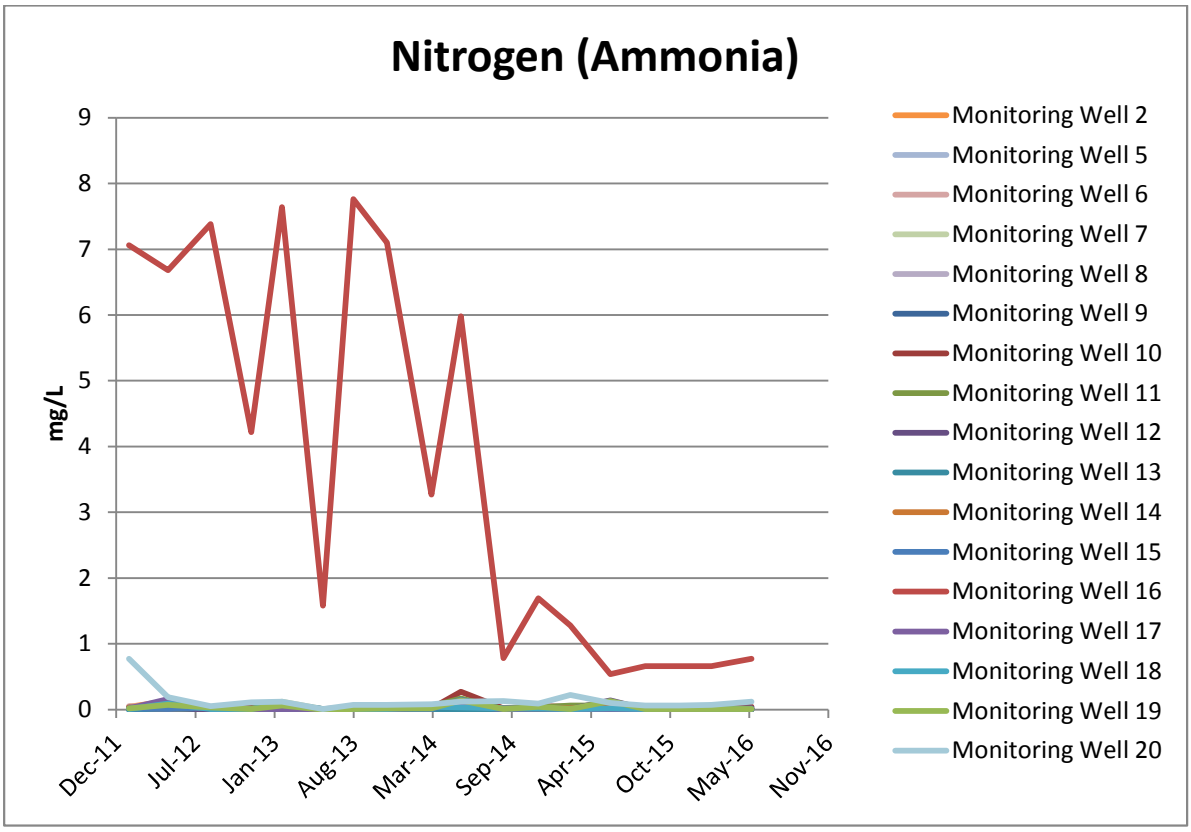
Figure 3.2.2.4 Magnesium results presentation



Monitoring well results are in line with historical levels and have maintained consistent levels. The magnesium levels sampled would be considered quite “hard” and consistent with other typical water hardness measures such as alkalinity and calcium.

Monitoring well 14 has demonstrated the must instability over the five year sampling period. However, all other wells appear relatively stable.

Figure 3.2.2.5 Nitrogen as ammonia results presentation

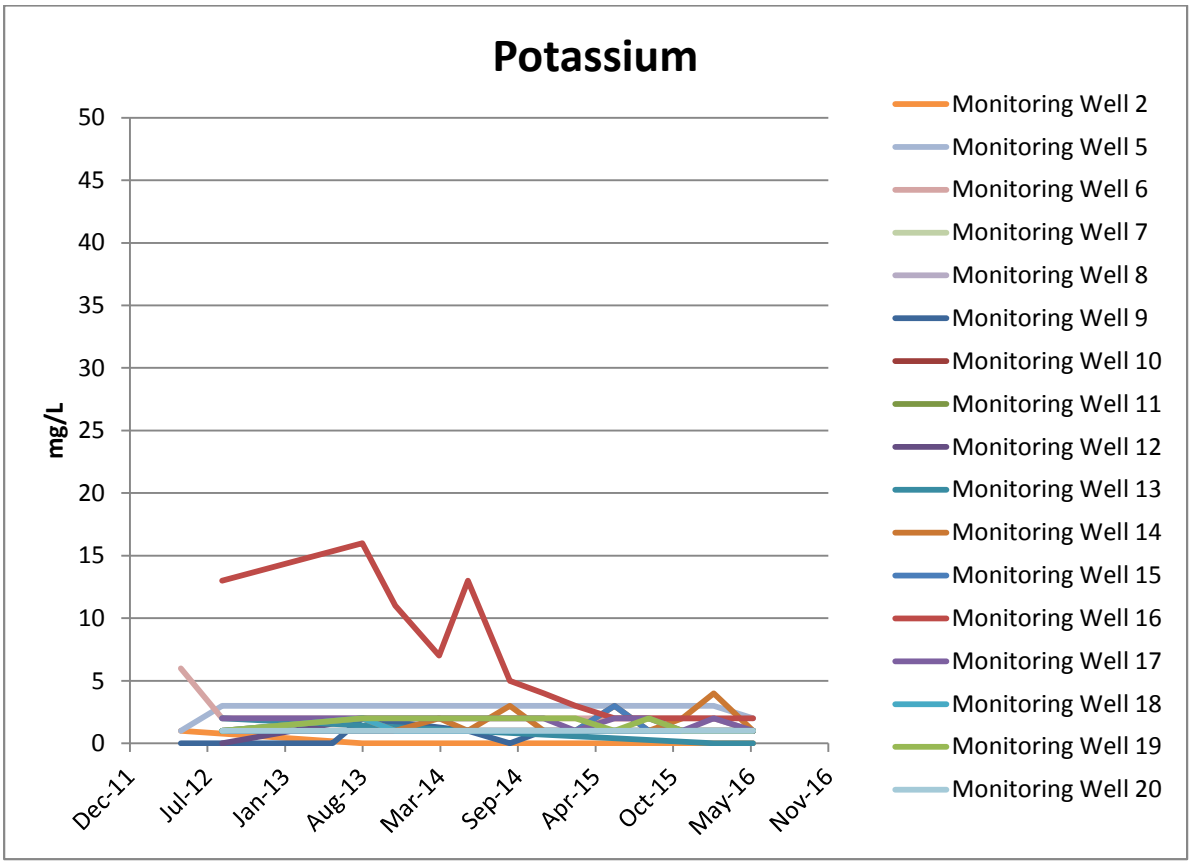


Ammonia is found in the environment, in the air, soil and water; in plants and animals. It is formed naturally by the decomposition of urine and manure. It is a source of nitrogen which is needed by plants and animals.

The monitoring wells indicate that ammonia levels in the groundwater are extremely low and often beneath the testing limits. However, monitoring point 16 has indicated a relatively higher result level. Considering that monitoring points 16 and 19 are arguably the most relevant with regard to groundwater movement away from the site, the result must continue to be monitored closely. Ammonia is arguably the clearest indicator of leachate contamination and the results from well 16 should continue to be monitored in future sampling events to be sure that the relative higher levels are not indicative of leachate migration.

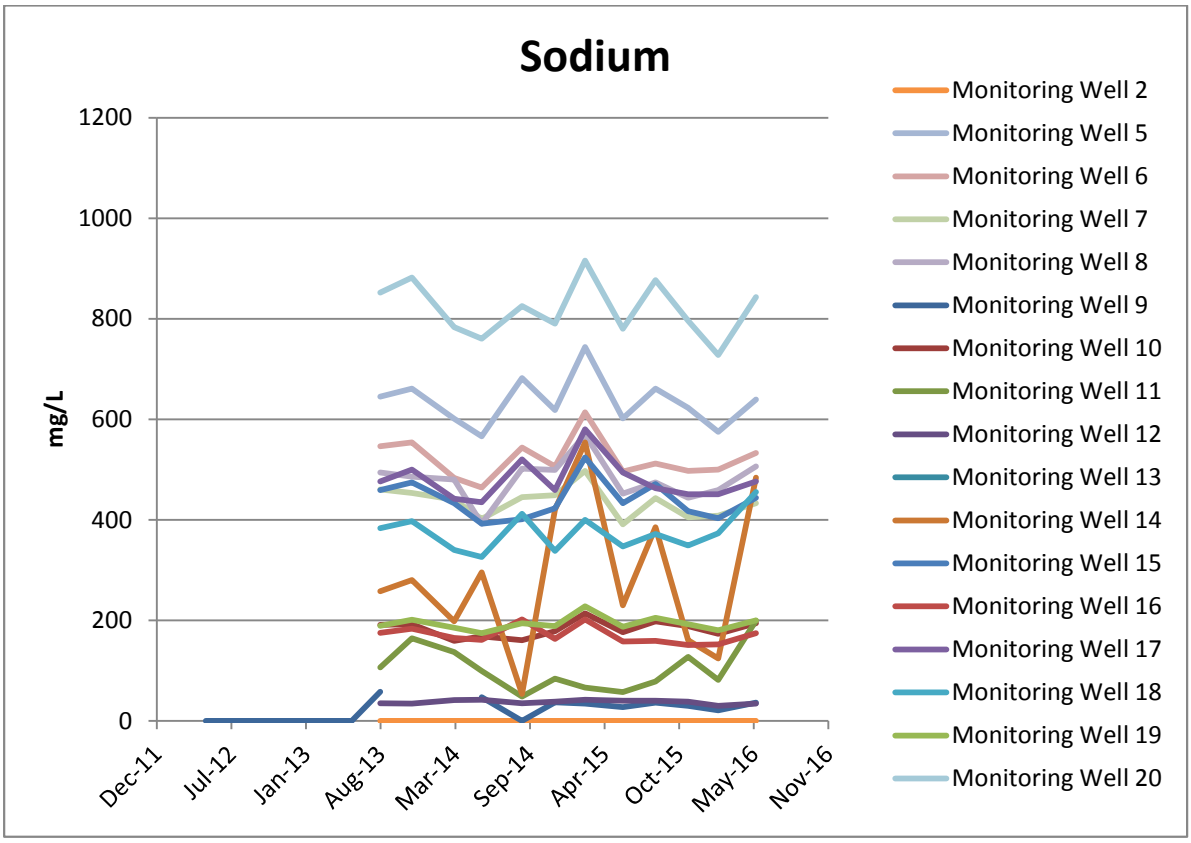
The data established over the reporting period indicates that ammonia levels in well 16 have started to stabilise at a low level of less than 1 mg/L, noting that up to 0.5 mg/L is considered suitable in drinking water.

Figure 3.2.2.6 Potassium results presentation



Potassium is present in groundwater systems outside coastal areas generally through weathering of clays and as a result of agriculture (leaching of fertiliser). Potassium may also be present in the breakdown of glass and especially cathode ray tubes. Groundwater monitoring wells indicate that potassium levels in the ground water are generally low over the available results period. Monitoring point 16 was reading higher than all other wells, but again is showing a positive overall downward trend.

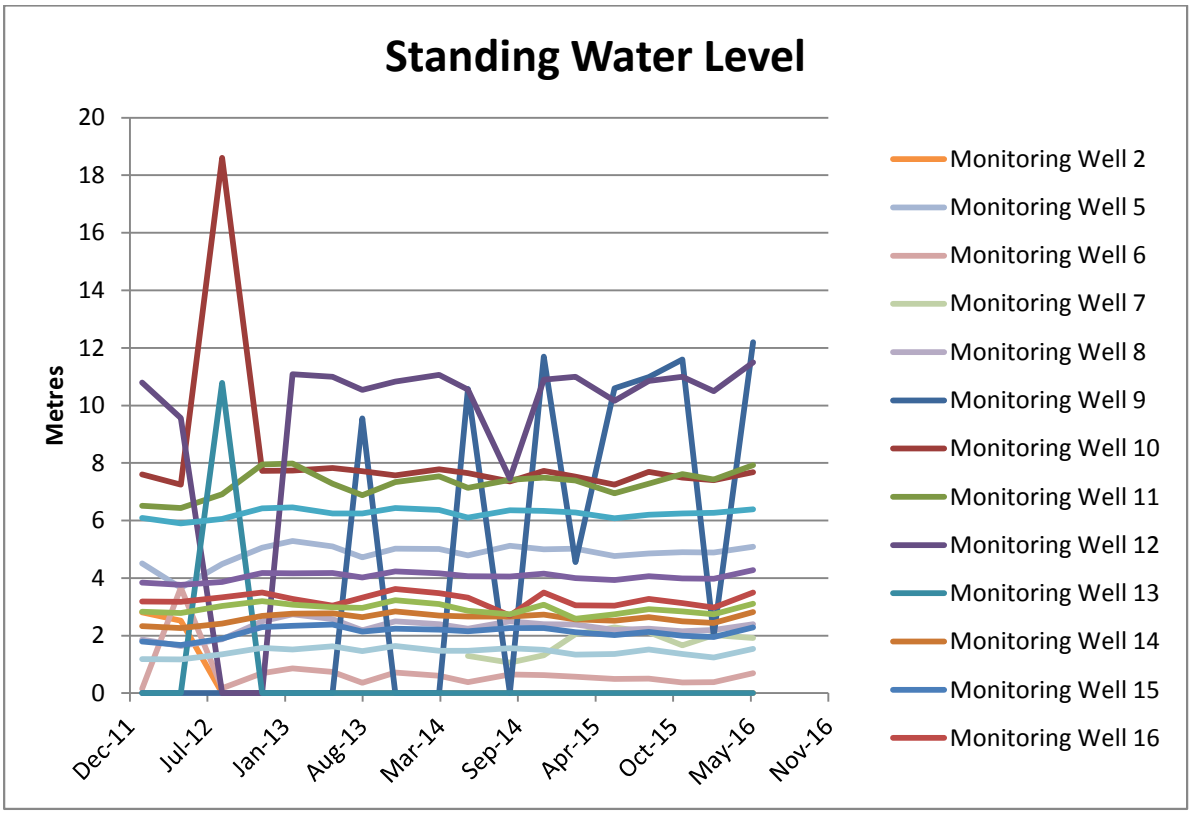
Figure 3.2.2.7 Sodium results presentation



High sodium levels can be indicative of leachate contamination infiltrating the groundwater. As presented, results for sodium over the reporting period have been in line with historical fluctuations experienced throughout the history of data available.

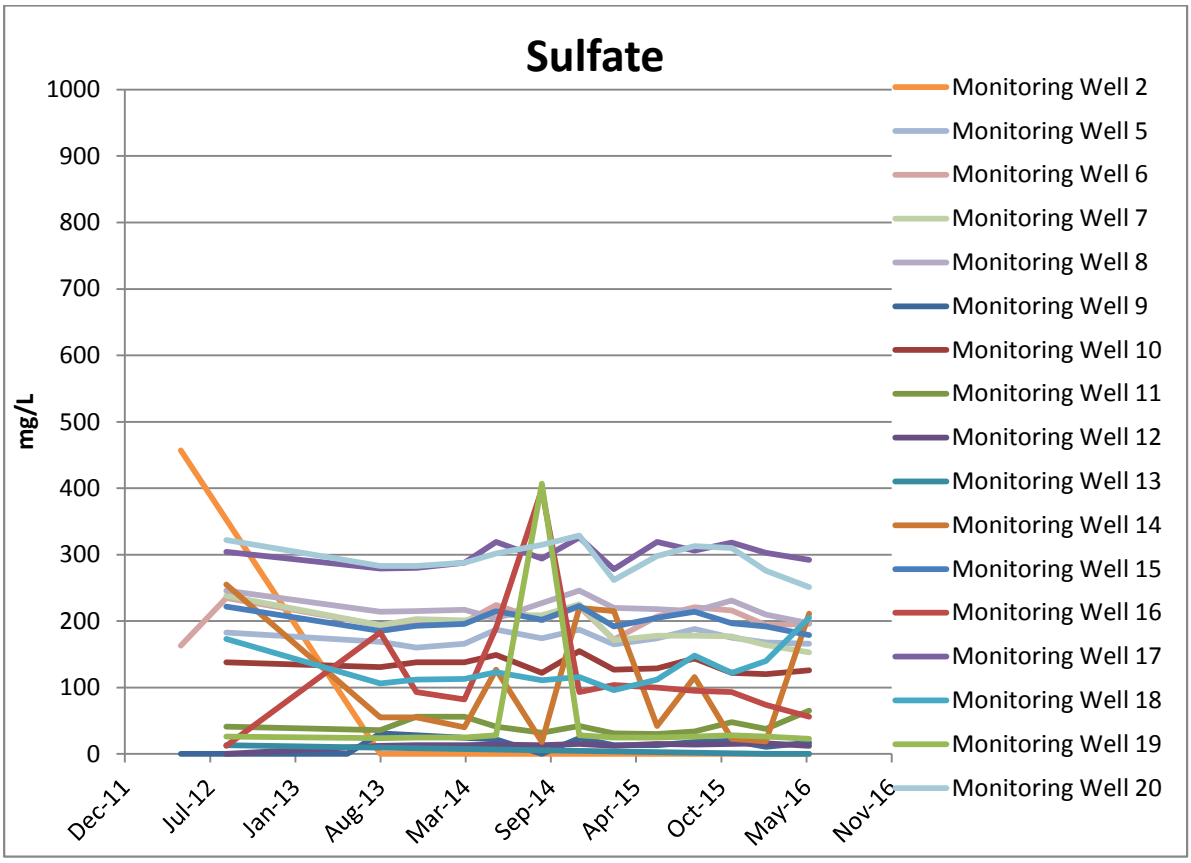
Monitoring well 14 most recently indicated an elevated fluctuation. However, the fluctuation is not a historic high level. Well 14 to be reviewed again at the next quarterly sampling event.

Figure 3.2.2.8 Standing water level presentation



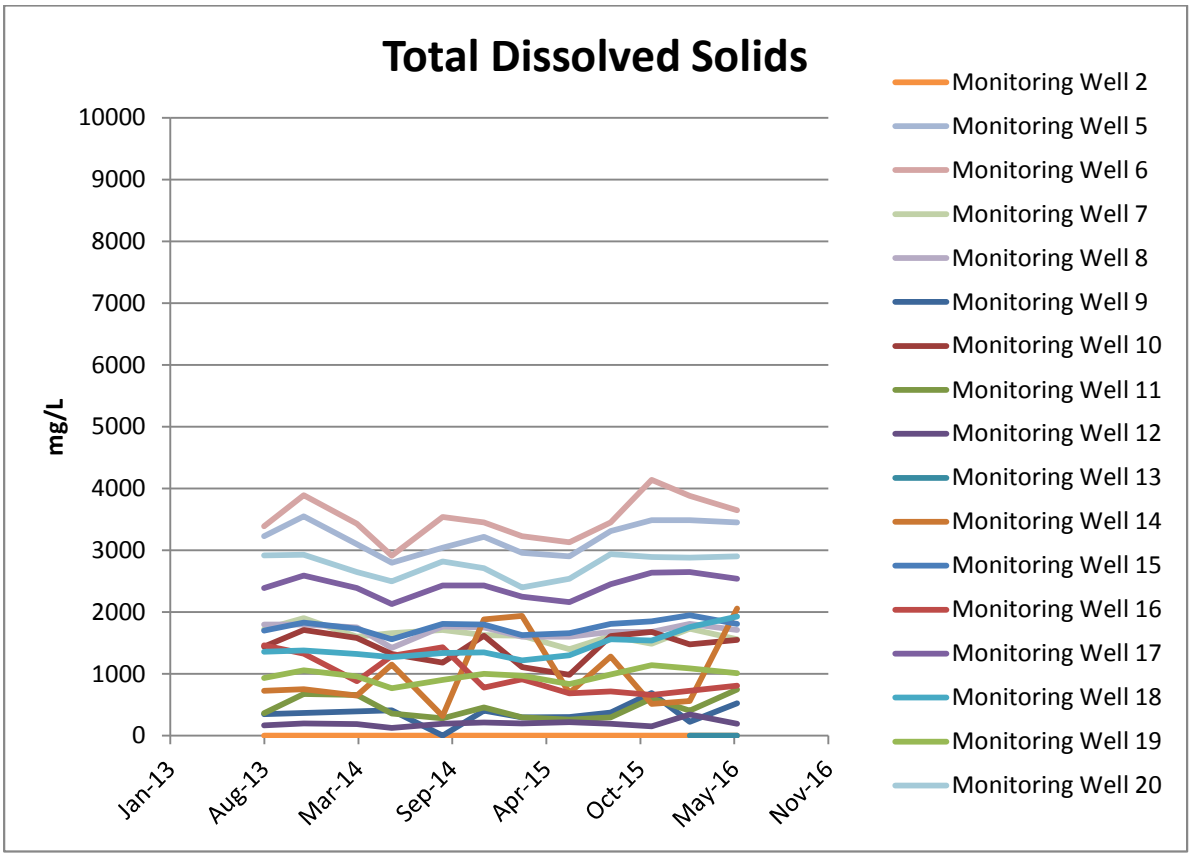
Groundwater level trends have been fairly stable, with the fluctuation over the five year testing period. It should be noted that some wells have run dry at periods, whilst well thirteen appears to be permanently dry.

Figure3.2.2.9 Sulfate results presentation



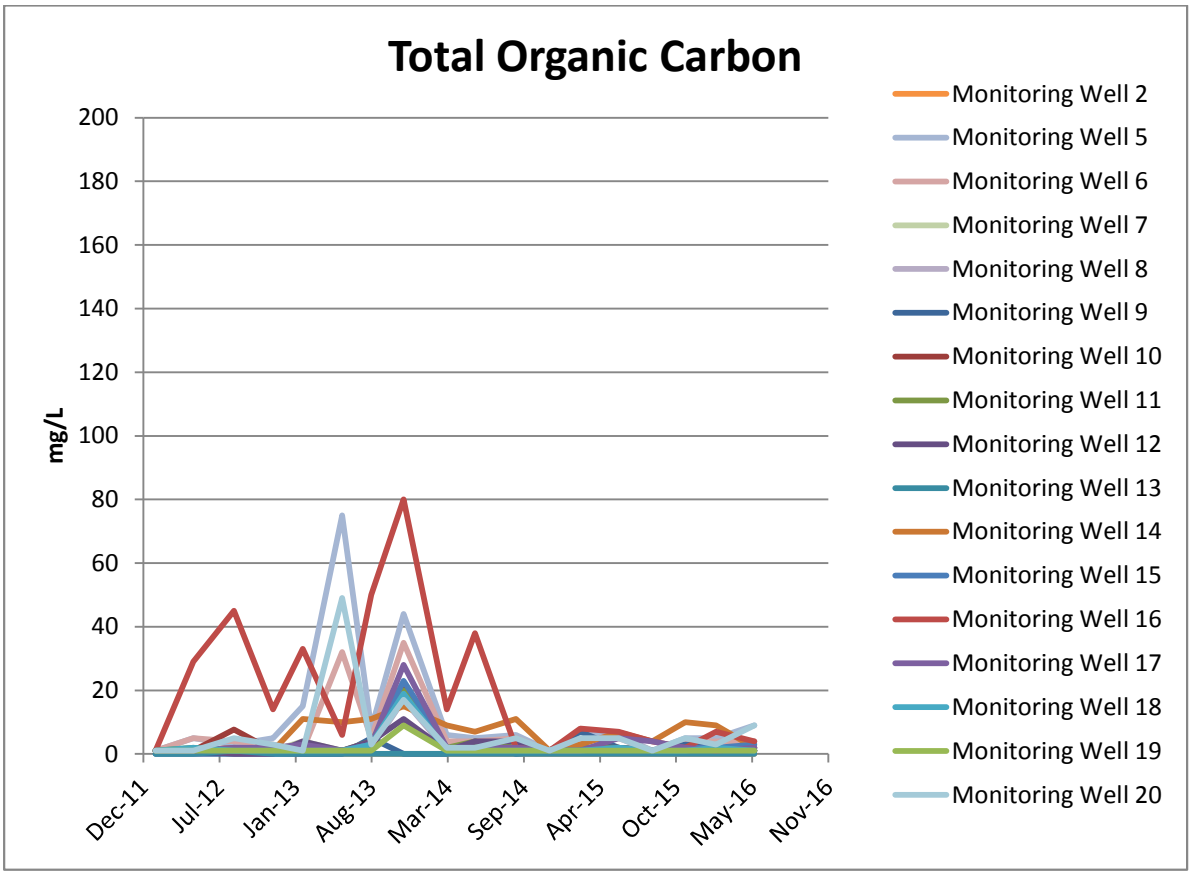
For context the *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the groundwater monitoring wells are in line with the historical levels experienced at the Site and are generally better than the drinkable water standard. Inorganic ions such as sulfate provide a good indication of groundwater contamination by landfill leachate.

Figure 3.2.2.10 Total dissolved solids results presentation



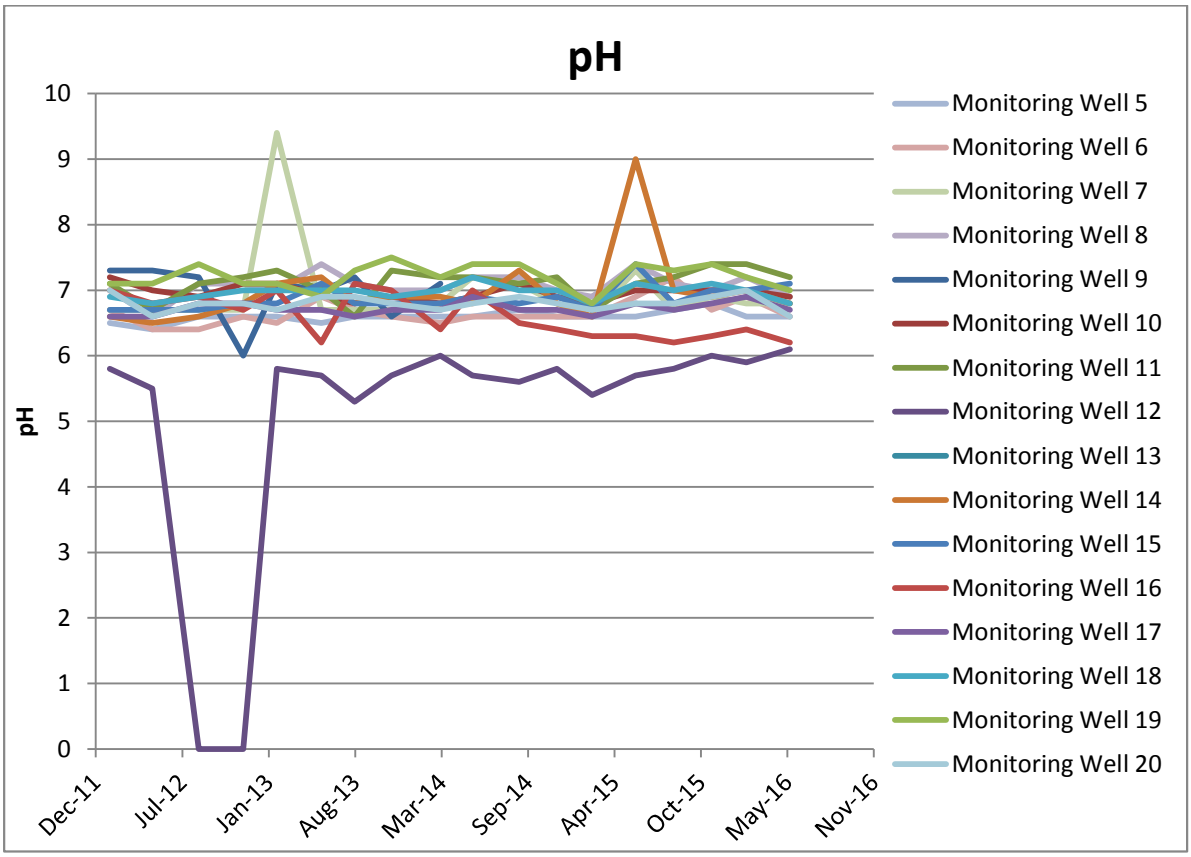
The trend for the quantity of dissolved solids has been fairly stable for the ground water monitoring wells over the reporting period, in line with historical trends. High levels of dissolved solids can be sourced from salts derived from leachate infiltration. Monitoring well 14 has most recently exhibited an upward fluctuation. Well 14 to be reviewed again at the next quarterly sampling event.

Figure 3.2.2.11 Total organic carbon results presentation



Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of groundwater contamination by organic compounds derived from the landfilling of organic materials. The amount of total organic carbon has remained relatively stable over recent years.

Figure 3.2.2.12 pH results presentation



The pH levels indicated in the groundwater monitoring wells have been extremely stable over the review period. The fluctuations have been very small except with minor anomalies that invariably return to a stable trend. The groundwater monitoring wells indicate that the historical pH of the groundwater has been maintained for over approximately five years.

3.2.3 Tabulated Results – Annual Monitoring

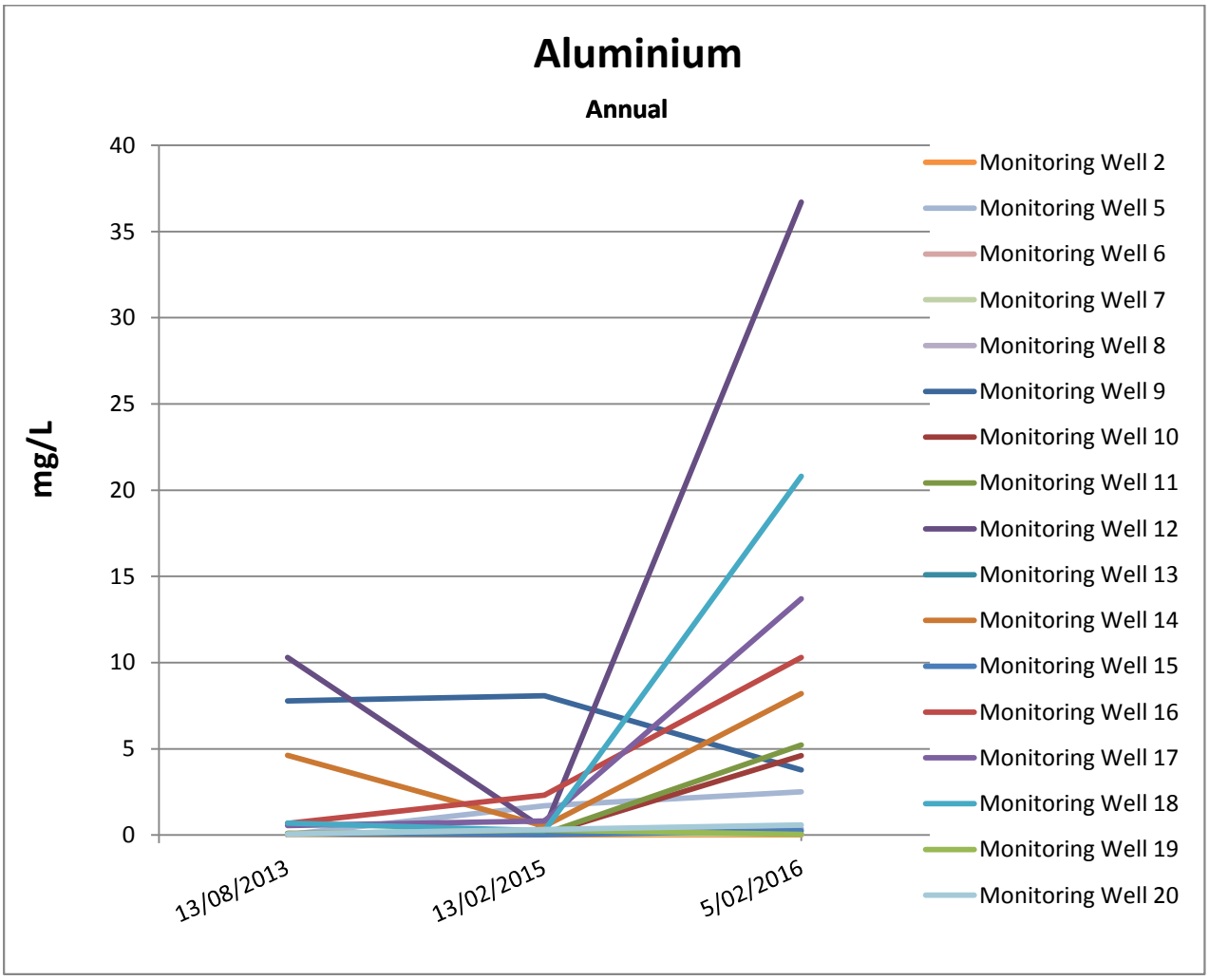
Note: Monitoring Point 2 is damaged and is scheduled for repair and Monitoring Point 13 was dry for the round of annual testing.

Table 3.2.3.1 Annual analyte testing results for 5 February 2016. *Note: Well destroyed

		Monitoring Points																
Analyte	**Units**	**2**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Aluminium	mg/L	*	2.51	0.08	0.06	0.38	3.77	4.61	5.22	36.7	Dry	8.2	.25	10.3	13.7	20.8	0.04	0.58
Arsenic	mg/L	*	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.002	Dry	0.002	<0.001	0.006	0.002	0.006	0.001	0.002
Barium	mg/L	*	0.01	0.014	0.005	0.09	0.028	0.042	0.025	0.127	Dry	0.113	0.015	0.311	0.041	0.103	0.134	0.056
Benzene	µg/	*	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/L	*	<0.0001	0.0001	<0.001	0.0002	<0.0001	0.0001	<0.0001	<0.0001	Dry	<0.00 01	<0.0001	0.0006	<0.00 01	<0.0001	<0.0001	<0.00 01
Chromium (hex.)	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Chromium (total)	mg/L	*	0.002	<0.001	<0.001	<0.001	<0.001	0.006	0.004	0.023	Dry	0.007	<0.001	0.012	0.013	0.01	0.001	0.001
Cobalt	mg/L	*	<0.001	0.003	<0.001	0.002	<0.001	0.0001	0.004	0.014	Dry	**0.007**	<0.001	0.048	0.013	0.017	<0.001	0.012
Copper	mg/L	*	0.007	0.009	0.004	0.01	0.01	0.08	0.018	0.059	Dry	0.025	0.018	0.045	0.024	0.045	0.004	0.014
Ethyl Benzene	µg/L	*	<2	<2	<1	<2	<2	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
Fluoride	mg/L	*	0.6	0.5	0.5	0.9	0.2	0.4	0.7	0.3	Dry	0.3	0.7	0.1	0.4	0.5	0.4	0.8
Lead	mg/L	*	0.002	<0.001	<0.001	0.003	0.002	0.009	0.005	0.02	Dry	0.007	<0.001	0.021	0.011	0.023	<0.001	0.004
Manganese	mg/L	*	0.05	0.428	0.005	0.178	0.028	0.336	0.413	0.676	Dry	0.624	0.011	3.22	0.524	0.755	0.03	1.7
Mercury	mg/L	*	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Dry	<0.00 01	<0.0001	<0.0001	<0.00 01	<0.0001	<0.0001	<0.00 01
Nitrate	mg/L	*	<0.01	<0.01	<0.01	0.01	0.26	0.13	0.02	0.84	Dry	0.02	0.06	0.04	0.16	<0.01	0.19	0.07
Nitrite	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OCP	µg/	*	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Dry	0.5	0.5	0.5	0.5	0.5	0.5	0.5
OPP	µg/	*	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Dry	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PAH	µg/	*	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/	*	<2	<2	<2	<2	<2	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
TPH	µg/	*	<50	<50	<50	<50	<50	<50	<50	<50	Dry	<50	<50	<50	<50	90	<50	<50
Total Phenolics	mg/L	*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	Dry	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene	µg/	*	<2	<2	<2	<2	<2	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
Zinc	mg/L	*	0.017	0.015	0.013	0.031	0.017	0.081	0.025	0.077	Dry	0.034	0.015	0.178	0.047	0.07	0.006	0.024

3.2.4 Data Presentation – Annual Monitoring

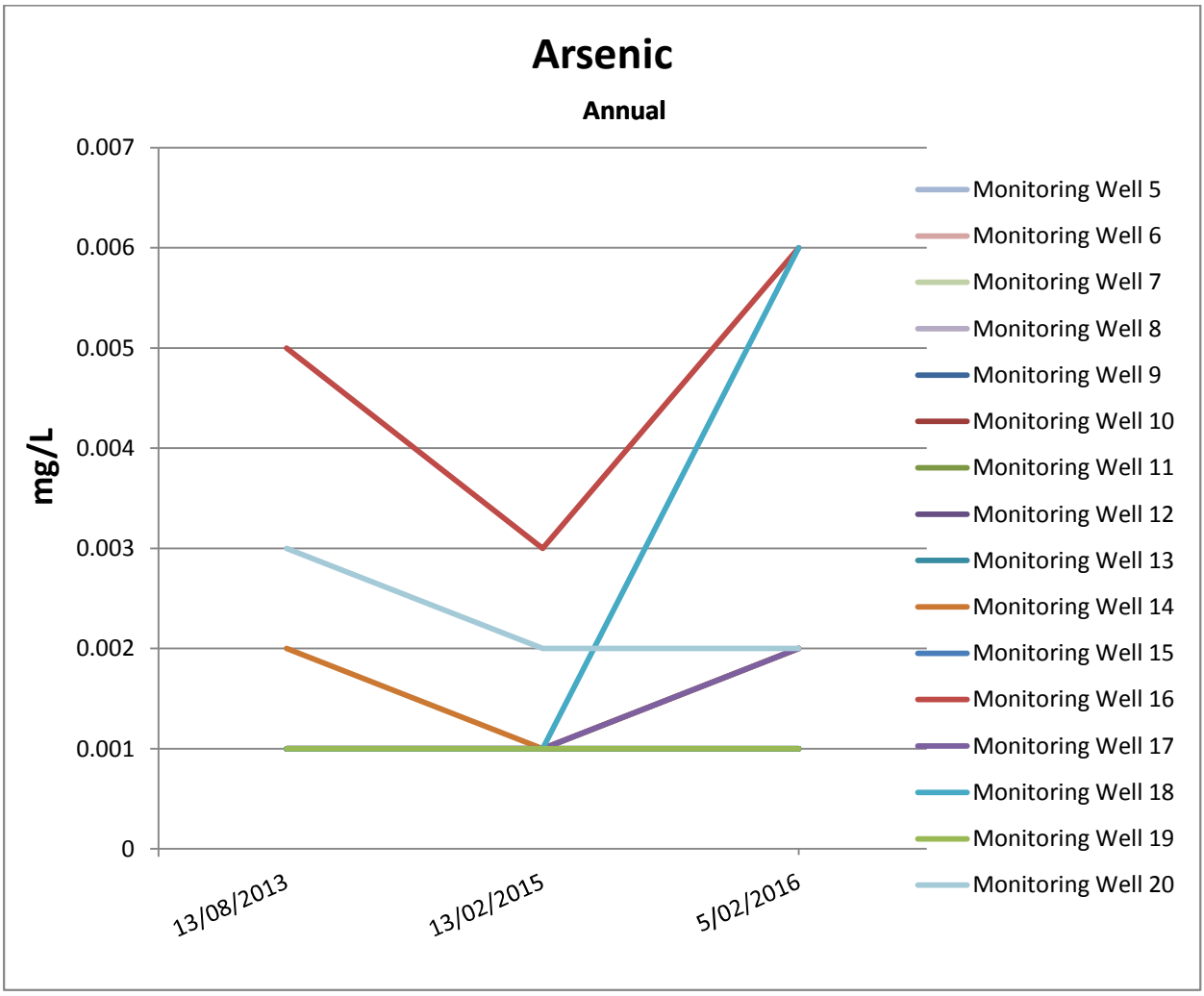
Figure 3.2.4.1 Aluminium results presentation



Aluminium levels in the sampled groundwater monitoring points 12 and 18 are relatively higher than the other point's onsite. Whilst aluminium is naturally abundant in rocks and soil (third most abundant element in the earth's crust), anthropogenic releases are typically in the form of air emissions, waste water effluents, and solid waste primarily associated with industrial processes, such as aluminium production.

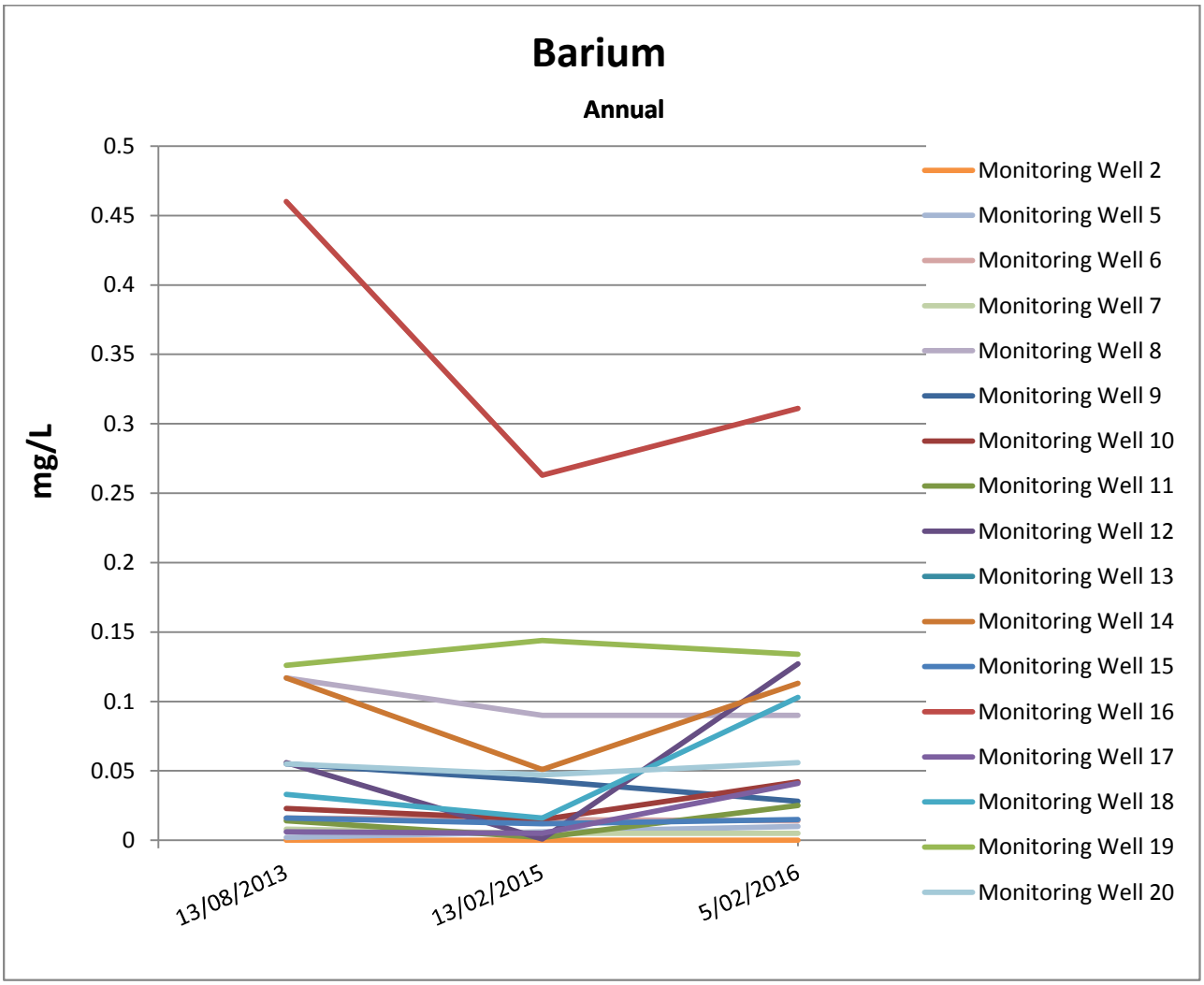
Monitoring well 12 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing.

Figure 3.2.4.2 Arsenic results presentation



The US EPA sets the maximum contaminant level of arsenic in groundwater at 0.05mg/L. Therefore amount of arsenic found in the groundwater monitoring wells over the reporting period is considered to be extremely low. In fact arsenic levels are below detectable limits (0.001 mg/L) in the majority of the test results.

Figure 3.2.4.3 Barium results presentation

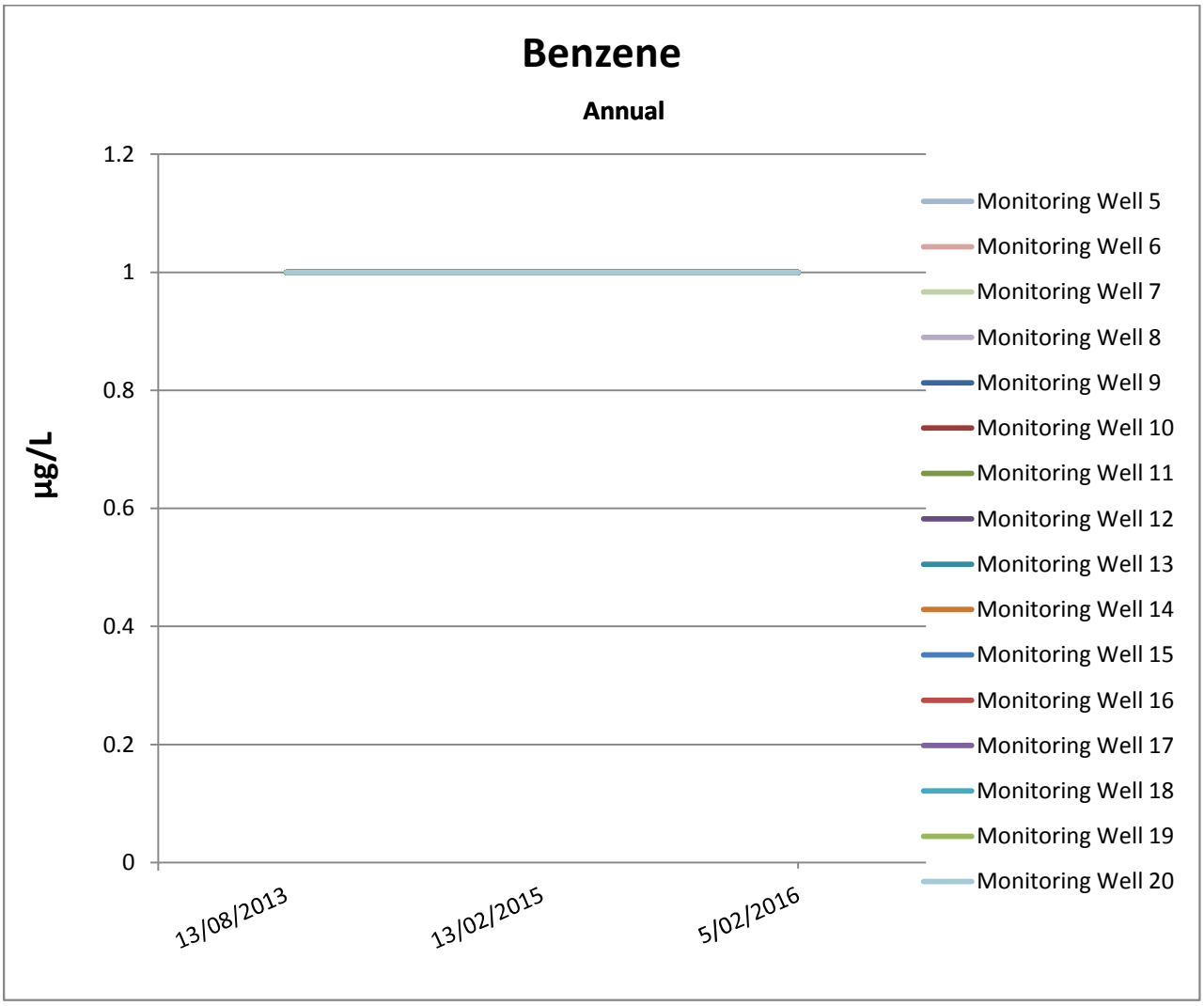


Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 2 mg/L of barium is safe for consumption. Barium levels are therefore extremely low and stable in the sites groundwater.

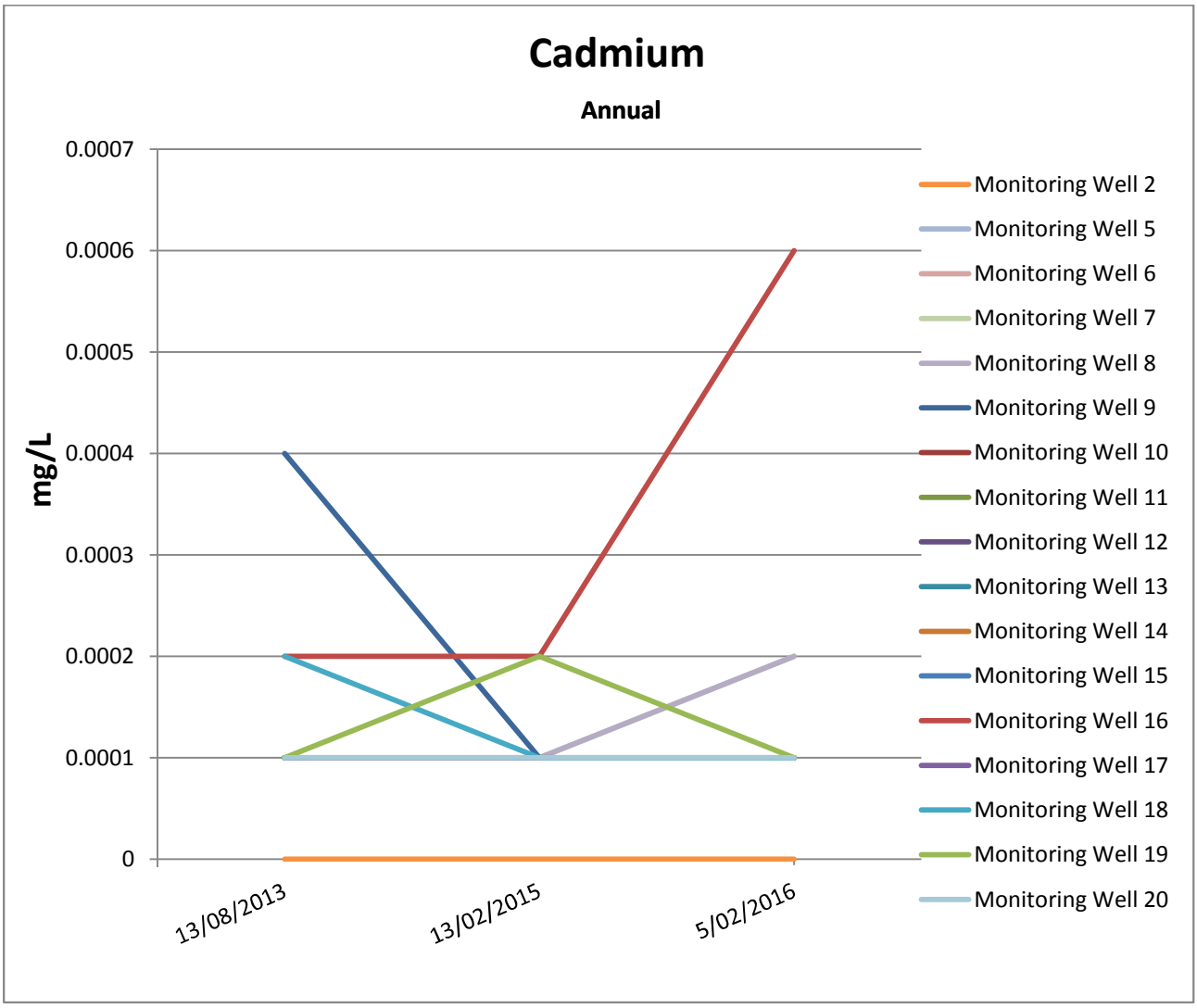
Monitoring well 10 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing.

Figure 3.2.4.4 Benzene results presentation



Benzene concentrations are non-existent at the Site. Every instance of benzene sampling has not yielded a result due to the concentration of benzene being below laboratory testing thresholds.

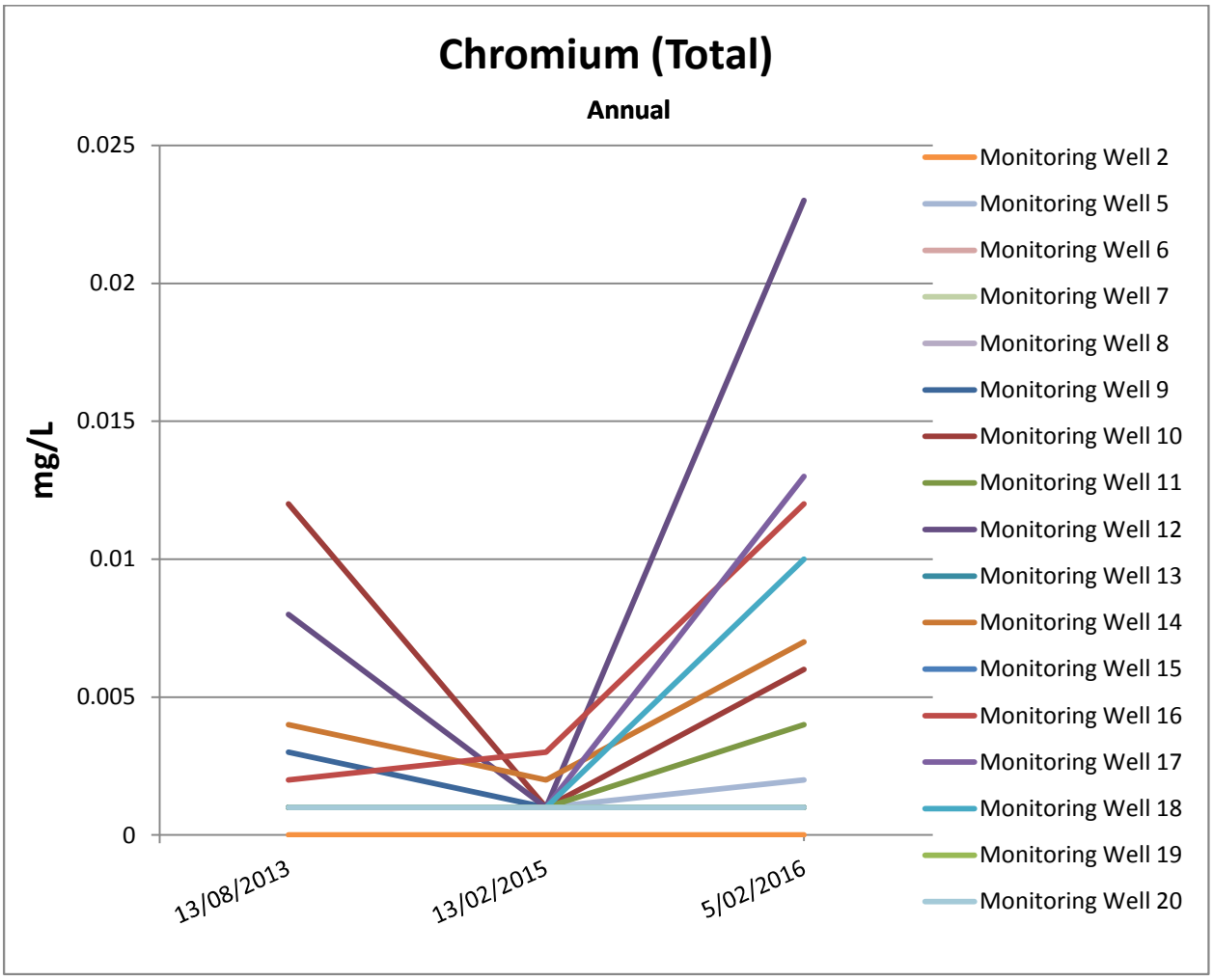
Figure 3.2.4.5 Cadmium results presentation



The US EPA sets the maximum contaminant level of cadmium in groundwater at 0.01mg/L. Cadmium levels present in the ground water monitoring wells are extremely low. Cadmium levels are always below 0.01 mg/L and below detectable limits in the majority of readings taken during the reporting period.

Whilst monitoring well 10 exhibits relatively higher concentrations of cadmium, the real concentration of up to 0.0006 mg/L is extremely low.

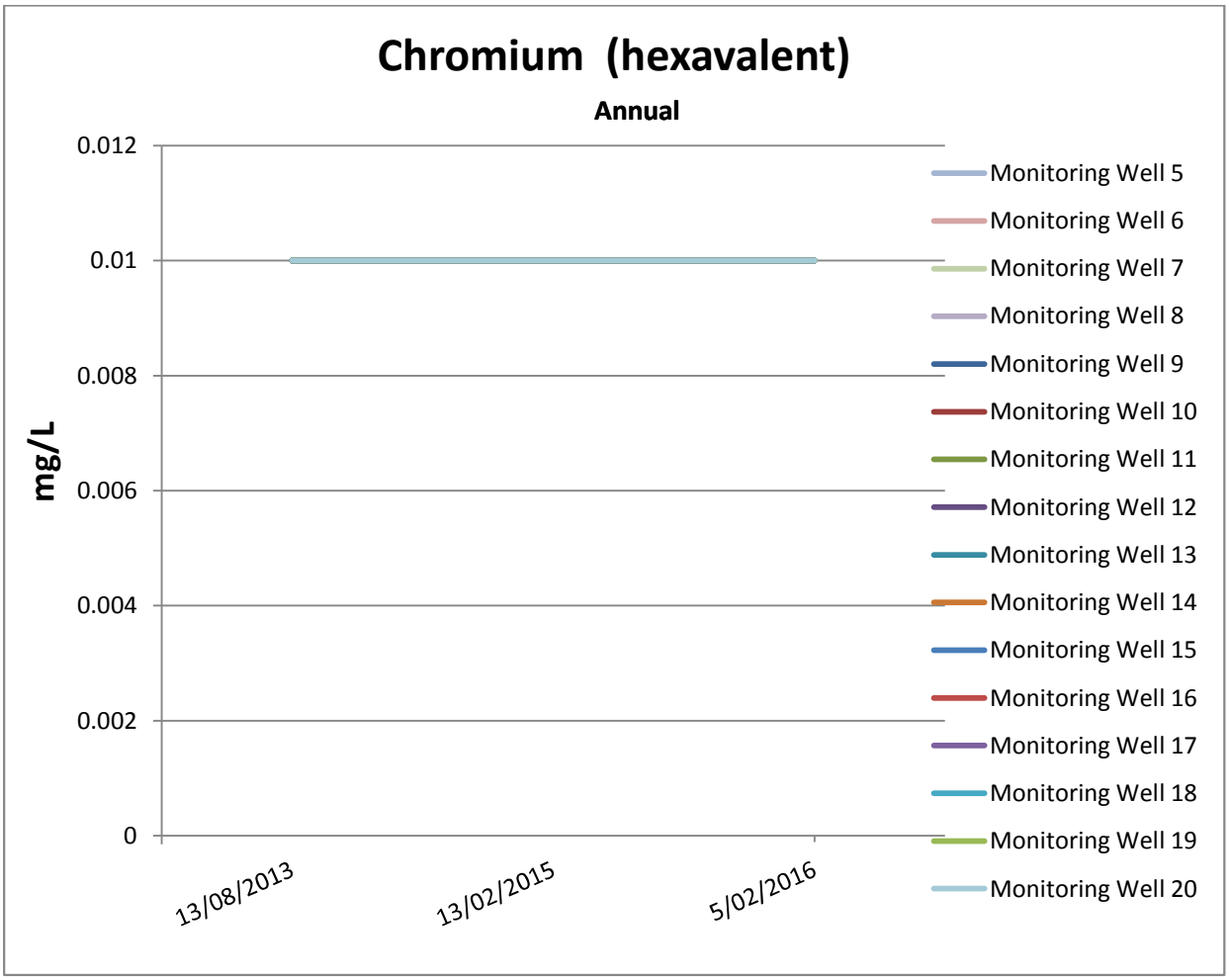
Figure 3.2.4.6 Chromium results presentation



The US EPA sets the maximum contaminant level of chromium in groundwater at 0.05mg/L The levels of chromium detected in the ground water monitoring wells over the reporting period have been extremely low.

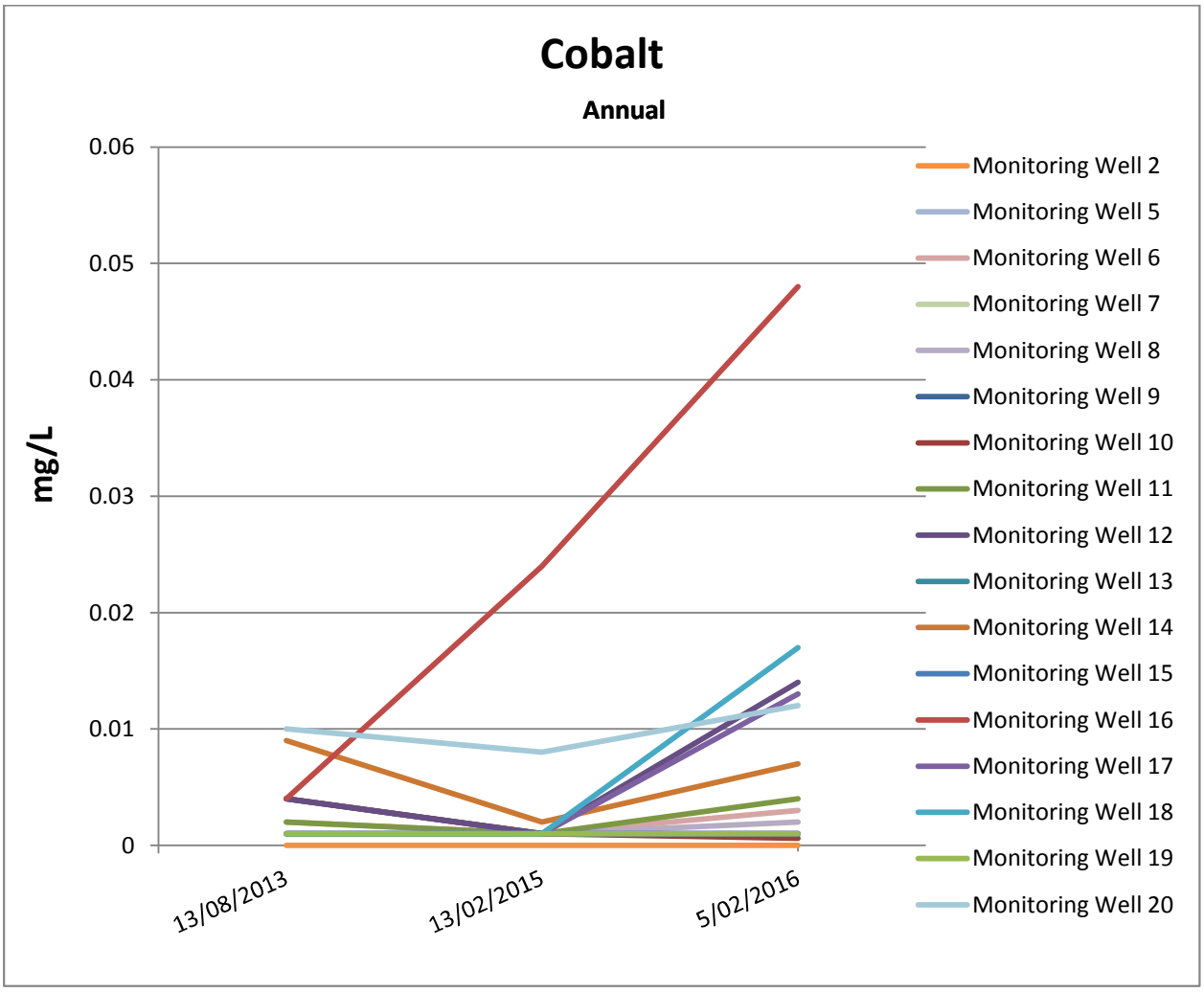
Monitoring well 12 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing.

Figure 3.2.4.7 Chromium (hexavalent) results presentation



Hexavalent chromium has not been detected in any samples taken for the Site. The demonstrated model shows that the concentration of hexavalent chromium results received is below laboratory testing thresholds.

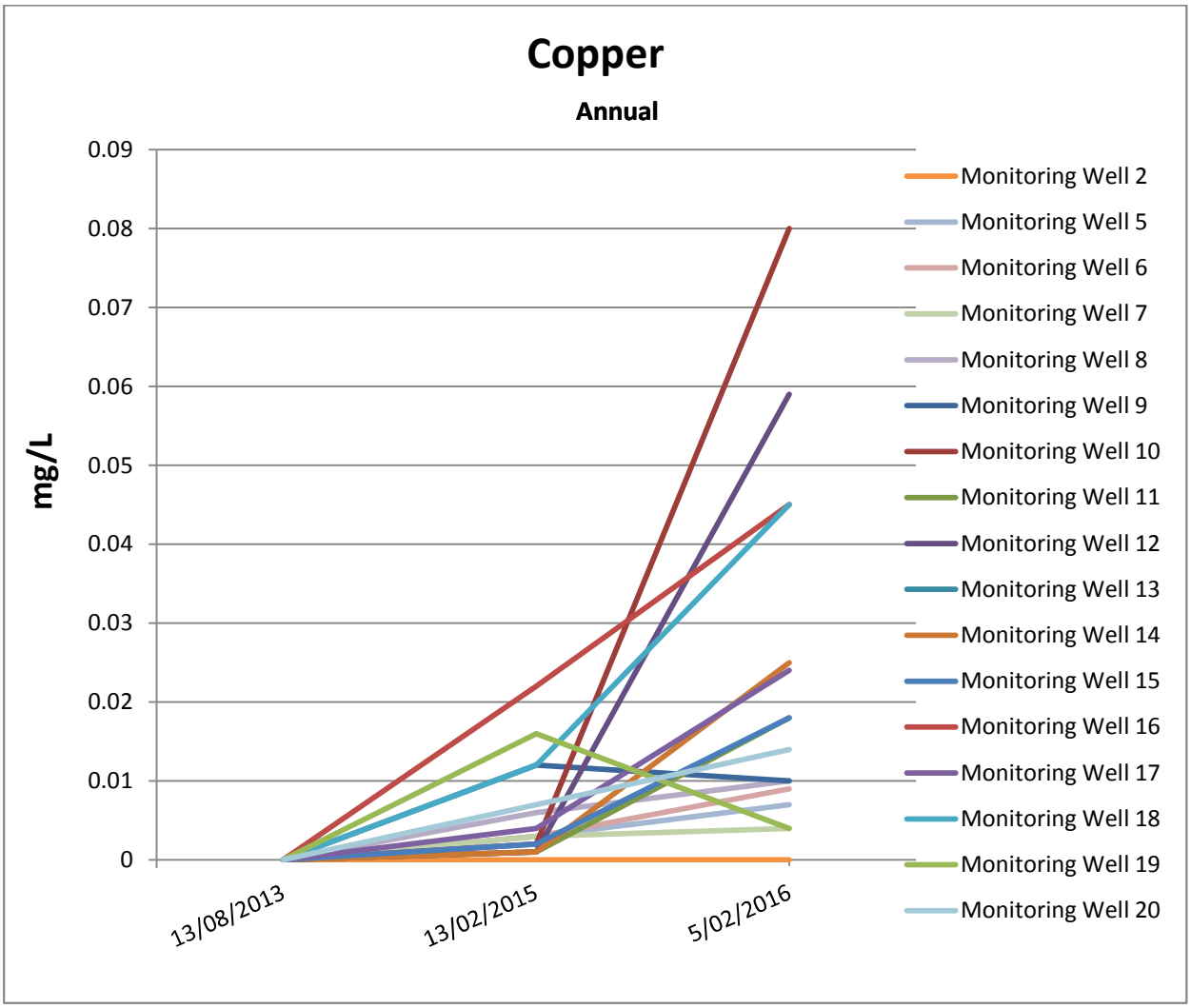
Figure 3.2.4.8 Cobalt results presentation



Anthropogenic sources of cobalt in the environment include agricultural runoff (trace amounts), sewage effluent, paints, inks and from electroplating in batteries. Worksafe Australia limits cobalt exposure to 0.05 mg/m^3 over 8 hours. The comparison concentration of cobalt in well 10 is one thousand times lower at 0.00005 mg/m^3.

The relatively higher level of cobalt in well 16, whilst still exceedingly low, is noteworthy and should be re-reviewed during the next round of annual testing. Accumulation is not thought to be an issue due to cobalt's small half-life.

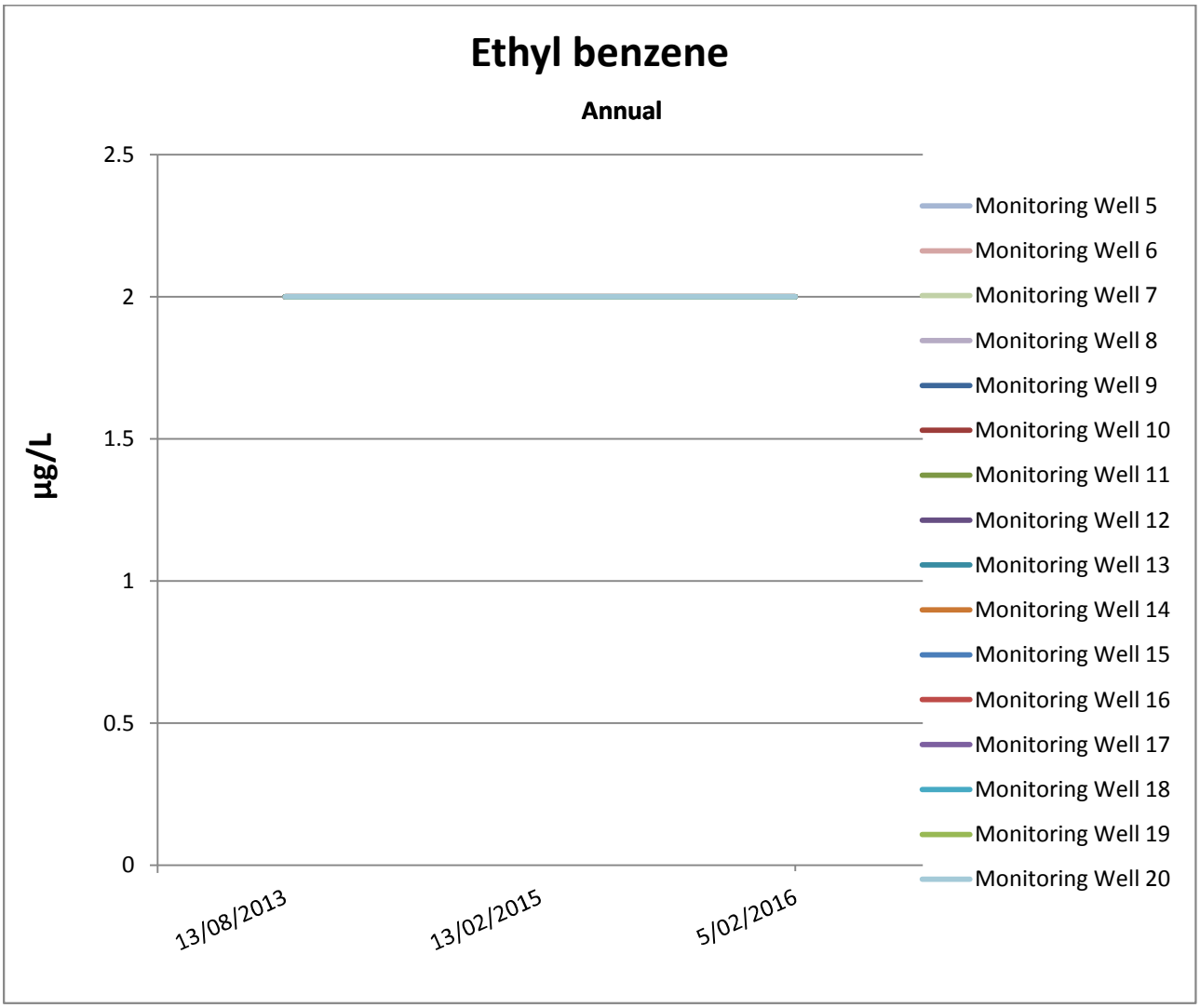
Figure 3.2.4.9 Copper results presentation



Tested results from the ground water monitoring wells show an extremely small amount of copper. The *2011 Australian Drinking Water Guidelines 6* prescribes an aesthetic limit of 1 mg/L of copper in drinking water. Clearly, the results therefore indicate that copper contamination is not evident.

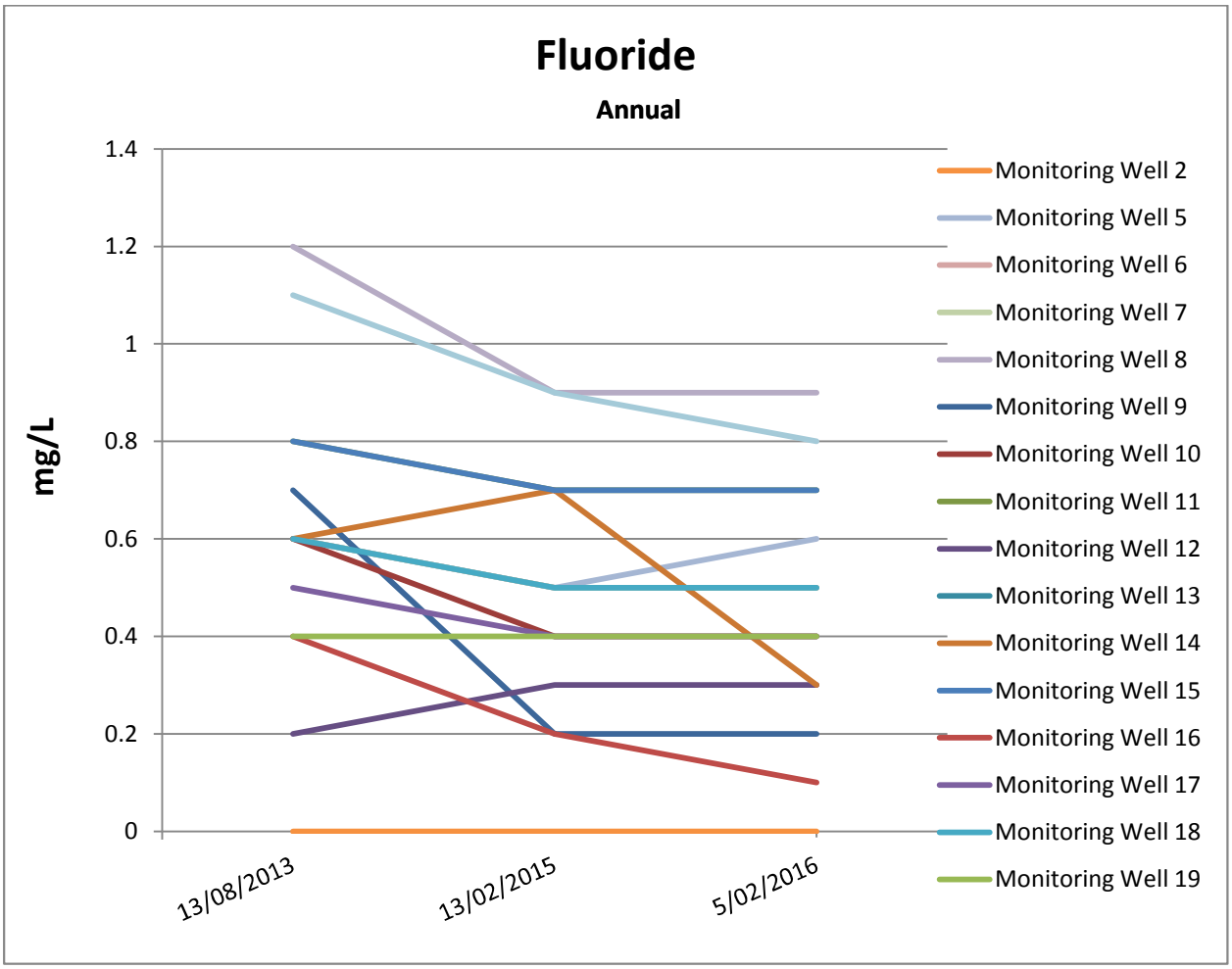
Monitoring wells 10 and 12 are located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. Whilst the levels appear relatively high, the actual concentration is still considered as very low.

Figure 3.2.4.10 Ethyl Benzene results presentation



Ethyl benzene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity above laboratory testing limits.

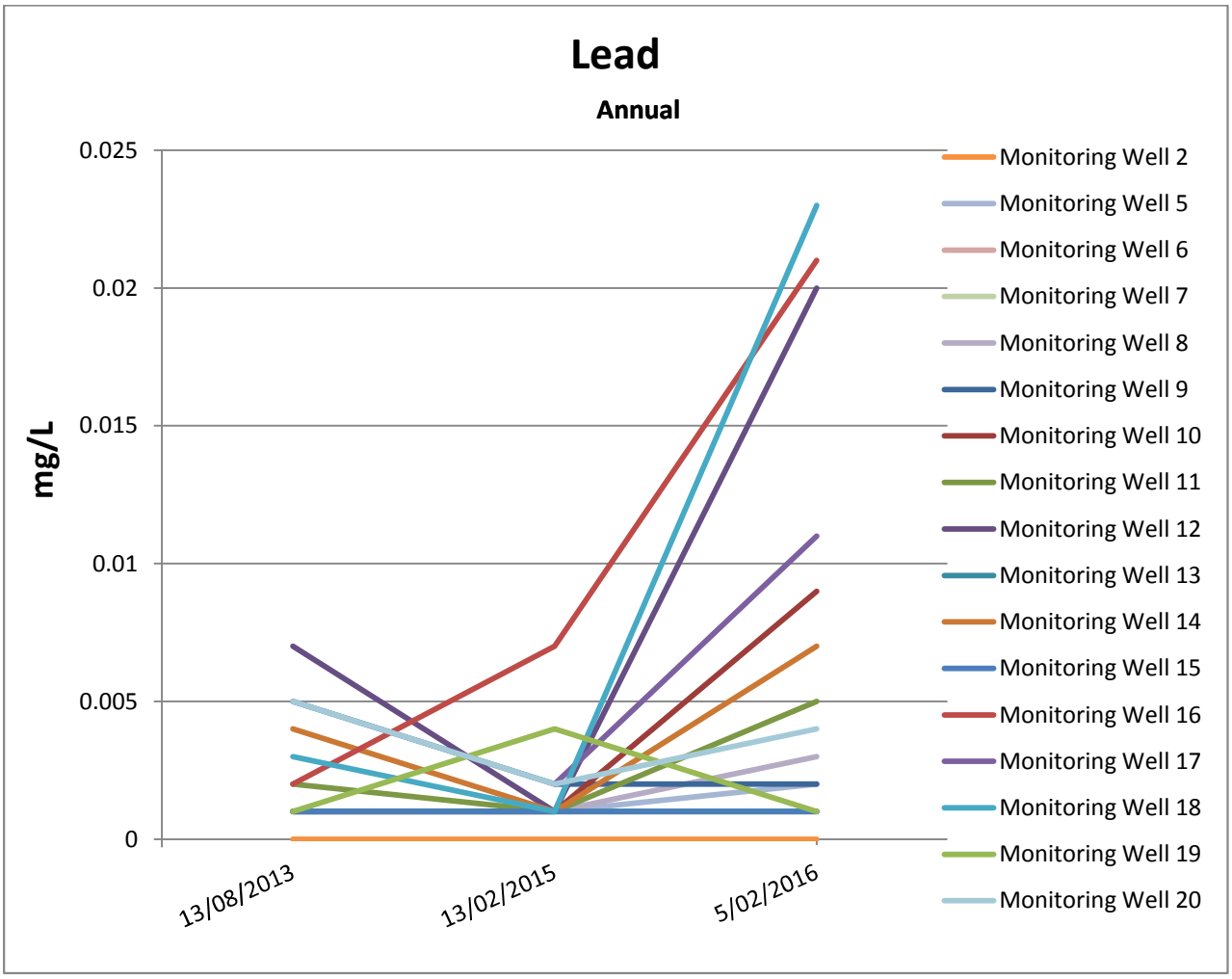
Figure 3.2.4.11 Fluoride results presentation



Industrial emissions are understood to be the primary anthropogenic pathway for fluoride to enter the environment. The US EPA sets the maximum contaminant level of fluoride in groundwater at 4 mg/L. Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L.

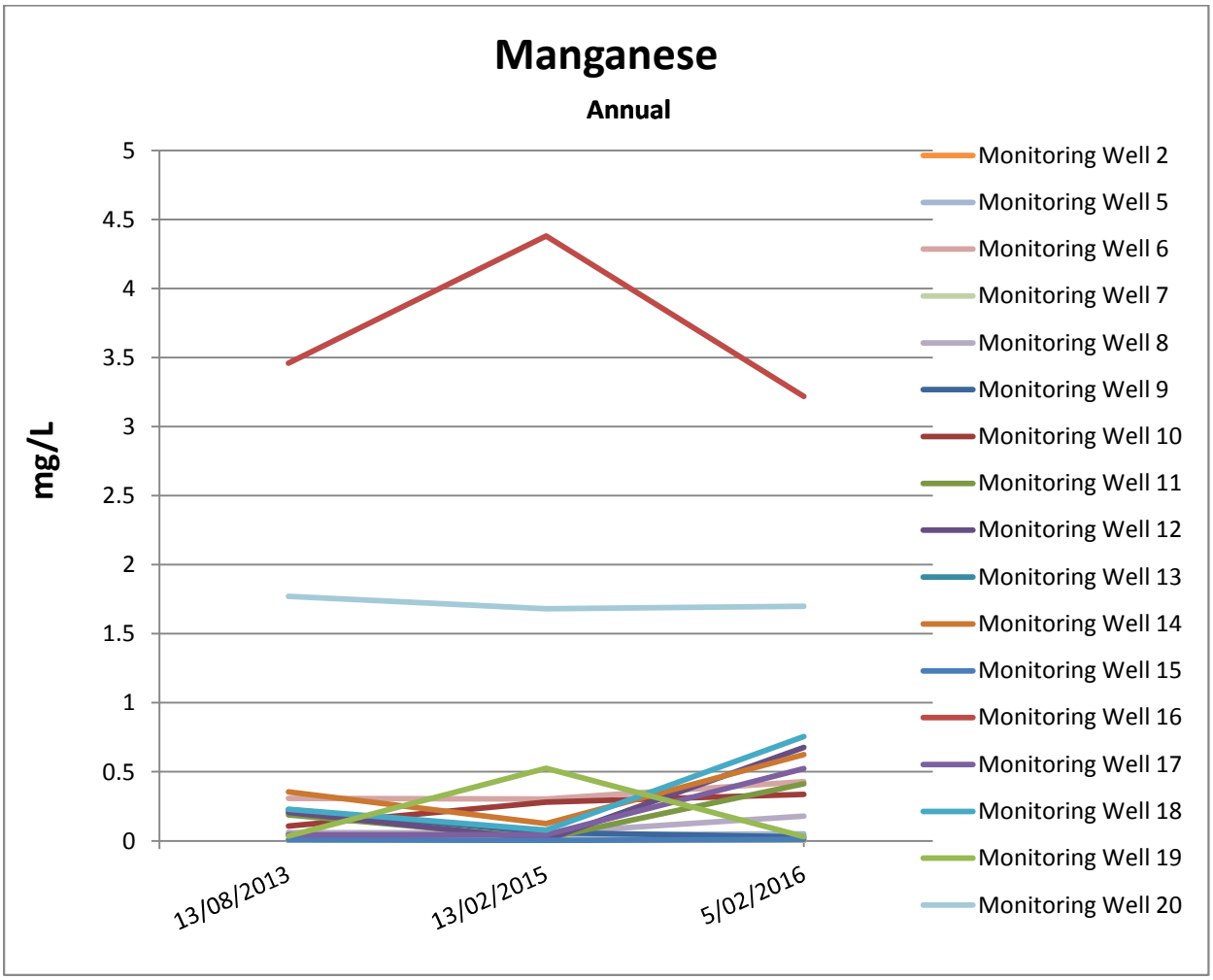
The fluoride concentrations found in the Sites groundwater are considered to be quite stable.

Figure 3.2.4.12 Lead results presentation



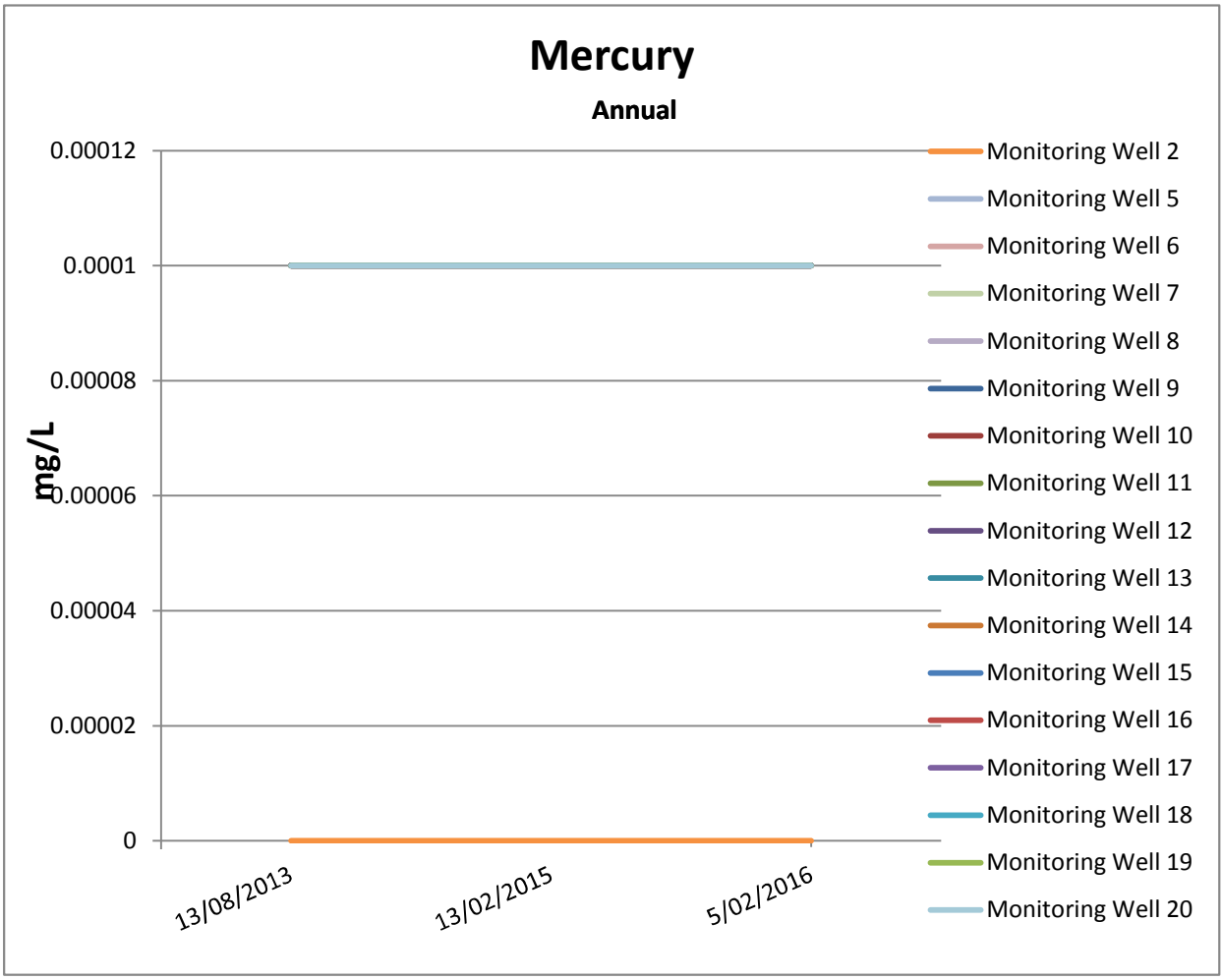
Heavy metal contamination in the groundwater in the form of lead is at very low levels. The presented data on the surface appears to indicate a steep climb of most locations during the reporting period. However, the results are extremely close to the testing limits achievable in a laboratory. For perspective, 95% of the samples taken indicate that lead levels are safe to consume.

Figure 3.2.4.13 Manganese results presentation



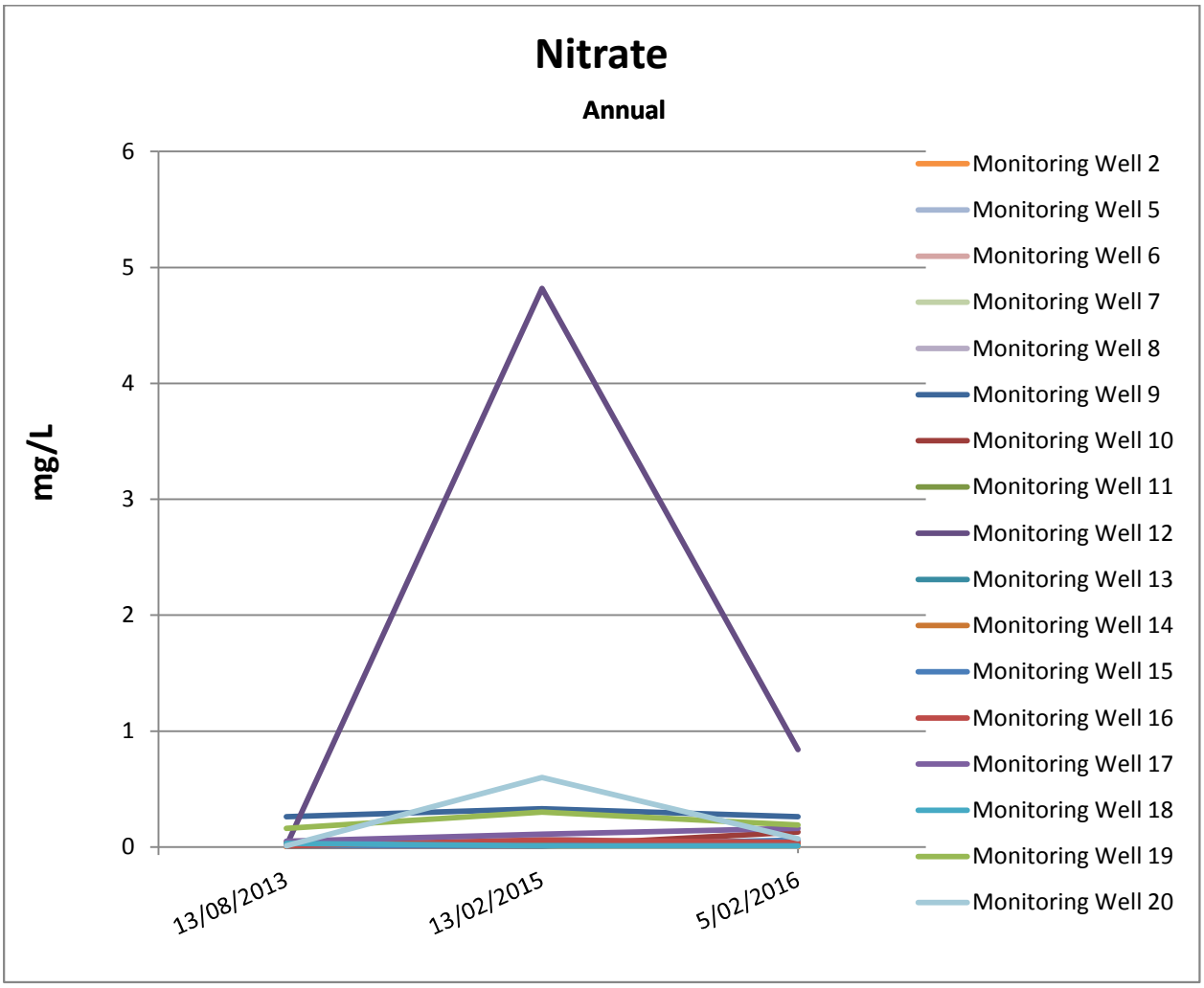
Manganese can be a strong indicator of landfill leachate in groundwater leached from hazardous waste sites and commonly derived from battery disposal. Monitoring points 16 and 20 have demonstrated relatively higher levels of manganese over the three year monitoring history. These results are at odds with surrounding monitoring wells and are separated by other wells that do not show elevated results. Continued annual monitoring will help determine the stability of manganese concentration in these locations.

Figure 3.2.4.14 Mercury results presentation



Mercury has not been detected at any level at the Site. All results provide concentrations below the limit of laboratory testing.

Figure 3.2.4.15 Nitrate results presentation



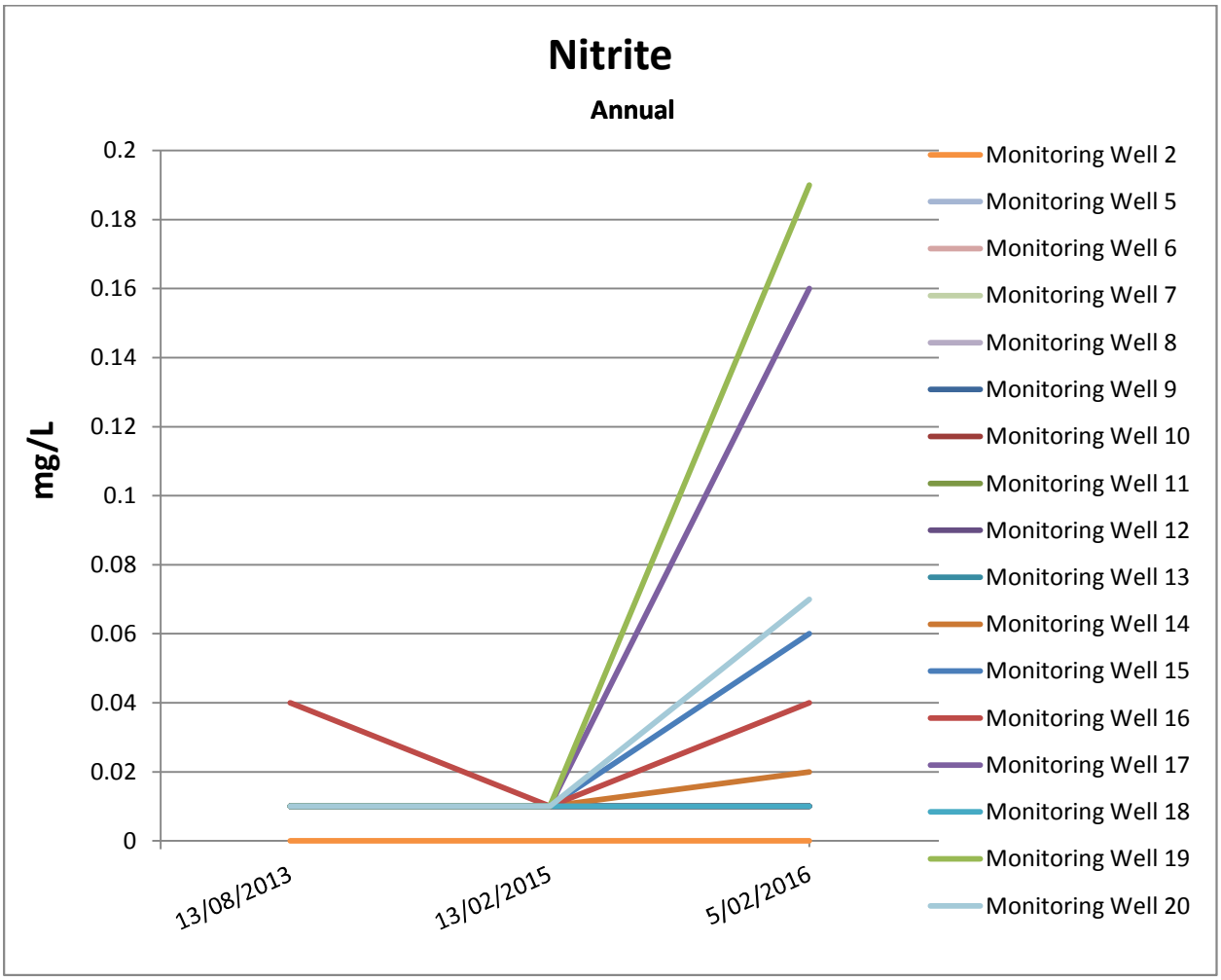
The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 50 mg/L of nitrate is safe for consumption.

Nitrate and nitrite are naturally occurring ions that are part of the nitrogen cycle that includes the decomposition of organic matter, such as what takes place in landfills. Denitrification is a process common in leachate treatment where the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form occurs. Under anoxic conditions microorganisms consume the oxygen in the nitrate and liberate the nitrogen.

The World Health Organisation suggests that nitrate concentration in surface water is normally between up to 18 mg/L, therefore the levels found in the monitoring wells on Site are considered to be relatively low.

Monitoring wells 12 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. The elevated 2015 result has more recently started to return to the concentration found in other monitoring wells.

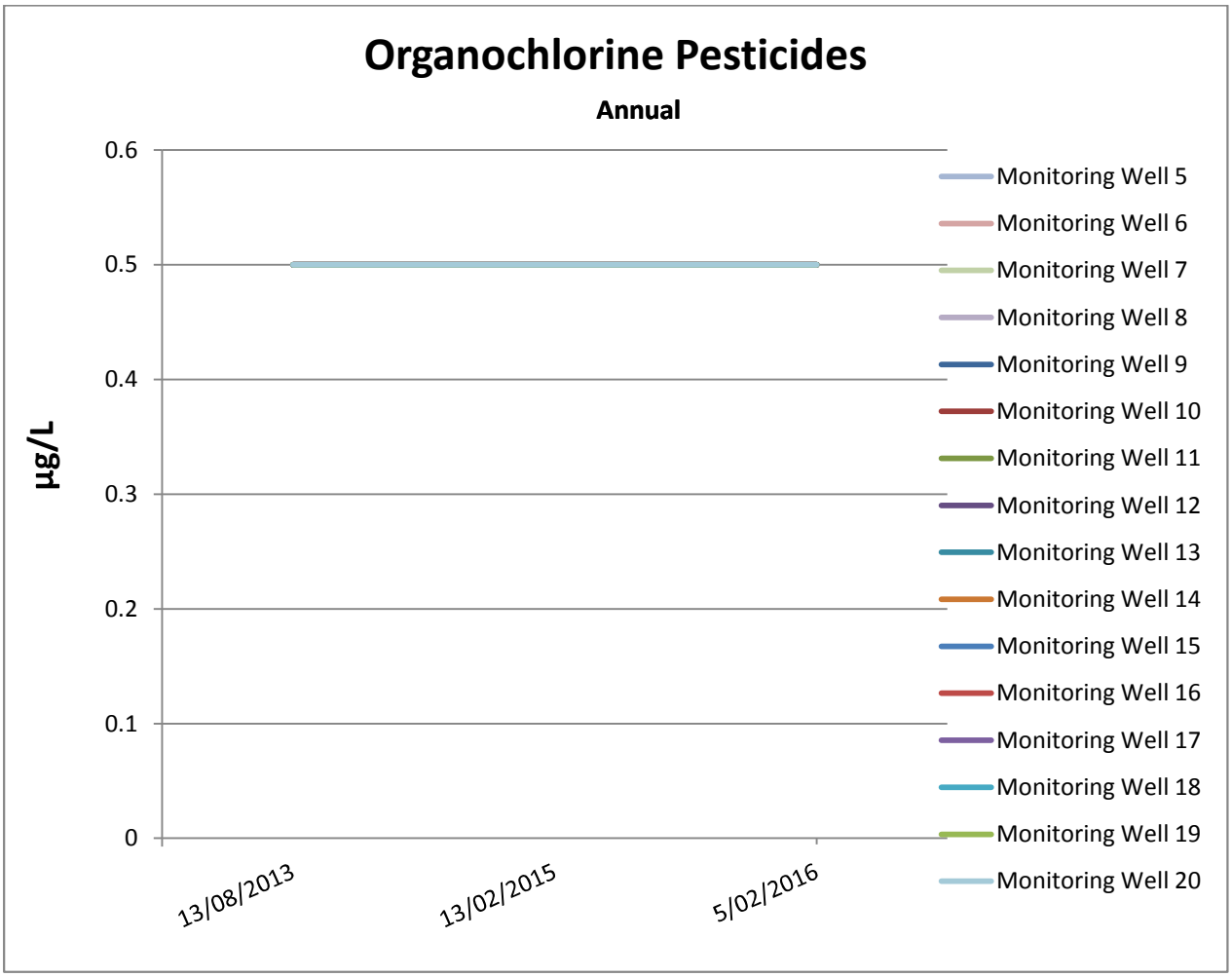
Figure 3.2.4.16 Nitrite results presentation



Nitrification is a twostep aerobic biological process where bacteria known as nitrosomonas convert ammonia and ammonium to nitrite. Next, bacteria called nitrobacter finish the conversion of nitrite to nitrate. The conversion of nitrite to nitrate is generally very fast and nitrite levels are therefore invariably quite low. More toxic than nitrate, nitrite is an indicator of ammonia (major constituent of landfill leachate) that has not been biologically processed (into nitrate). Nitrite levels above 3 mg/L are considered potentially harmful by the *2011 Australian Drinking Water Guidelines 6*.

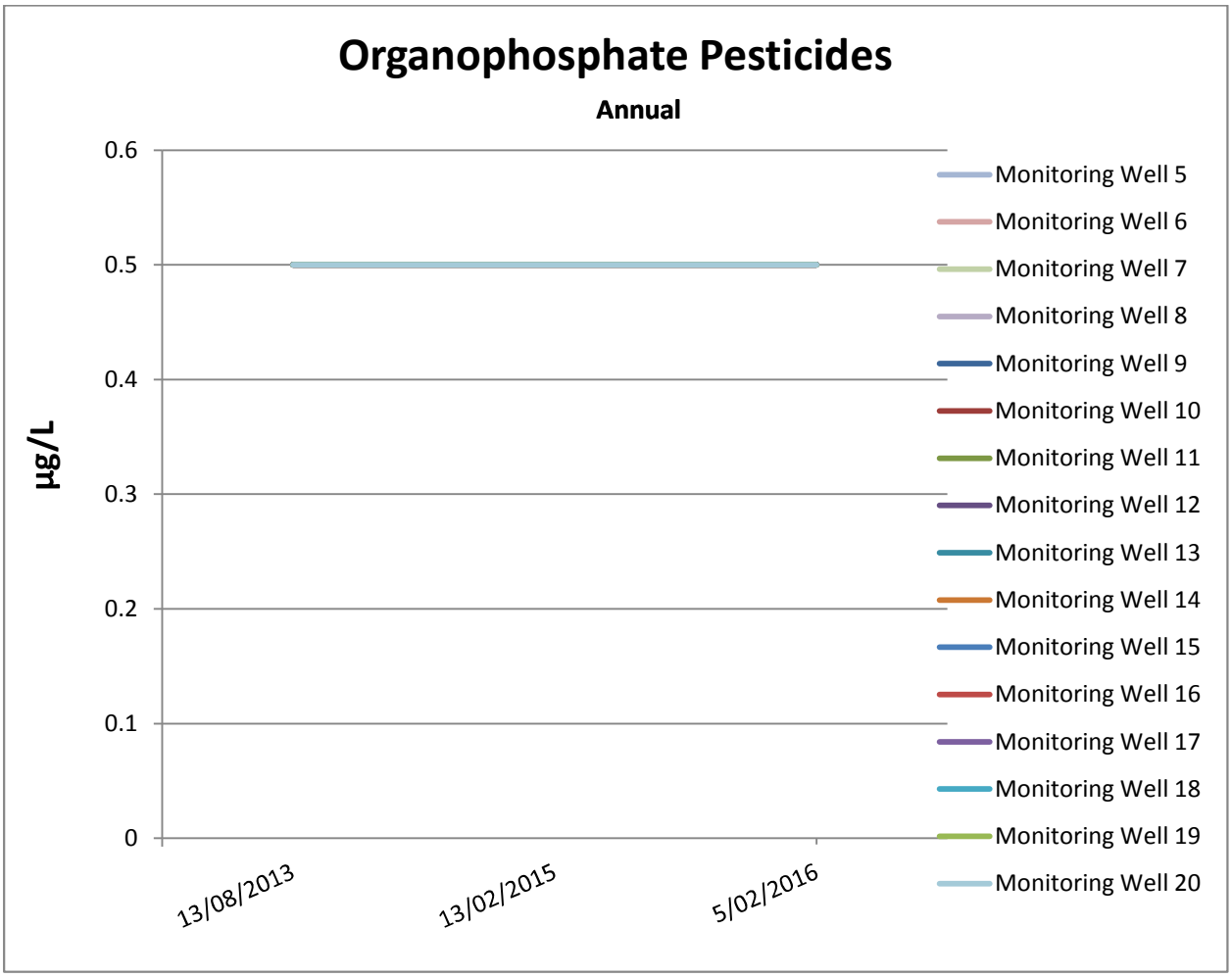
Nitrite levels found in the ground water monitoring wells are extremely small and below detectable limits in almost all of the samples taken. However, the slight increase in wells 17 and 19 should be carefully scrutinised during the next round of annual sampling.

Figure 3.2.4.17 Organochlorine Pesticides results presentation



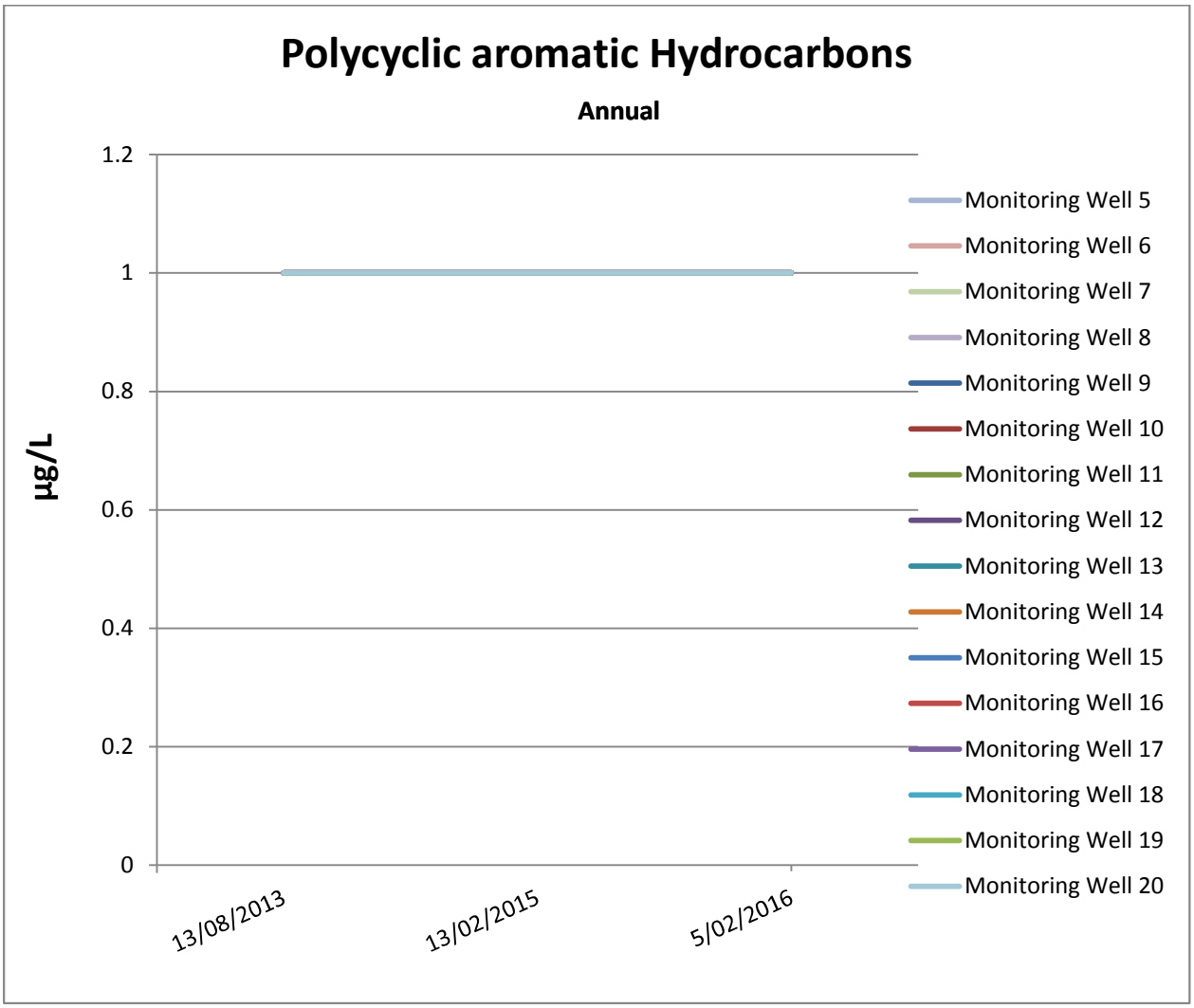
Organochlorine pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.18 Organophosphate Pesticides results presentation



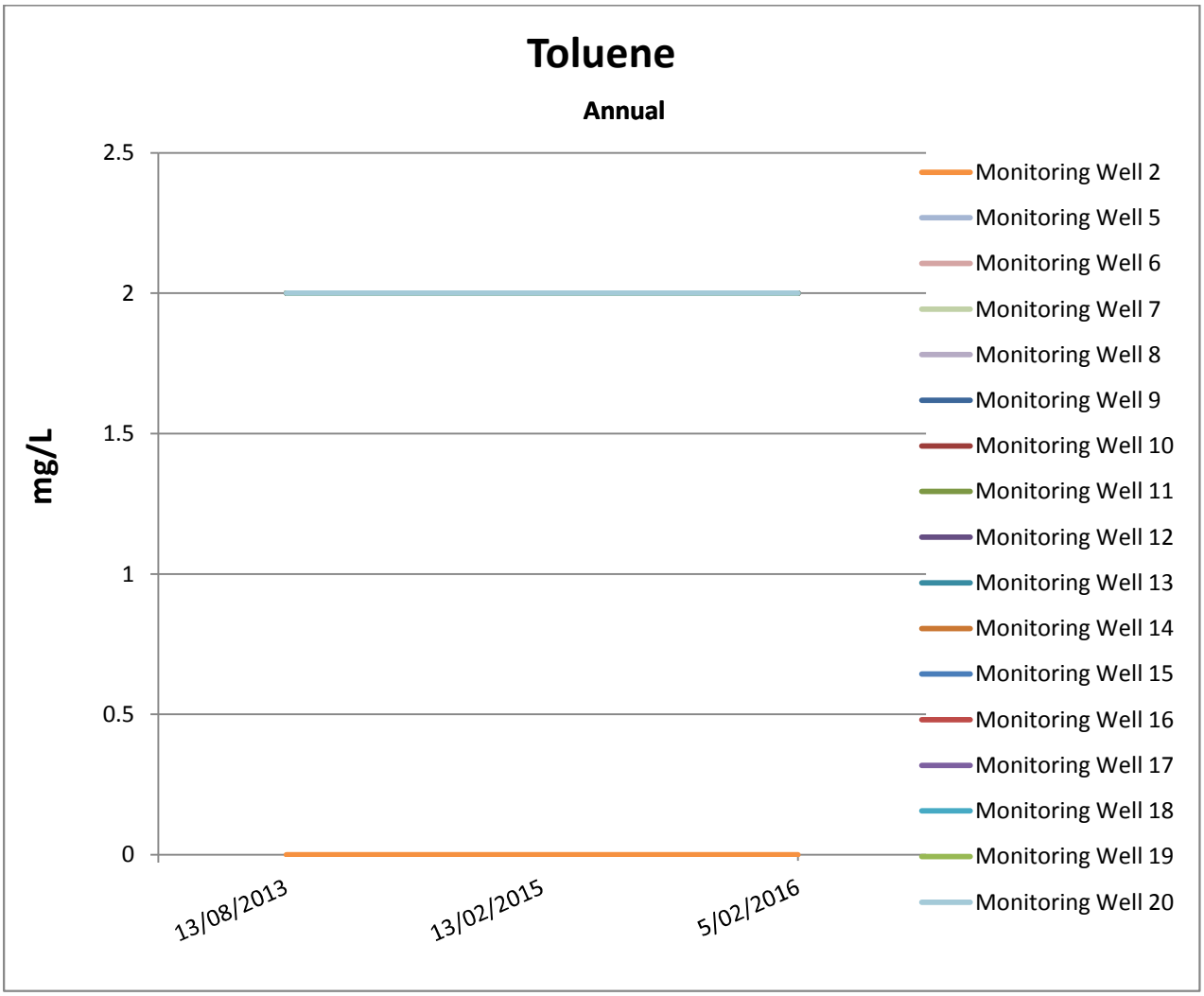
Organophosphate pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.19 Polycyclic Aromatic Hydrocarbons results presentation



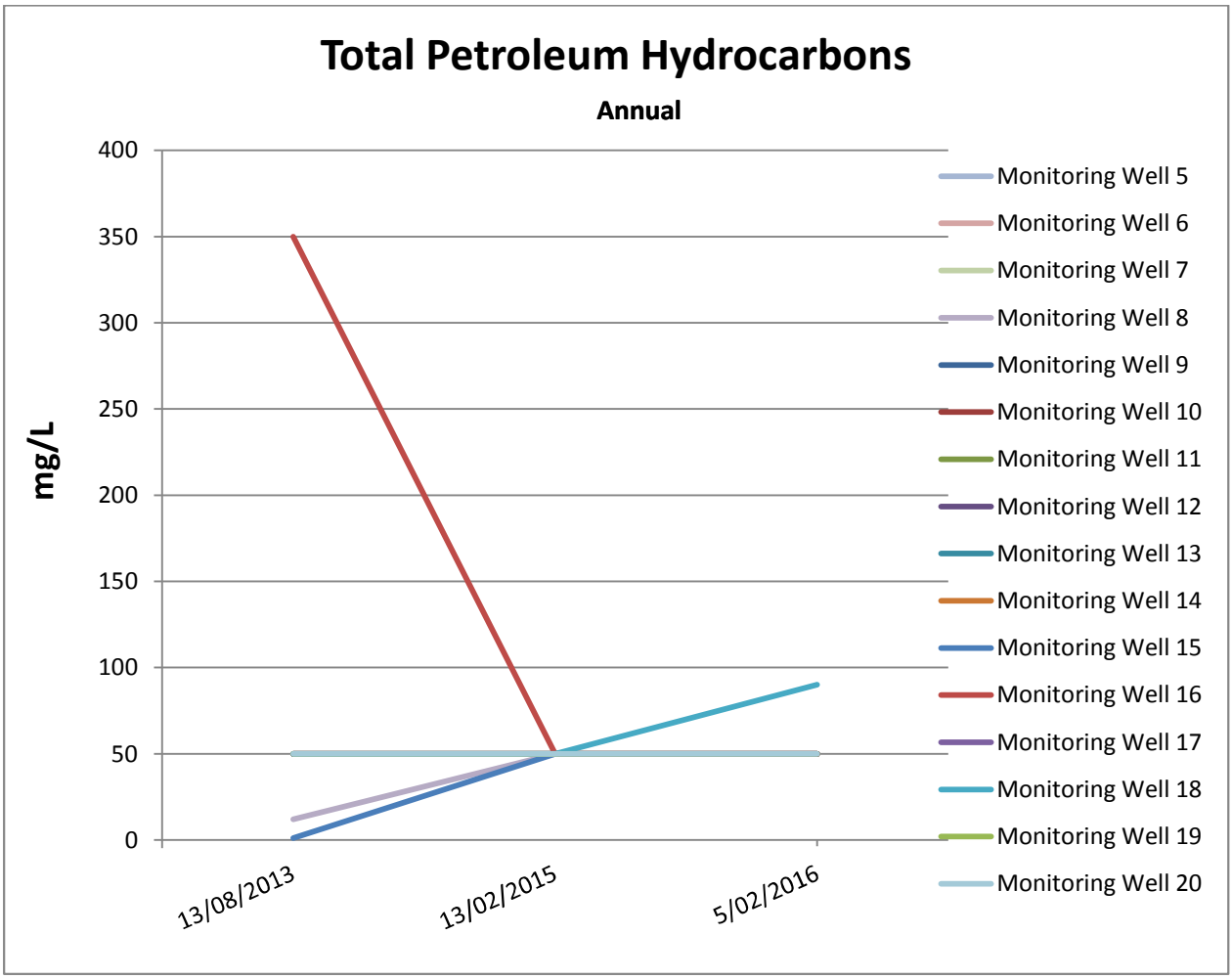
Polycyclic aromatic hydrocarbons were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.20 Toluene results presentation



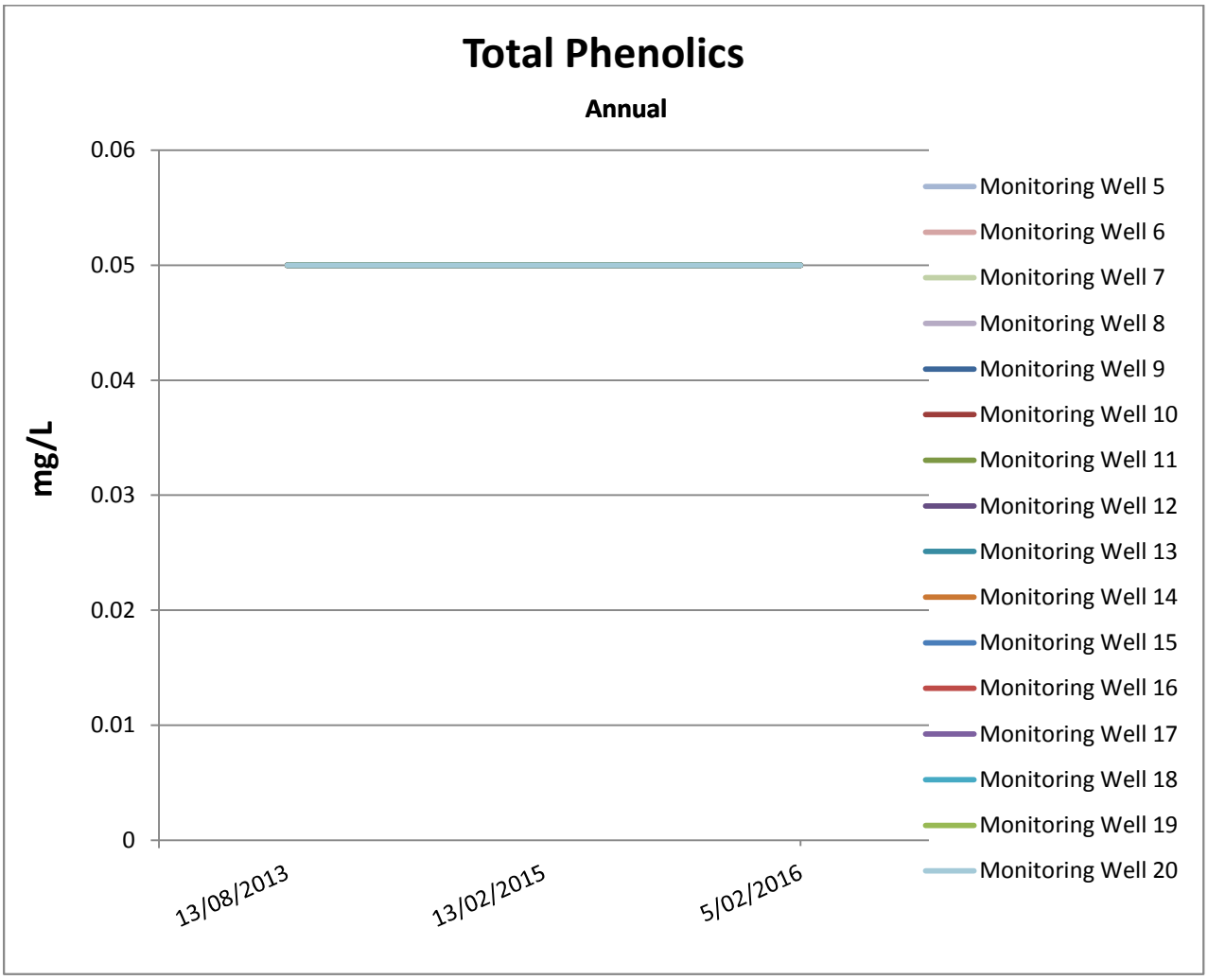
Toluene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.21 Total Petroleum Hydrocarbons results presentation



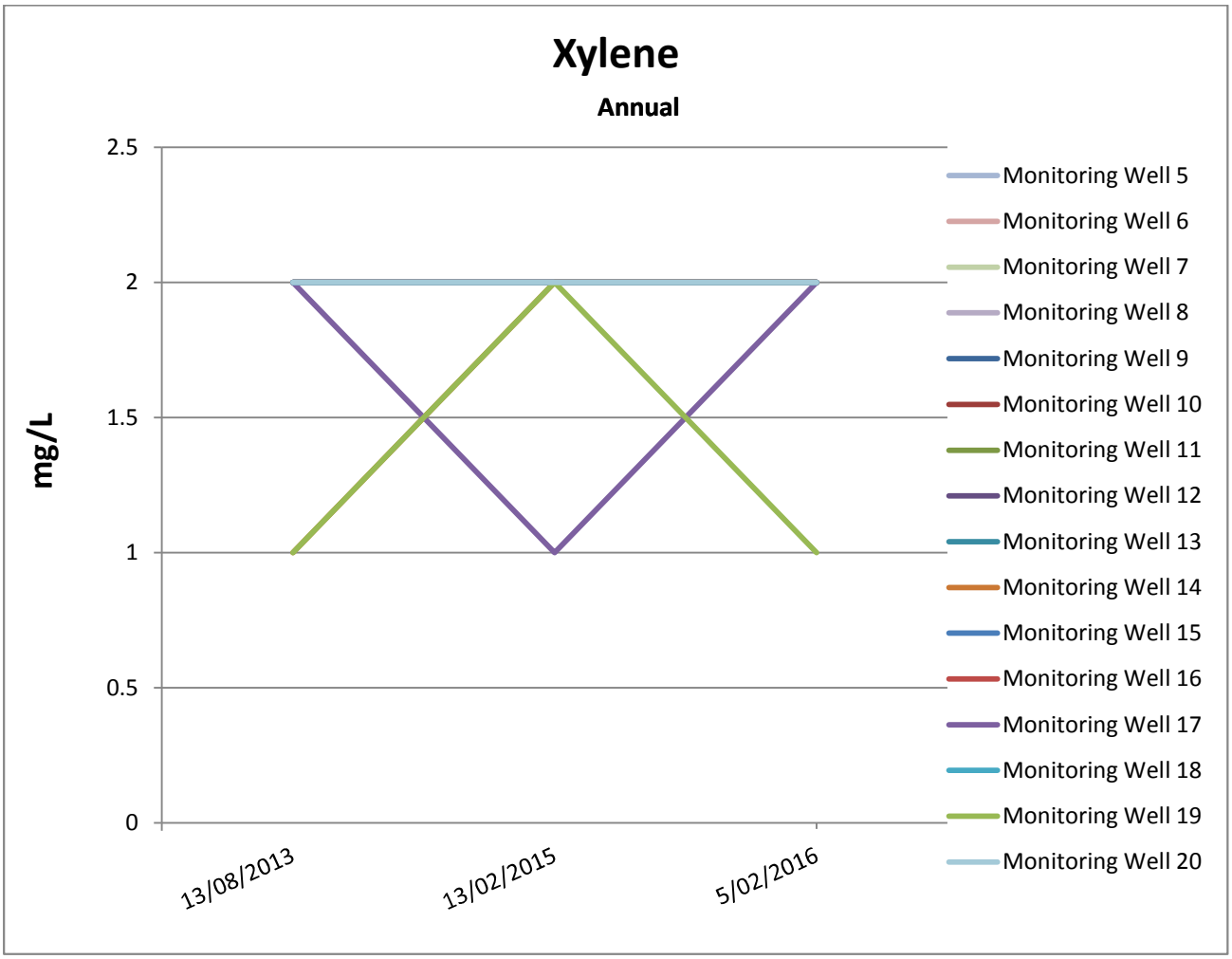
Total petroleum hydrocarbons are generally at concentrations below detectable limits in the monitoring wells. The initial spike in well 16 has since returned to low levels, whilst well 18 has exhibited a slight increase. Continued annual monitoring will help identify any continued trends.

Figure 3.2.4.22 Total Phenolics results presentation



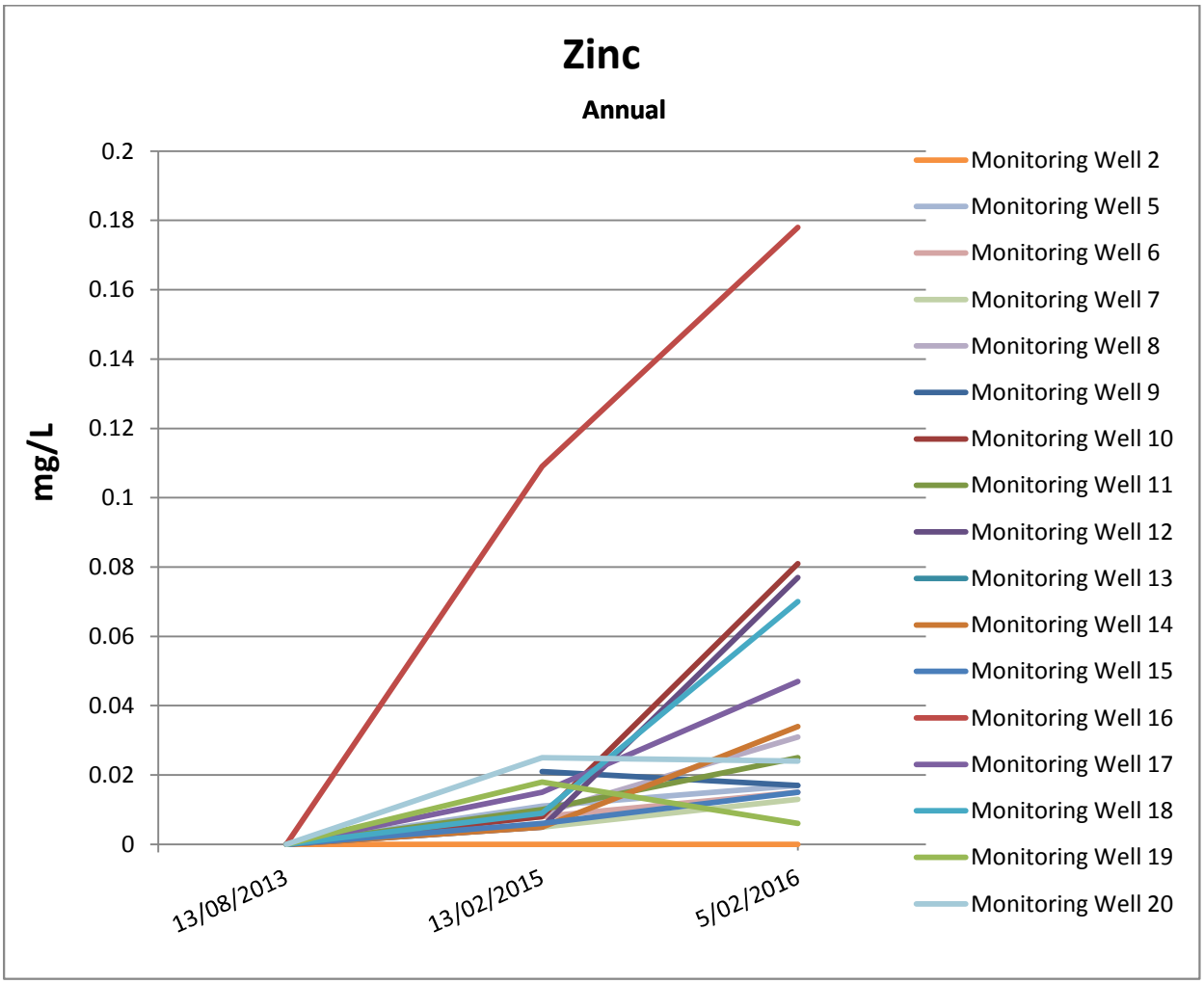
Total phenolics were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.23 Xylene results presentation



Xylene has not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories. Only the inconsistency in the applied laboratory standard (Note: laboratory is NATA accredited) between 1 mg/L and 2 mg/L as prescribed detectable limits has changed.

Figure 3.2.4.24 Zinc results presentation



The *2011 Australian Drinking Water Guidelines 6* states that for aesthetic reasons a maximum of 3 mg/L of zinc is desirable for consumption. Landfill sites can be an anthropogenic source of zinc in groundwater, however despite the extremely low levels of zinc detected; monitoring well 16 should be further monitored in future annual sampling regimes due to the display of levels higher than the other surrounding points.

3.2.5 Groundwater Testing Results Interpretation

Results indicate that there has been no conclusive increase in concentration levels for any of the analytes detailed when compared to the historical results and trends. The following table indicates the analytes that should be closely monitored for developing trends at the next scheduled round of testing:

Table 3.2.5 Analytes that require closer scrutiny on future sampling

Analyte	Monitoring Point	Regime	Next Sample
Nitrogen (Ammonia)	16	Quarterly	August 2017
Aluminium	12	Annual	February 2017
Barium	16	Annual	February 2017
Cadmium	10	Annual	February 2017
Chromium (total)	12	Annual	February 2017
Cobalt	16	Annual	February 2017
Copper	10, 12	Annual	February 2017
Lead	12, 16, 18	Annual	February 2017
Manganese	16, 20	Annual	February 2017
Nitrate	12	Annual	February 2017
Nitrite	17, 19	Annual	February 2017
Total petroleum hydrocarbons	16	Annual	February 2017
Zinc	16	Annual	February 2017

On reflection, key indicators of landfill leachate's potential ingress into groundwater particularly ammonia, nitrate, nitrite levels and other less poignant indicators as tested do not conclude that that landfill leachate is entering the surrounding ground water system. However, the results presenting in monitoring wells 12 and 16 warrant continued scrutiny.

3.3 AIR EMISSIONS MONITORING

3.3.1 Tabulated Results

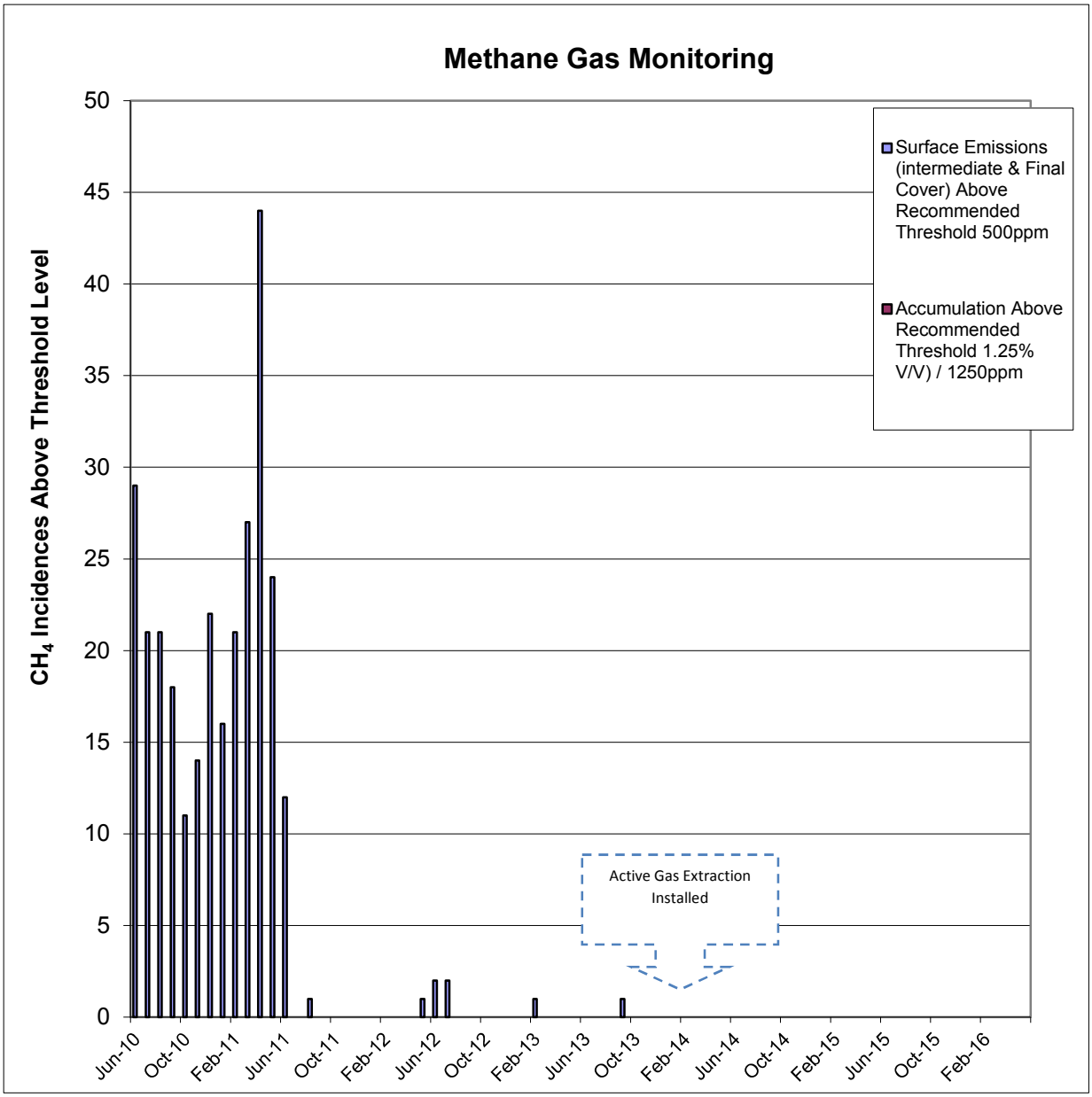
Table 3.3.1 Methane monitoring results for the reporting period

Date	Results Above Recommended Threshold 500ppm	Accumulation Above Recommended Threshold 1250ppm
Jun-15	0	0
Jul-15	0	0
Aug-15	0	0
Sep-15	0	0
Oct-15	0	0
Nov-15	0	0
Dec-15	0	0
Jan-16	0	0
Feb-16	0	0
Mar-16	0	0
Apr-16	0	0
May-16	0	0

The presented data describes the number (zero in the reporting period) of individual sample results derived from monthly testing that are above the EPA Benchmark Technique recommended threshold levels for further action regarding surface emissions (500 ppm) and accumulation levels (1,250 ppm).

3.3.2 Data Presentation

Figure 3.3.2 Air emissions test results above benchmark recommended threshold levels presentation



There is no evident trend for methane gas emissions from the landfill surface. No accumulation levels above the recommended benchmark threshold were found.

3.3.3 Air Emissions Monitoring Results Interpretation

During the period 2011-2012 results sampled by GHD showed continued occurrences of surface methane emissions above the EPA recommended threshold levels. A more recent contract awarded to a NATA approved laboratory (ALS Environmental) has shown that the GHD recorded levels were potentially overstated. Both companies state that the accumulation monitoring clearly shows that the methane is not migrating offsite.

Despite the differences in sample results, the site has the potential to generate relatively high amounts of landfill gas, namely methane that must be dealt with. Accordingly, Council commenced installation of methane gas extraction infrastructure in February 2014. Phase 1 (covering the older western gully) of the landfill gas management is in place and connected to a flaring unit. Phase 2 (capturing gas from legacy waste in under the new cell liner in eastern gully) has been fully constructed and has been commissioned. The final Phase 3 gas collection system will include infrastructure within the waste filling of the new landfill cell at the WWARRP. This project has been placed on hold due to the potential Council merger with Shellharbour City Council and the additional purchasing power that may present in procuring Phase 3 on behalf of both the Dunmore and Whytes Gully sites.

3.4 ENVIRONMENTAL COMPLAINTS

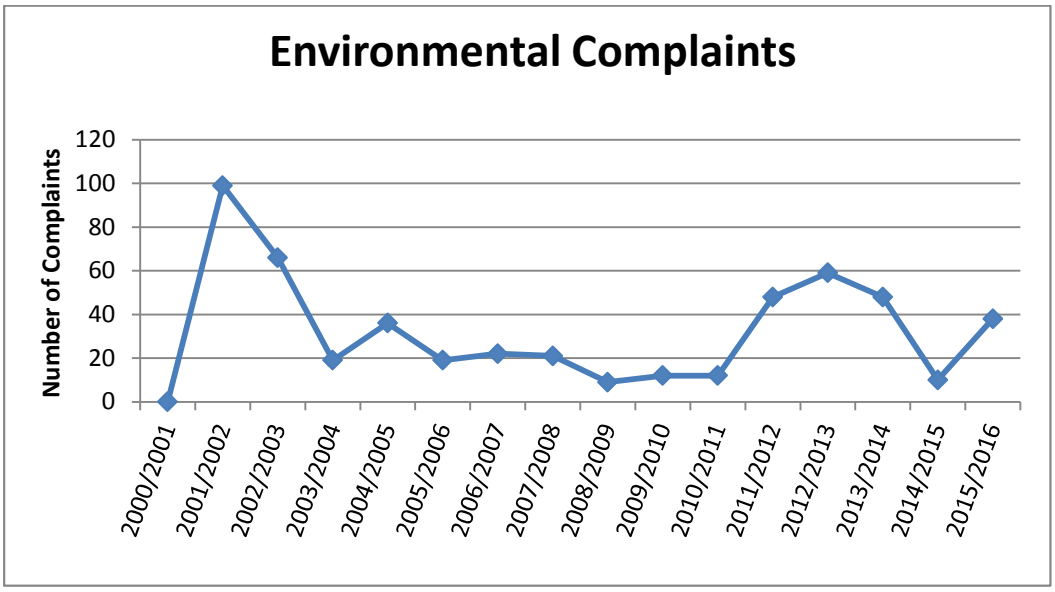
3.4.1 Tabulated Results

Table 3.4.1.1 Environmental complaints

Year	Environmental Complaints
2000/2001	0
2001/2002	99
2002/2003	66
2003/2004	19
2004/2005	36
2005/2006	19
2006/2007	22
2007/2008	21
2008/2009	9
2009/2010	12
2010/2011	12
2011/2012	48
2012/2013	59
2013/2014	48
2014/2015	10
2015/2016	38

3.4.2 Data Presentation

Figure 3.4.2.1 Environmental related complaints presentation

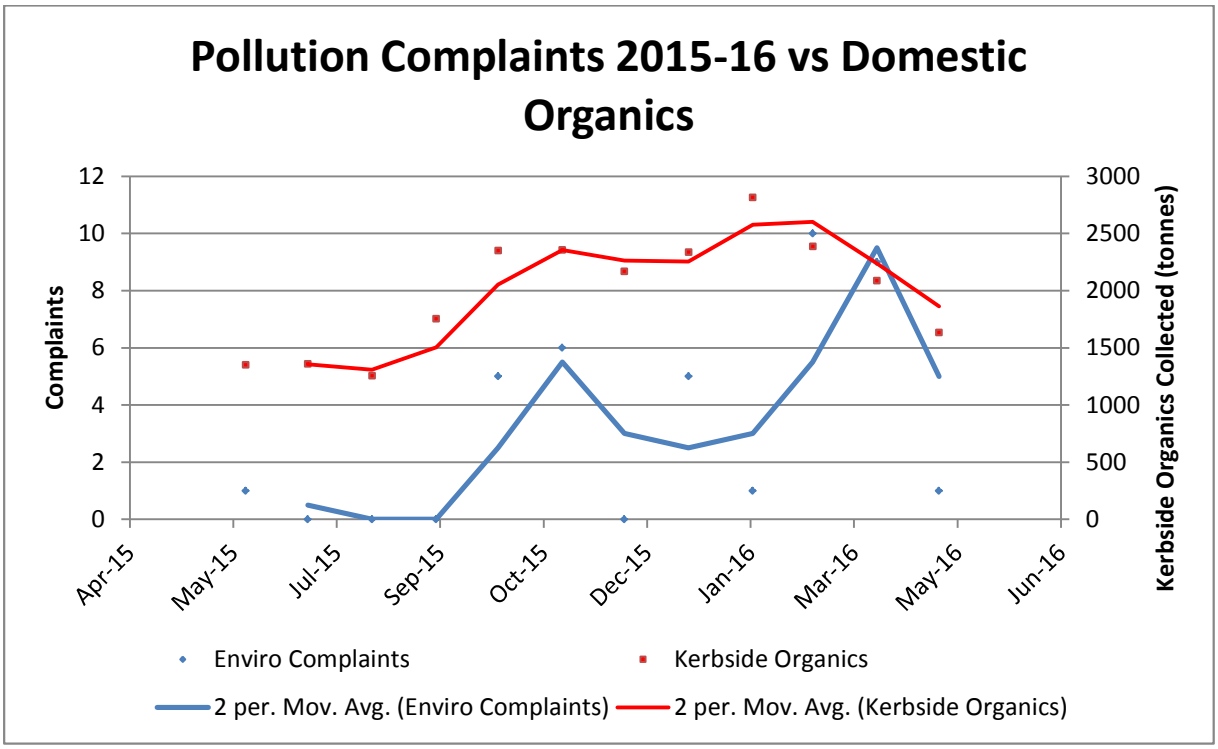


3.4.3 Environmental Complaints Results Interpretation

The overlying trend for environmental complaints had been downward after closure of the solid waste energy recovery facility in 2004. However, the reporting periods 2011/12 to 2013/14 have given rise to a spike of approximately 150 complaints, invariably regarding perceived odour from the WWARRP. It should be noted that Council commenced community engagement over a new landfill cell development at Whytes Gully coinciding with the 2011/12 year complaints spike.

The bulk of the complaints (almost 70%) conveyed in the reporting period have been received in the period January through April 2016. This coincides with historic timing for the highest number of complaints, which mirrors the highest volumes of kerbside collected green waste.

Figure 3.4.3.1 Pollution (odour) complaints compared to garden organics collection volumes



As demonstrated by the blue line in the Figure 3.4.3.1, the majority of complaints have been received during late summer and into the autumn season. This mirrors the red line which displays trend average volume of green waste collected from kerbside collections. Statistically, the data set for odour related complaints has a strong correlation value (r^2) of greater than +0.5 to the data set for the volume of domestic garden organics. This gives efficacy to the theory that garden organics are most often the source of odours detected by nearby residents.

From 01 July 2014, kerbside green waste not stored at the WWARRP, instead it is unloaded at a nearby site on Reddalls Road, which also accepts other Council area's green waste and food waste. Regardless of this, Wollongong City Council fully investigates all odour complaints received upon receipt of the complaint. An example of an Environment Incident Report completed as a result of complaints received in March 2016 can be found in Annexure B. The Environment Incident Report demonstrates the procedure Council uses to respond to environment complaints.

3.5 TRADE WASTEWATER RESULTS

As required in Clause M6.2 of the Sites EPL, the Trade Wastewater Results are tabulated below:

Table 3.5.1 Trade Wastewater Results May-Aug 2015

Analyte	Units	5-Jun	12-Jun	23-Jun	30-Jun	1-Jul	24-Jul	4-Aug	11-Aug	31-Aug	28-Aug
pH Start	Units	7.1	7.6	7.4	6.9	7.3	7.5	7.4	7.4	8	7.7
TDS	mg/L	3760	4090	3790	780	3520	4780	4720	5180	3070	3280
TSS	mg/L	62	30	95	5	52	38	109	35	99	96
Ammonia (N)	mg/L	1.3	0.8	0.6	13.6	0.8	0.3	1.9	2.2	4	0.8
pH Finish	Units	7.2	7.4	8.2	6.9	7.3	7.3	7.9	7.5	7.5	8.1
BOD	mg/L	57	23	16	15	11	20	16	16	8	37
Temp	^{o}C	12	15				16	11	14	16	

Table 3.5.2 Trade Wastewater Results Sep-Nov 2015

Analyte	Units	4-Sep	14-Sep	23-Sep	2-Oct	8-Oct	19-Oct	28-Oct	5-Oct	13-Nov	20-Nov
pH Start	Units	7.5	7.3	7.2	7.4	7.1	7	7.2	7.3	7.4	7.8
TDS	mg/L	3460	2780	2780	3060	3480	2890	3640	3710	4150	4370
TSS	mg/L	30	64	113	56	89	43	57	55	37	41
Ammonia (N)	mg/L	0.3	0.2	0.1	0.1	0.1	0.3	0.6	0.6	0.3	0.3
pH Finish	Units	7.5	7.2	7	7.1	7.2	6.9	7.4	7.2	7.3	7.5
BOD	mg/L	9	14	18	16	28	10	18	12	24	16
Temp	^{o}C	18	26	14	20	17	24	20	21	20	24

Table 3.5.3 Trade Wastewater Results Nov 15 –Feb 16

Analyte	Units	24-Nov	3-Dec	8-Dec	5-Jan	13-Jan	21-Jan	29-Jan	5-Feb	15-Feb	24-Feb
pH Start	Units	7.4	7.1	7.2	7.6	7.1	7.2	7.1	7.2	7.4	7.5
TDS	mg/L	4060	4830	5000	5090	4020	4020	3750	3820	4060	4190
TSS	mg/L	34	30	45	81	29	45	52	40	28	38
Ammonia (N)	mg/L	0.2	0.6	0.3	5.4	0.2	0.1	0.3	0.1	2.6	0.3
pH Finish	Units	7.5	7.1	7.8	6.9	7.3	7.3	7.2	7.5	7.4	7.6
BOD	mg/L	9	8	4	20	69	7	9	9	10	17
Temp	^{o}C	28	28	24	24	28	31	27	25	27	28

Table 3.5.4 Trade Wastewater Results Mar –May 16

Analyte	Units	4-Mar	11-Mar	20-Mar	29-Mar	8-Apr	22-Apr	3-May	18-May	26-May	4-Jun
pH Start	Units	7.3	7.4	8	7.5	7.2	7.3	7.2	7.5	7	7.3
TDS	mg/L	4090	4310	4260	3890	4050	4510	5430	5490	5890	4090
TSS	mg/L	39	23	22	56	36	28	28	44	34	39
Ammonia (N)	mg/L	77.9	0.8	2.5	6.6	0.8	0.1	0.02	1.7	3.3	77.9
pH Finish	Units	7.4	7.4	8.6	7.6	7.6		7.2	7	7.1	7.4
BOD	mg/L	60	12	6	23	2	6	8	3	21	60
Temp	^{o}C	33	28	24	25	20		19	20	15	33

4 SITE SUMMATION

4.1 DEFICIENCY IDENTIFICATION & REMEDIATION

4.1.1 Surface Water Overflow Result of 116 mg/L in August 2015

As presented in Section 3.1.4, the discharge of turbid water was caused by a heavy rainfall event in which the site was inundated with water. The major construction works relating to the new landfill cell development and associated infrastructure is understood to be a major contributor to the source of sediment in the control ponds. Additionally, the pond holding capacity was not at its optimal volume when the rainfall event took place.

Specifically, the water that exited the site contained suspended solids at levels above the 50 mg/L concentration limit prescribed in the sites Environment Protection Licence. Given that the entire catchment was visibly turbid and heavily laden with sediment at the time (both upstream and downstream samples taken at the same time indicated suspended solids approaching the 50 mg/L concentration limit) there was no material harm caused by the non-compliance (as defined by Section 147 of the POEO Act (1997)).

To help reduce the likelihood of future non compliances, a Wet Weather and Stormwater Management work instruction has been created and implemented to ensure that the sediment pond capacity is maintained between rainfall events. The Wet Weather and Stormwater Management work instruction is attached to this report in Annexure C.

4.1.2 Elevated Calcium, Chloride, Magnesium and Sulfate Levels in Sediment Pond Annual Sample March 2016

As discussed in Section 3.1.4, the March 2016 Annual Sample of the sediment pond displayed elevated calcium, chloride, magnesium and sulfate levels compared to the historic trends. The March sample was not an overflow event and therefore these elevated analytes did not exit the site. Three additional samples taken since March 2016 have all indicated that these analytes have returned to historic levels. Given the analytes as a group, the most common anthropogenic source is construction and building material. Therefore it is likely that the construction works taking place at Whytes Gully

have discharged some sediment laden water which has been captured in the sedimentation ponds (as per their design and function).

The help ensure that this is not repeated, Council now completes daily inspections of sediment control devices and infrastructure installed by construction crews on the Site.

4.1.2 Destruction of EPA Monitoring Point 2

Monitoring Point 2 is located in an operational area that is utilised for the Small Vehicle Transfer Station and organics receipt. The impractical location of well 2 has led to various vehicular interactions and consequential repairs over the years. However, the current damage to the well is such that it was unable to be sampled during the reporting period. The Monitoring Point is located south west of the old 'Western Gully' landfill cell and is situated to intercept ground water movement in a south westerly direction through the site. There are also additional sampling points to the south, south west and west of this monitoring point that also intercept south westerly ground water movement though the site. In lieu of the damaged bore, Council has used monitoring points 5, 11 and 18 to continue to monitor ground quality in this region.

In planning for the repair, it was identified that the location of monitoring well 2 will be further impacted by the new Haul Road construction commencing in 2016 and the associated stormwater drainage infrastructure. Council is currently reviewing the ongoing relevance of monitoring well 2. Given the proximity and location of the Monitoring Points 5, 11 and 18 preliminary expert advice suggests there is potential to remove this Monitoring Point altogether from the licence, or replace it at a nearby location. Council will progress this assessment as a priority and inform the EPA of the expert's determination.

4.1.3 Official Caution Incomplete and Inaccurate2013-14 Annual Return

Council received an Official Caution dated 21 March 2016 for failing to identify the 2013-14 issued penalty notices within the Statement of Compliance section of the 2013-14 Annual Return.

Council acknowledges the importance of accurate reporting in the Annual Returns and endeavours to provide true and complete records when submitting these documents. However, as identified by the EPA, on this occasion an error was made in the 2013-14 Annual Return stating nil non-compliance when in fact a penalty notice was received against licence condition O6.4 just prior to the end of the reporting period.

This error was in no way an attempt to conceal the non-compliance (note that the non-compliance was referred to inside the written portion of the Annual Report), nor there be any benefit in doing so as the penalties were made public through the local media and are also available to the public on the Environment Protection Authority's website

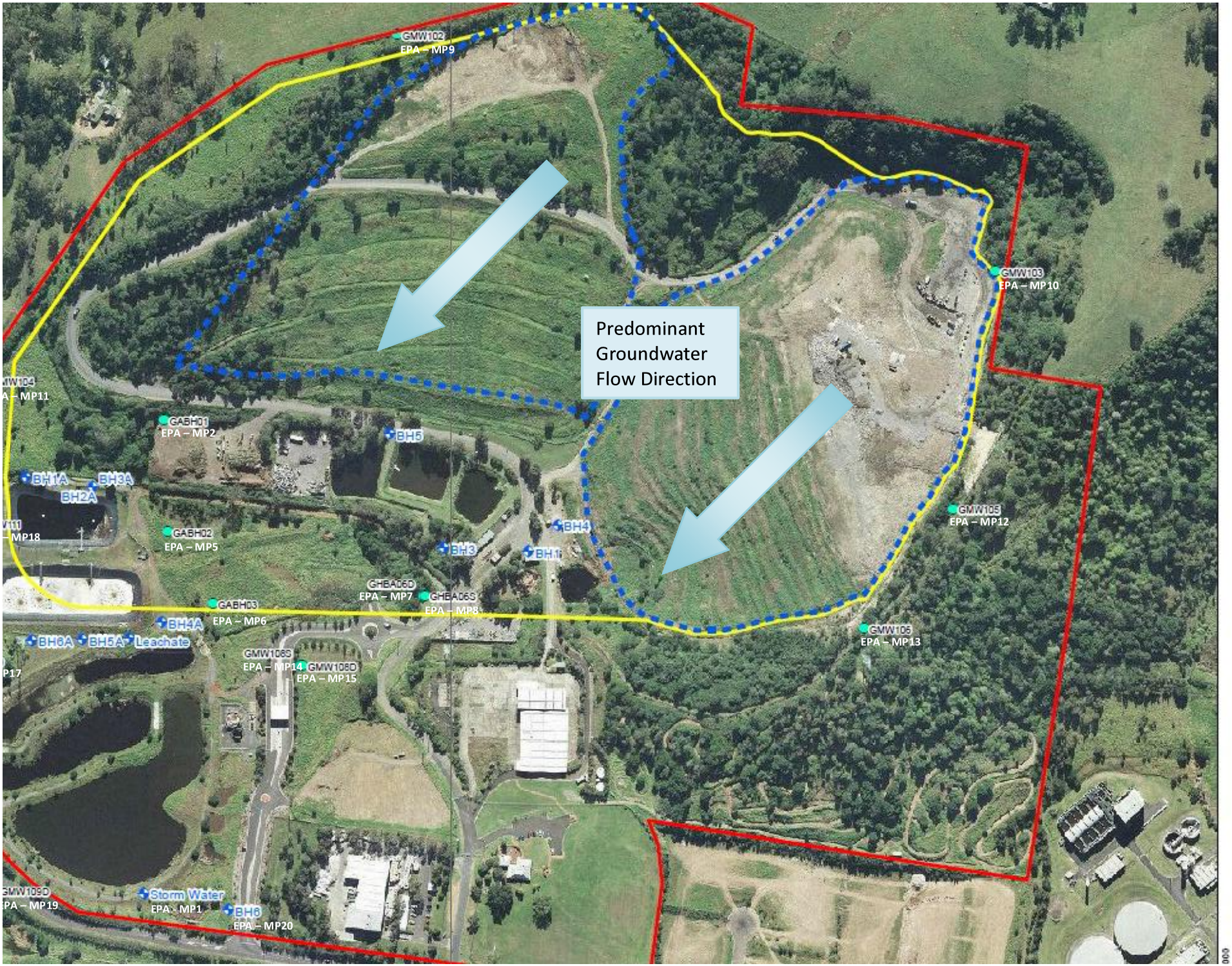
4.2 CONCLUSION

The site is performing well within the individual criteria and limits assigned to it in regard to environmental performance. The low number of deficiencies shows that Council has maintained satisfactory environmental performance. Actions have already commenced to improve the sites performance in regard to the identified deficiency in Section 4.1.1 and 4.1.3, which will ensure Council's goal of continuous environmental improvement at Whytes Gully is achieved.

Further, the modernised test regimes already implemented, along with the best practice multi redundancy lined new cell development will provide a far more sustainable environmental outcome for the surrounding environment. Observations made in this year's annual return indicate that the new landfill cell development is functioning well and as designed.

ANNEXURE A

Environmental Monitoring Locations



LEGEND

- Proposed Ground W
- Existing Monitoring L
- Approximate Extent
- Extent of Landfill Wo
- Site Boundary

NOTES

Extent of waste based on site ob
provided by Council.

Aerial Ortho-Photograph provide
16 May 2011, Reference 18763A

Extent of landfill works as per Go

Investigation locations surveyed

0 25 50 100

SCALE (at A3) 1:4,0

Coordinate System: GDA 1994 M

PROJECT:	11762500
DATE:	26/03/201
DRAWN:	FA`
CHECKED:	JMc

ANNEXURE B

Example Environmental Incident Report

ENVIRONMENTAL INCIDENT REPORT - (1)

Complete this form for all environmental incidents that occur at or on Wollongong City Council worksites.

MATERIAL HARM INCIDENTS MUST BE REPORTED TO 5 ESSENTIAL AGENCIES IMMEDIATELY

(i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or

(ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and

(iii) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment

The purpose of this form (1) is to alert Waste Service to potential environmental incidents. It does not represent Wollongong City Council's final position for any incident reported on this form.

Remember!	Complete all fields prior to submitting form Be succinct, stick to the facts and **do not** make assumptions Only record information you know to be correct

Incident Details

DATE:	22-3-2016	TIME:	Between 6.00am-1.30pm	Duration: 7.5hrs – odour profile varied	TRIM: PATHWAY: 507754, 507765, 507768, 507770, 507771, 507773, 507774

Description (provide a brief description of what happened during the incident (**MATERIAL HARM INCIDENT - 5 ESSENTIAL AGENCIES MUST BE NOTIFIED IMMEDIATELY)**	507754 - After hours call Ref 126132. Garbage odour in air. Has been there for past few days. Caller feels like vomiting. Ongoing issue. Odour started on Tuesday at approx 8.10am.
	507765 - The caller was advised to call Environment line by Council. Caller has been affected by a rotten refuse odour intermittently over several years but didn't know where to complain about the problem. The caller was affected by the odour at a strong level yesterday at about 6:45am. The odour occurred again this morning, though not quite as strong in intensity. The odour has abated since earlier this morning. Caller unsure of wind direction.
	507768 - After hours call Ref 126135: Odour coming from a waste facility. Odour was noticed at about 08:15 on 22/3/16. Coming into the dining room and through the house.
	507770 - Caller affected by a strong rotten refuse odour, it was extremely strong early in the morning, still quite bad at about 8:30. The odour is still present at time of call but not as strong. The odour was also present on the weekend mornings.
	507771 - Very strong garbage odours coming from Whytes Gully Waste Disposal Facility, Reddalls Rd, Farmborough Heights. Very strong garbage odours on Sunday morning 20/3/16 at 8:30am & today 22/3/16 at 7:30am, caller rated the strength of the odours as 5 very strong and said they had to stay indoors and close the house.
	507773 - The smell at 11:30 is like a "chemically treated smell" but fairly sure it is rotting green waste. It's not the same as the "dump odour" that he smelled earlier this morning. The weather today is windy, wind from the South, and the odour is about 4/6 in strength.
	507774 - Caller was affected by a strong rotten refuse odour, it infiltrated the home, and was extremely strong when outdoors. The odour had abated by about 10am. The caller believes that the Whytes gully waste facility was the source of

	the odour.
EXACT location of the incident (include chainage, landmarks, features, nearest cross street) – provide a sketch if appropriate	Fairloch Ave, Loch Carron Ave, Aberdare Place, Highview Place, all Farmborough Heights
Quantity or volume of material discharged or affected by incident (provide estimate if quantity is unknown)	N/A
Estimated distance to nearest waterway. This can include stormwater drains and dry watercourses. (where relevant)	N/A
Type of activity that caused incident (what works were in progress at the time of the incident?)	Usual Waste Operations Wollongong Resource and Recovery Park. Development Site west of Waste facility excavating organic matter reported to EPA at11.40 am, EPA to investigate separately. Strong Odour Reported by Weighbridge staff and contractors on site at Waste Facility to Waste Services Coordinator.
How was the incident identified? (eg employee, Contractor, community, complaint)	Community complaint to EPA Environment Line.
Name and contact details of complainant (where relevant)	EPA
Address of complainant	Anonymous
If Odour, describe complainants description of odour, What does it smell like? Intensity: 0 No odour 1 Very faint odour 2 Faint odour 3 Distinct odour 4 Strong odour 5 Very Strong odour	Odour Intensity: ☐1 ☐ 2 ☐ 3 ☐ 4 ☒ 5
Describe weather conditions at the time Temperature(very warm, warm, mild, cold) Wind Strength (none, light, steady, strong, gusting) Wind Direction (eg from NE)	Mild temperature 17.6 to 20.6 Wind Direction SSW 8.2 Km/h Little rain overnight
Describe weather conditions during recent weeks Temperature(very warm, warm, mild, cold) Wind Strength (none, light, steady, strong, gusting) Wind Direction (eg from NE)	Mild Temperature avg 22.6 5.4 Km/h avg wind speed 20.4 mm Rain last 22 Days

Any other details of the incident (including any information which did not fit in spaces above, as well as any special circumstances of the day or the location)

Strong Odour Reported by Weighbridge staff Waste Facility to Waste Services Coordinator during morning of 22 March 2016. Unable to detect the source of the strong odour onsite at WWARRP. Operations (i.e. lifting the lids) didn't commence onsite until after 7.30am.
Investigated development site west of facility at 11.30 am strong rotting organic –vegetation smell .Observed several excavators loading dump trucks with loose/sloppy material on adjacent site. Wind direction from the SW towards Waste Facility. Interviewed Contractor s on site at Waste facility they confirmed rotting vegetation smell during morning of complaint. Investigate Waste fill area some waste smell but nothing unusual to normal daily operations. See photos bellow. Refer to attached wind correlation map for further information.
Investigated complaint areas at Farmborough Heights, no odour detected between 11.40am and 12.30 pm Wind speed increased and changed direction to SE.

What immediate actions/control measures were taken to rectify or contain the incident?

Sourcing extra cover material on site in addition to usual cover material and land fill covers.
Monitor odour on site and Farmborough Heights in the immediate future.
Staff advised not to 'pull back' cover tomorrow morning to reduce the chance of odour being released.

What corrective action has been taken to prevent similar incidents recurring?

Reinforce opening procedure to minimise impact.
Waste Coordinator and Waste Operations Manager attended Farmborough Heights at 7.10 am 23 March 2016 – nil odour detected. Staff then perform checks of the WWARRP site. WOM went to the top of the WWARRP site and waited until the lids had been lifted to detect any odour. None present this morning.
No excavation works visible on development site today 23/3/16 in the area the wet material was seen being loaded yesterday.
Odour management study being commissioned.
WCC has also become aware the Shellharbour City Council are preparing to take their FOGO (Food Organics/ Garden Organics) to Soilco at Kembla Grange until such time that their FOGO facility is constructed at Dunmore commencing 1 July 2016. It is anticipated that this will increase odour complaints in the Kembla Grange and Farmborough Heights areas.

Incident Category

Potential Category 1 Incident (may involve one or more of the following (tick incident type)	
☒ Material, odour or noise that travels beyond site boundary causing or potentially causing adverse impact to the environment or community	☐ Unauthorised harm or damage to threatened species, endangered populations, endangered ecological communities or critical habitat.
☐ Discharge of waters from site not in accordance with any applicable REF determination/approval/environment protection licence condition	☐ Unauthorised harm or damage to threatened aquatic species and protected marine vegetation or unauthorised dredging of reclamation works within a watercourse.
☐ A fire that travels beyond site boundary	☐ Unauthorised damage or destruction to any State or locally significant relic or Heritage item
☐ Unauthorised harm or desecration to Aboriginal objects and Aboriginal places	☐ Material harm to the environment or persons as per Part 5.7 of POEO Act (including harm on site)
☐ Failure to comply with a REF determination/approval/environment protection licence condition.	☐ Works undertaken without required approval or environmental assessment.

Potential Category 2 Incident (may involve one or more of the following (tick incident type)	
☐ Failure to implement component of Environment Management Plan that does not result in a Category 1 incident	☐ Spills that do not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact.
☐ A fire contained on site without causing impact to the environment	

Sign-Off (person making report)

Print Name: Brock Heycott	Sign: B Heycott
Position: Waste Services Coordinator	Date: 22.3.2016

Notification to the <u>5 Essential Agencies</u> (where material harm identified <u>notify immediately</u>)

To be completed by the relevant Manager or delegated authority

Were relevant authorities notified under part 5.7 of POEO Act?

Authority	**Number**			**Date and Time Notified**
Fire and Rescue	000	☐ Yes	☐ No	n/a
Wollongong City Council	4227 7111	☐ Yes	☐ No	n/a
EPA NSW	131 555	☐ Yes	☐ No	n/a
The Ministry of Health	4222 5000	☐ Yes	☐ No	n/a
WorkCover Authority	13 10 50	☐ Yes	☐ No	n/a

Fire and Rescue	1300 729 579	☐ Yes	☐ No	n/a
Department of Planning	4224 9450	☐ Yes	☐ No	n/a

Surrounding Land Holders (if necessary)	Refer to Pollution Incident Response Management Plan (PIRMP) for contacts	☐ Yes	☐ No	n/a

Who notified the EPA?
Name: Sandra Belanszky Position: Waste Operations Manager

Notification Method ☒ Phone (and email) ☐ on site	Date	22/3/16	Time	Various ☒ am ☒ pm

Has there been a EPA Environmental Line Complaint? ☒ Yes ☐ No	EPA Complaint No: I04328-2016, I04340-2016, I04324-2016, I04325-2016, I04316-2016, I04311-2016, I04321-2016

Authorities notified and why: (eg Essential Agencies and Neighbouring properties) Nil

Sign off (Manager/delegated authority officer)

Print Name: Sandra Belanszky	Sign: S Belanszky
Position: Waste Operations Manager	Date: 23.3.2016

Z15/38744

***ANNEXURE** C*

Wet Weather & Stormwater Management Work Instruction

1.0 PURPOSE AND SCOPE

The purpose of this work instruction is to describe the way in which wet weather monitoring and storm water management is carried out on Council's Waste Sites:

- The Wollongong Waste and Resource Recovery Park (Whytes Gully)

2.0 DEFINITIONS/REFERENCES

The following references may be consulted if required;

- Whytes Gully Licence Number 5862 under Section 55 of the Protection of the Environment Operations Act 1997 (see http://www.epa.nsw.gov.au/prpoeoapp/ and enter licence number 5862 for the latest version)
- Whytes Gully Consent to discharge trade waste - Agreement No 11205 (TRIM Ref Z16/149009)
- Whytes Gully LEMP September 2014 Report No: 117625003_061_R_Rev2 (TRIM Ref Z12/221925)

3.0 INSTRUCTION DETAILS

3.1 GENERAL DESCRIPTION OF STORMWATER MANAGEMENT

3.1.1 Storm runoff water is collected into three dams (see Figure 2 below). Water in the dams should be kept below 50% capacity to enable sufficient storage capacity to handle runoff from most rainfall events and thus minimise the potential for uncontrolled discharges.

Warning: To avoid environmental harm no release is to occur to the external stormwater system until Council's Environment Officer (or nominated representative) has tested the water and confirmed that it is suitable for release. A record of the test must to be retained on file.

3.1.2 After cessation of inflow from a rainfall event, stored water in all three dams is allowed to settle. Dams may require expedited treatment through the use of gypsum dosing to bring the turbidity down to levels suitable for release to the external storm water system. The water may also need to be treated with acid or caustic to ensure pH is within range.

3.1.3 When testing shows that the water quality of a dam meets Environment Protection Licence conditions for release, it may be released to the creek at a rate not exceeding 1,000 m^3 /day (or 1 ML /day) until the water level is returned below 50% capacity.

3.1.4 Water remaining in the dams after cessation of the rainfall event may be managed/utilised as follows:

- dust suppression
- used for on-site irrigation

3.1.5 When an overflow event occurs during rainfall, sampling must be carried out by a Council's Waste Operations Manager (or nominated representative) at discharge points numbered 1, 4 and 6 on Figure 2 at a frequency of no less than one sample per day.

Note: Point numbers 1, 4 and 6 on Figure 2 represent the Environment Protection Licence Identification Numbers displayed in Table 1:

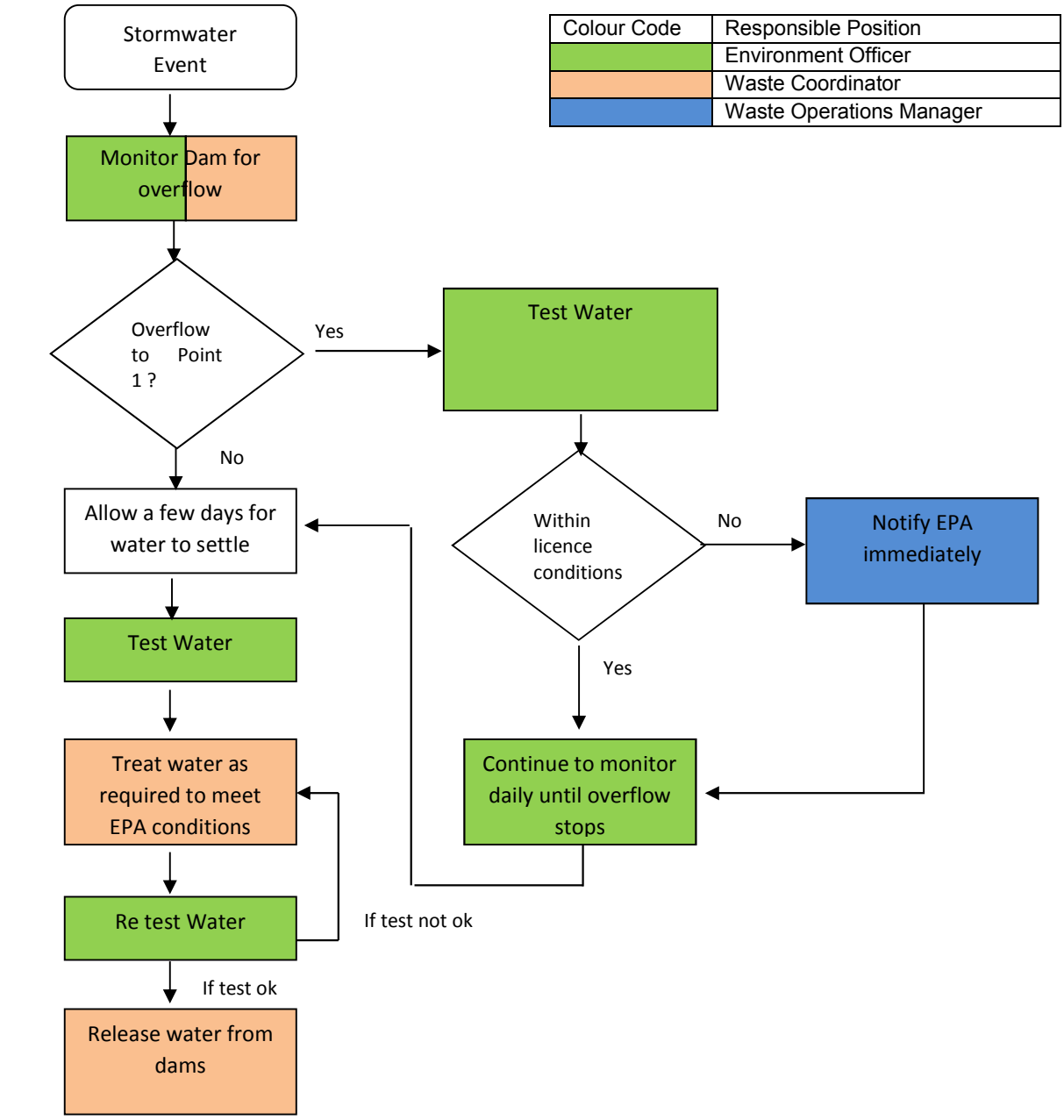
Table 1 Key Environment Protection Licence Identification Numbers

Figure 2 No.	EPL No.	Comment
1	1	Source
4	33	Downstream
6	34	Upstream

3.1.6 The samples are tested for compliance against the parameters specified in the Environment Protection Licence 5862. Where there is an exceedance of licence conditions, Council's Waste Operations Manager (or delegated representative) is to notify the EPA immediately.

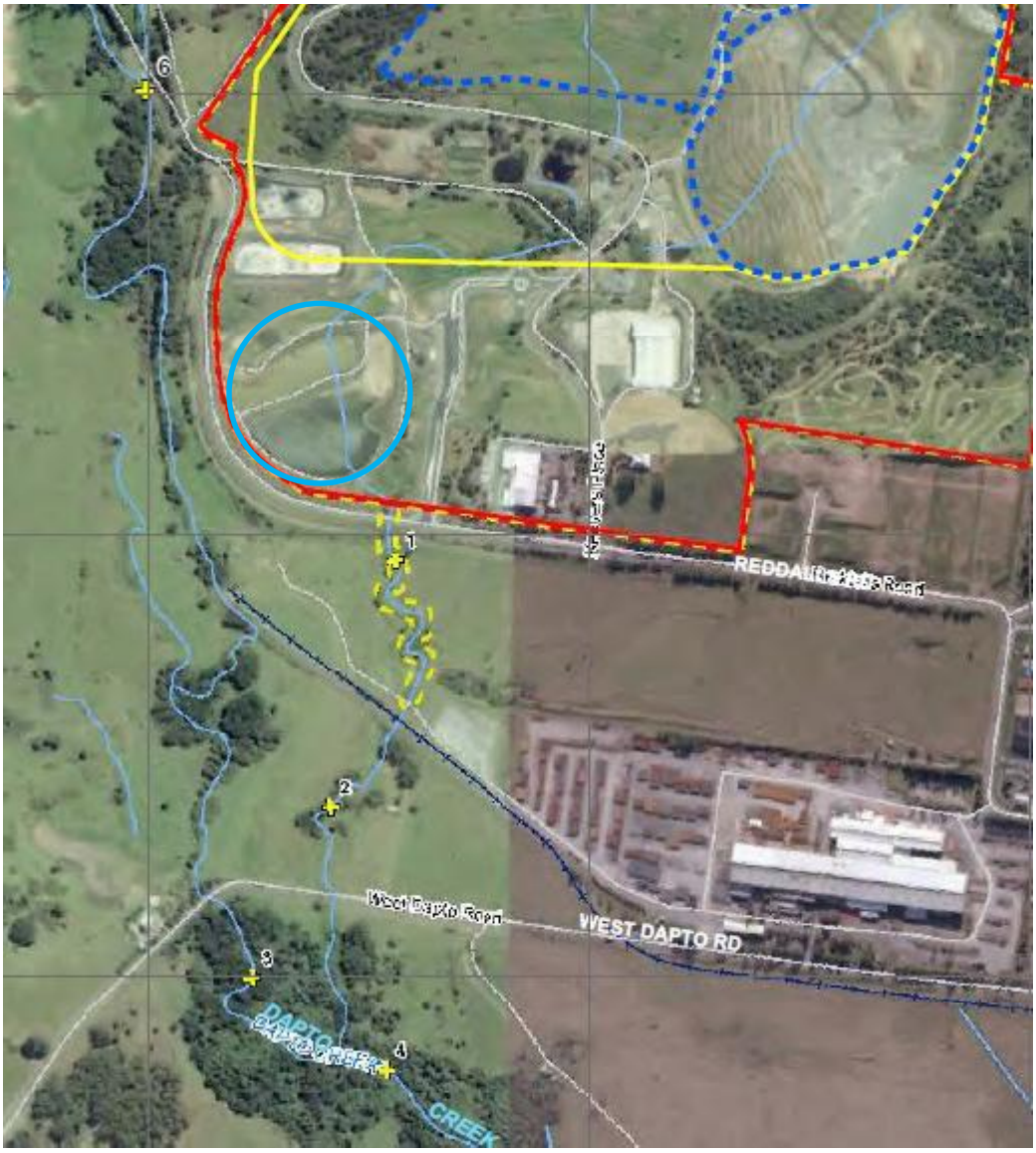
3.1.7 Where the samples are collected by the site Environmental Officer (or nominated Council representative) the Laboratory Submission Cover Sheet in Appendix 4.1 should be filled in and retained on file.

Figure 1 Stormwater Management Process



Note: Treatment will be by gypsum dosing to reduce suspended solids

Figure 2: Location monitoring points



3.2 RESPONSIBILITIES

3.2.1 For each rainfall event the Environmental Officer and Site Coordinator (or delegate) shall monitor the dam levels to establish if there is an overflow condition. Where an overflow condition occurs, the Environmental Officer (or delegate) notifies contracted sampler or the environmental representative who will in turn arrange for samples from monitoring points 1, 4 and 6.

3.2.2 Controlled release of water to creek is carried out by Council under the direction of the Operations Manager. The Operations Manager is responsible to ensure that appropriate testing is conducted and that the water quality falls within EPA guidelines before a controlled release occurs.

3.2.3 Council will be required to chemically dose dams using gypsum (dosage varies with sediment load, but dose average is 32kg/100m^3). The Site Coordinator will arrange for a suitably trained person to carry out this work.

3.2.4 Council is responsible for the supply of all chemicals required to treat storm water. The Waste Coordinator (or delegate) is required to monitor the stock of chemicals on site and record their use and replace stocks. The Environment Officer will ensure that all chemicals are listed on the hazardous chemicals register, MSDS are available on site for all chemicals, and that staff using the chemicals have been appropriately trained in their safe handling prior to use.

3.2.5 All major site drainage works such as stormwater ponds, dams, bund, drains, sediment retention traps, screens and erosion controls will be constructed by in accordance with relevant requirements (Refer appendices for construction methods). The Waste Coordinator is responsible for the operation and maintenance of the storm water management infrastructure which includes:

- Maintaining in a litter free condition
- Desilt & repair on an as required basis
- Maintain in a peak functional condition in accordance with design capacity
- Ensure that drainage occurs in a manner which prevents ponding and minimises erosion/scouring

3.2.6 All temporary drains will generally be earthen drains constructed at grades not steeper than 1%, to minimise scouring. Where steeper grades are required, the drains must be provided with appropriate scour protection, for example hay bales or rubble. All earthen drains will be grassed to minimise erosion.

<u>Warning:</u> A life buoy and throw rope is required when working in or around the dams in case someone slips or falls into the dam.

4.0 APPENDICES

4.1 Laboratory Submission Sheet

4.2 Construction of Drains on Outside of Batter

4.3 Construction of Drainage Channels

4.4 Typical Erosion Control Structure

4.5 Stormwater Treatment Plant

Wollongong City Council
City Works and Services Division – Waste Services
Laboratory Submission Sheet

Location/Site	Wollongong Waste and Resource Recovery Park (Whytes Gully)
Laboratory	ALS – Contract T
Purchase Order	
Sample Number	
Period Sampled	
Date Dispatched	

Dust Analysis Suite (Select One)

Selection	Test Type	Analytes/Results Required
☐	Monthly Dust	Total Insoluble Solids
☐	Other	Specify

Water Analysis Suite (Select One) (Note: All results in milligrams per litre unless specified)

Selection	Test Type	Analytes/Results Required
☐	Sediment Basin Discharge	pH, Total Suspended Solids.
☐	Surface Water Annual	Alkalinity (as Calcium Carbonate), Ammonia, Calcium, Chloride, Conductivity (µS/cm), Dissolved Oxygen, Filterable Iron, Fluoride, Magnesium, Nitrate, pH, Potassium, Sodium, Sulfate, Temperature (^{o}C), Total Organic Carbon , Total Phenolics and Total Suspended Solids.
☐	Quarterly Ground Water	Alkalinity (as Calcium Carbonate), Calcium, Chloride, Conductivity (µS/cm), Magnesium, Nitrogen (Ammonia), pH, Potassium, Sodium, Standing Water Level (m), Sulfate, Total Dissolved Solids and Total Organic Carbon
☐	Annual Ground Water	Aluminium, Arsenic, Barium, Benzene, Bicarbonate, Cadmium, Chromium (Hexavalent), Chromium (Total), Cobalt, Copper, Ethyl Benzene, Fluoride, Lead, Manganese, Mercury, Nitrate, Nitrite, Organochlorine Pesticides, Organophosphate pesticides, Polycyclic Aromatic Hydrocarbons, Toluene, Total Petroleum Hydrocarbons, Total Phenolics, Xylene and Zinc.
☐	Trade Waste (22 Days)	Ammonia, Biochemical Oxygen Demand, Suspended Solids, Temperature (^{o}C), Total Dissolved Solids, pH.
☐	Other	Specify

Special Instructions: Certified report required. All work to be undertaken to a current accredited testing method.

Contact	Signed	Name

ANNEXURE D

Annual Return 2014 - 2015

ANNUAL RETURN

LICENCE NO	**5862**
LICENCE HOLDER	WOLLONGONG CITY COUNCIL
REPORTING PERIOD	29-May-2015 to 28-May-2016

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD _____ / _____ / _____ to _____ / _____ / _____

(Note: the revised reporting period also needs to be entered in Section E)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 28-Jul-2016

Your Annual Return must be completed, including certification in Section I, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

- **the issue of a Penalty Notice for $1500 (individuals) or $3000 (corporations);**

OR

- **prosecution.**

Please send your completed Annual Return by **Registered Post** to:

Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF $250,000 FOR A CORPORATION OR $120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997.*

Use the checklist below to ensure that you have completed your Annual Return correctly.
(✓ the boxes)

CHECKLIST		
☑	Section A:	All licence details are correct
☑	Section B1:	You have entered the correct number in the complaints table
☑	Section B2 – B3:	If there are tables, you have provided the required details
☑	Section C:	You have answered question 1, and 2 if applicable
☑	Section D:	If applicable, you have completed all load calculation worksheets
☑	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
☑	Section F:	You have answered question 1, 2 and 3 if applicable
☑	Section G:	You have answered question 1 and questions 2, 3 and 4 or questions 5 through to 11 if applicable
☑	Section H:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
☑	Section I:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
☑	Make a copy of the completed Annual Return and keep it with your licence records	
☑	Attach a cheque (unless you have paid separately) for the payment of the administrative fee for the next licence fee period PAID SEPARATELY	

Please send your completed Annual Return by **Registered Post** to:

Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232

A Statement of Compliance - Licence Details

ALL licence holders must check that the licence details in Section A are correct

If there are changes to any of these details**you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.**

Licence variation and transfer application forms are available on the EPA website at: http://www.epa.nsw.gov.au/licensing or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number	5862
Licence Holder	WOLLONGONG CITY COUNCIL
Trading Name *(if applicable)*	
ABN	63 139 525 939

A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	WHYTES GULLY WASTE DISPOSAL FACILITY
Premises	REDDALLS ROAD KEMBLA GRANGE NSW 2526

A3 Activities to which Licence Applies

Waste disposal (application to land)

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Waste disposal by application to land		capacity

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period. **If no complaints were received enter nil in the attached box, otherwise complete the table below.**	38

Pollution Complaint Category	Number of Complaints
Air	38
Water	
Noise	
Waste	
Other	

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.
Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Discharge & Monitoring Point 1

Stormwater monitoring and discharge point, Outlet at Reddalls Road - Monitoring point labelled 1 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297777 N6183972

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	3	3	129	259-33	455

Ammonia	milligrams per litre	3	3	0·1	0·75	1-92
Calcium	milligrams per litre	3	3	24	81-33	190
Chloride	milligrams per litre	3	3	37	270·67	649
Conductivity	microsiemens per centimetre	3	3	508	1465·67	3060
Dissolved Oxygen	milligrams per litre	3	3	2-99	6-85	9-46
Filterable iron	milligrams per litre	3	3	<0·05	0·10	0·19
Fluoride	milligrams per litre	3	3	0-3	0-4	0·5
Magnesium	milligrams per litre	3	3	14	45·67	102
Nitrate	milligrams per litre	3	3	0·29	1-12	2·62
pH	pH	3	3	7-6	7-93	8·2
Potassium	milligrams per litre	3	3	12	14-33	17
Sodium	milligrams per litre	3	3	58	174·00	342
Sulfate	milligrams per litre	3	3	20	55·33	114
Temperature	degrees Celsius	3	3	13-7	19-63	24
Total organic carbon	milligrams per litre	3	3	11	13	16
Total Phenolics	milligrams per litre	3	3	<0-05	<0-05	<0-05

Total suspended solids	milligrams per litre	3	3	18	75-67	116

Monitoring Point 2

Groundwater quality monitoring, Monitoring point labelled GABH01 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297751.8 N6184474

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre					
Aluminium	milligrams per litre					
Arsenic	milligrams per litre					
Barium	milligrams per litre					
Benzene	milligrams per litre					
Cadmium	milligrams per litre					
Calcium	milligrams per litre					
Chloride	milligrams per litre					
Chromium (hexavalent)	milligrams per litre					
Chromium (total)	milligrams per litre					
Cobalt	milligrams per litre					
Conductivity	microsiemens per centimetre					

DESTROYED

Copper	milligrams per litre					
Ethyl benzene	micrograms per litre					
Fluoride	milligrams per litre					
Lead	milligrams per litre					
Magnesium	milligrams per litre					
Manganese	micrograms per litre					
Mercury	milligrams per litre					
Nitrate	milligrams per litre					
Nitrite	milligrams per litre					
Nitrogen (ammonia)	milligrams per litre					
Organochlorine pesticides	milligrams per litre					
Organophosphate pesticides	milligrams per litre					
pH	pH					
Polycyclic aromatic hydrocarbons	milligrams per litre					
Potassium	milligrams per litre					
Sodium	milligrams per litre					

DESTROYED

Standing Water Level	metres					
Sulfate	milligrams per litre					
Toluene	milligrams per litre					
Total dissolved solids	milligrams per litre					
Total organic carbon	milligrams per litre					
Total petroleum hydrocarbons	milligrams per litre					
Total Phenolics	milligrams per litre					
Xylene	milligrams per litre					
Zinc	milligrams per kilogram					

DESTROYED

Monitoring Point 3

Surface gas monitoring, Areas where intermediate or final cover has been placed.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.01	5.55	157

Monitoring Point 4

Gas accumulation monitoring, Inside all buildings within 250 metres of deposited waste.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value

Methane	percent by volume	12	12	0·25	1-91	3-10

Monitoring Point 5

Groundwater quality monitoring, Monitoring point labelled GABH02 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297754.9 N6184377

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	998	1072	1130
Aluminium	milligrams per litre	1	1	1100	1100	1100
Arsenic	milligrams per litre	1	1	<0·001	<0·001	<0·001
Barium	milligrams per litre	1	1	0·01	0·01	0·01
Benzene	milligrams per litre	1	1	<0·001	<0·001	<0·001
Cadmium	milligrams per litre	1	1	<0·0001	<0·0001	<0·0001
Calcium	milligrams per litre	4	4	290	306·5	340
Chloride	milligrams per litre	4	4	911	1025·25	1080
Chromium (hexavalent)	milligrams per litre	1	1	<0·01	<0·01	<0·01
Chromium (total)	milligrams per litre	1	1	0·002	0·002	0·002
Cobalt	milligrams per litre	1	1	<0·001	<0·001	<0·001
Conductivity	microsiemens per centimetre	4	4	5190	5362·5	5550

Copper	milligrams per litre	1	1	0.007	0.007	0.007
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	194	189	196
Manganese	micrograms per litre	1	1	50	50	50
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.015	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.6	6.675	6.8
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	2	2.75	3
Sodium	milligrams per litre	4	4	575	624-5	661

Standing Water Level	metres	4	4	4.85	4.9325	5.09
Sulfate	milligrams per litre	4	4	166	174.25	188
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	3310	3435	3490
Total organic carbon	milligrams per litre	4	4	1	5	9
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Zinc	milligrams per kilogram	1	1	0.017	0.017	0.017

Monitoring Point 6

Groundwater quality monitoring, Monitoring point labelled GABH03 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297793.8 N6184315

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	639	715.5	752
Aluminium	milligrams per litre	1	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.014	0.014	0.014

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	0.0001	0.0001	0.0001
Calcium	milligrams per litre	4	4	327	360	383
Chloride	milligrams per litre	4	4	996	1149	1240
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	0.003	0.003	0.003
Conductivity	microsiemens per centimetre	4	4	5160	5372.5	5540
Copper	milligrams per litre	1	1	0.009	0.009	0.009
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	191	206	214
Manganese	micrograms per litre	1	1	428	428	428
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.00001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01

Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0175	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.6	6.85	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1.75	2
Sodium	milligrams per litre	4	4	497	510.5	533
Standing Water Level	metres	4	4	0.37	0.485	0.69
Sulfate	milligrams per litre	4	4	194	206.75	221
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	3450	3780	4140
Total organic carbon	milligrams per litre	4	4	1	3.25	4
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.015	0.015	0.015

Monitoring Point 7

Groundwater quality monitoring, Monitoring point labelled GABH06D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297975.6 N6184322

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	327	352.5	377
Aluminium	milligrams per litre	1	1	0.06	0.06	0.06
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.005	0.005	0.005
Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.001	<0.001	<0.001
Calcium	milligrams per litre	4	4	90	100	107
Chloride	milligrams per litre	4	4	464	543.5	584
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	2780	2802.5	2830

Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	micrograms per litre	1	1	<0.001	<0.001	<0.001
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	56	61.25	67
Manganese	micrograms per litre	1	1	5	5	5
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.01	0.01
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.7	6.8	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	405	422.25	443

Standing Water Level	metres	4	4	1·64	1·7175	1·86
Sulfate	milligrams per litre	4	4	153	168	178
Toluene	milligrams per litre	1	1	<0·002	<0·002	<0·002
Total dissolved solids	milligrams per litre	4	4	1490	1597·5	1730
Total organic carbon	milligrams per litre	4	4	1	1·25	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<0·05	<0·05	<0·05
Total Phenolics	milligrams per litre	1	1	<0·05	<0·05	<0·05
Xylene	milligrams per litre	1	1	<0·002	<0·002	<0·002
Zinc	milligrams per kilogram	1	1	0·013	0·013	0·013

Monitoring Point 8

Groundwater quality monitoring, Monitoring point labelled GABH06S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297977 N6184322

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	393	426·25	458
Aluminium	milligrams per litre	1	1	0·38	0·38	0·38
Arsenic	milligrams per litre	1	1	0·001	0·001	0·001
Barium	milligrams per litre	1	1	0·09	0·09	0·09

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	4	75	84.25	93
Chloride	milligrams per litre	4	4	470	553.5	590
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	4	4	2880	2990	3080
Copper	milligrams per litre	1	1	0.01	0.01	0.01
Ethyl benzene	micrograms per litre	1	1	< 0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.9	0.9	0.9
Lead	milligrams per litre	1	1	0.003	0.003	0.003
Magnesium	milligrams per litre	4	4	75	75.5	81
Manganese	micrograms per litre	1	1	178	178	178
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.01	0.01	0.01

Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.01	0.01
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.9	7.05	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	444	470.75	506
Standing Water Level	metres	4	4	2.15	2.2475	2.4
Sulfate	milligrams per litre	4	4	197	213.25	231
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	1680	1720	1810
Total organic carbon	milligrams per litre	4	4	1	1.25	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	<0.031	<0.031	<0.031

Monitoring Point 9

Groundwater quality monitoring, Monitoring point labelled GMW102 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297952.6 N6184807

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	100	197.50	302
Aluminium	milligrams per litre	1	1	3.77	3.77	3.77
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.028	0.028	0.028
Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	21	55.75	73
Chloride	milligrams per litre	4	4	15	17.25	20
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	268	524.75	699

Copper	milligrams per litre	1	1	0.01	0.01	0.01
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.2	0.2	0.2
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	7	18	24
Manganese	micrograms per litre	1	1	28	28	28
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.26	0.26	0.26
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.01	0.01
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.6	6.98	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	21	30.75	36

Standing Water Level	metres	4	4	2	9.20	12.2
Sulfate	milligrams per litre	4	4	11	16.50	20
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	222	453.25	690
Total organic carbon	milligrams per litre	4	4	1	2	3
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Zinc	milligrams per kilogram	1	1	0.017	0.017	0.017

Monitoring Point 10

Groundwater quality monitoring, Monitoring point labelled GMW103 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298470.2 N6184603

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	376	424	445
Aluminium	milligrams per litre	1	1	4.61	4.61	4.61
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.042	0.042	0.042

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	0.0001	0.0001	0.0001
Calcium	milligrams per litre	4	4	184	206.75	249
Chloride	milligrams per litre	4	4	378	415.5	446
Chromium (hexavalent)	milligrams per litre	1	1	<0.05	<0.05	<0.05
Chromium (total)	milligrams per litre	1	1	0.006	0.006	0.006
Cobalt	milligrams per litre	1	1	0.0001	0.0001	0.0001
Conductivity	microsiemens per centimetre	4	4	2240	2320	2390
Copper	milligrams per litre	1	1	0.08	0.08	0.08
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.009	0.009	0.009
Magnesium	milligrams per litre	4	4	64	72.25	85
Manganese	micrograms per litre	1	1	336	336	336
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.13	0.13	0.13

Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0325	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6-9	6.975	7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	173	188.75	198
Standing Water Level	metres	4	4	7.4	7.565	7.69
Sulfate	milligrams per litre	4	4	120	128	144
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	1480	1580	1680
Total organic carbon	milligrams per litre	4	4	1	1.25	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.081	0.081	0.081

Monitoring Point 11

Groundwater quality monitoring, Monitoring point labelled GMW104 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297597.9 N6184508

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	230	326.25	499
Aluminium	milligrams per litre	1	1	5.22	5.22	5.22
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.025	0.025	0.025
Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	33	41.75	56
Chloride	milligrams per litre	4	4	31	57.50	101
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.004	0.004	0.004
Cobalt	milligrams per litre	1	1	0.004	0.004	0.004
Conductivity	microsiemens per centimetre	4	4	507	910.75	1340

Copper	milligrams per litre	1	1	0.018	0.018	0.018
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.7	0.7	0.7
Lead	milligrams per litre	1	1	0.005	0.005	0.005
Magnesium	milligrams per litre	4	4	21	27.5	38
Manganese	micrograms per litre	1	1	413	413	413
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.02	0.02	0.02
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.015	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	7.2	7.3	7.4
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	78	121.25	199

Standing Water Level	metres	4	4	7.28	7.562	7.93
Sulfate	milligrams per litre	4	4	34		65
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	297	514.5	748
Total organic carbon	milligrams per litre	4	4	1	1.25	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Zinc	milligrams per kilogram	1	1	0.025	0.025	0.025

Monitoring Point 12

Groundwater quality monitoring, Monitoring point labelled GMW105 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298433.3 N6184397

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	37	43.75	50
Aluminium	milligrams per litre	1	1	36.7	36.7	36.7
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.127	0.127	0.127

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	5	6.5	8
Chloride	milligrams per litre	4	4	17	24.5	35
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.023	0.023	0.023
Cobalt	milligrams per litre	1	1	0.014	0.014	0.014
Conductivity	microsiemens per centimetre	4	4	220	245.25	269
Copper	milligrams per litre	1	1	0.059	0.059	0.059
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.3	0.3	0.3
Lead	milligrams per litre	1	1	0.02	0.02	0.02
Magnesium	milligrams per litre	4	4	2	3.25	4
Manganese	micrograms per litre	1	1	676	676	676
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.84	0.84	0.84

Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.1	0.1	0.1
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	5.8	5.95	6.1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	30	35.5	40
Standing Water Level	metres	4	4	10.5	10.96	11.5
Sulfate	milligrams per litre	4	4	12	14.25	16
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	191	219	341
Total organic carbon	milligrams per litre	4	4	1	1.5	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.077	0.077	0.077

Monitoring Point 13

Groundwater quality monitoring, Monitoring point labelled GMW106 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298356.8 N6184294

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4				
Aluminium	milligrams per litre	1				
Arsenic	milligrams per litre	1				
Barium	milligrams per litre	1				
Benzene	milligrams per litre	1				
Cadmium	milligrams per litre	1				
Calcium	milligrams per litre	4				
Chloride	milligrams per litre	4				
Chromium (hexavalent)	milligrams per litre	1				
Chromium (total)	milligrams per litre	1				
Cobalt	milligrams per litre	1				
Conductivity	microsiemens per centimetre	4				

Copper	milligrams per litre	1				
Ethyl benzene	micrograms per litre	1				
Fluoride	milligrams per litre	1				
Lead	milligrams per litre	1				
Magnesium	milligrams per litre	4				
Manganese	micrograms per litre	1				
Mercury	milligrams per litre	1				
Nitrate	milligrams per litre	1				
Nitrite	milligrams per litre	1				
Nitrogen (ammonia)	milligrams per litre	4				
Organochlorine pesticides	milligrams per litre	1				
Organophosphate pesticides	milligrams per litre	1				
pH	pH	4				
Polycyclic aromatic hydrocarbons	milligrams per litre	1				
Potassium	milligrams per litre	4				
Sodium	milligrams per litre	4				

Standing Water Level	metres	4				
Sulfate	milligrams per litre	4				
Toluene	milligrams per litre	1				
Total dissolved solids	milligrams per litre	4				
Total organic carbon	milligrams per litre	1		DR		
Total petroleum hydrocarbons	milligrams per litre	1				
Total Phenolics	milligrams per litre	1				
Xylene	milligrams per litre	1				
Zinc	milligrams per kilogram	1				

Monitoring Point 14

Groundwater quality monitoring, Monitoring point labelled GMW108S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297870.2 N6184262

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	347	466	583
Aluminium	milligrams per litre	1	1	8.2	8.2	8.2
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.113	0.113	0.113

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	26	71.75	137
Chloride	milligrams per litre	4	4	47	268	676
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.007	0.007	0.007
Cobalt	milligrams per litre	1	1	0.007	0.007	0.007
Conductivity	microsiemens per centimetre	4	4	787	1780.25	3720
Copper	milligrams per litre	1	1	0.025	0.025	0.025
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.3	0.3	0.3
Lead	milligrams per litre	1	1	0.007	0.007	0.007
Magnesium	milligrams per litre	4	4	13	51.25	108
Manganese	micrograms per litre	1	1	624	624	624
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.02	0.02	0.02

Nitrite	milligrams per litre	1	1	0.02	0.02	0.02
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0275	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	7	6.925	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	2	4
Sodium	milligrams per litre	4	4	124	288.25	484
Standing Water Level	metres	4	4	2.44	2.6	2.82
Sulfate	milligrams per litre	4	4	19	92.25	211
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	512	1,103.75	2060
Total organic carbon	milligrams per litre	4	4	2	6.25	10
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.034	0.034	0.034

Monitoring Point 15

Groundwater quality monitoring, Monitoring point labelled GMW108D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297871.4 N6184262

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	457	480.25	513
Aluminium	milligrams per litre	1	1	0.25	0.25	0.25
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.015	0.015	0.015
Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	113	122.75	136
Chloride	milligrams per litre	4	4	528	596.75	637
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	3060	3135	3200

Copper	milligrams per litre	1	1	0.018	0.018	0.018
Ethyl benzene	micrograms per litre	1	1	<2000	<2000	<2000
Fluoride	milligrams per litre	1	1	0.7	0.7	0.7
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	83	88.25	97
Manganese	micrograms per litre	1	1	11	11	11
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.06	0.06	0.06
Nitrite	milligrams per litre	1	1	0.06	0.06	0.06
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0125	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.8	6.975	7.1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	403	433.75	471

Standing Water Level	metres	4	4	1.95	2.09	2.28
Sulfate	milligrams per litre	4	4	179	195.5	214
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	1810	1855	1950
Total organic carbon	milligrams per litre	4	4	1	2	3
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.02	<0.02	<0.02
Zinc	milligrams per kilogram	1	1	0.015	0.015	0.015

Monitoring Point 16

Groundwater quality monitoring, Monitoring point labelled GMW109S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297605.7 N6184068

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	226	246.5	272
Aluminium	milligrams per litre	1	1	10.3	10.3	10.3
Arsenic	milligrams per litre	1	1	0.006	0.006	0.006
Barium	milligrams per litre	1	1	0.311	0.311	0.311

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	0.0006	0.0006	0.0006
Calcium	milligrams per litre	4	4	60	64.75	72
Chloride	milligrams per litre	4	4	168	212.5	265
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.012	0.012	0.012
Cobalt	milligrams per litre	1	1	0.048	0.048	0.048
Conductivity	microsiemens per centimetre	4	4	1080	1472.5	2280
Copper	milligrams per litre	1	1	0.045	0.045	0.045
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.1	0.1	0.1
Lead	milligrams per litre	1	1	0.021	0.021	0.021
Magnesium	milligrams per litre	4	4	35	37.75	39
Manganese	micrograms per litre	1	1	3220	3220	3220
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.04	0.04	0.04

Nitrite	milligrams per litre	1	1	0.04	0.04	0.04
Nitrogen (ammonia)	milligrams per litre	4	4	0.66	0.6875	0.77
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.2	6.275	6.4
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.01	<0.01	<0.01
Potassium	milligrams per litre	4	4	2	2	2
Sodium	milligrams per litre	4	4	151	159	174
Standing Water Level	metres	4	4	2.97	3.2175	3.5
Sulfate	milligrams per litre	4	4	56	79.5	95
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	657	728.25	812
Total organic carbon	milligrams per litre	4	4	2	4.25	7
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.178	0.178	0.178

Monitoring Point 17

Groundwater quality monitoring, Monitoring point labelled GMW110 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297572.6 N6184266

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	564	605.75	643
Aluminium	milligrams per litre	1	1	13.7	13.7	13.7
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.041	0.041	0.041
Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	180	190.75	202
Chloride	milligrams per litre	4	4	630	762.25	818
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.013	0.013	0.013
Cobalt	milligrams per litre	1	1	0.013	0.013	0.013
Conductivity	microsiemens per centimetre	4	4	3960	4075	4160

Copper	milligrams per litre	1	1	0.024	0.024	0.024
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.011	0.011	0.011
Magnesium	milligrams per litre	4	4	144	147.25	151
Manganese	micrograms per litre	1	1	524	524	524
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.16	0.16	0.16
Nitrite	milligrams per litre	1	1	0.16	0.16	0.16
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.01	0.01
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.7	6.775	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1.5	2
Sodium	milligrams per litre	4	4	451	460.25	476

Standing Water Level	metres	4	4	3.98	4.08	4.28
Sulfate	milligrams per litre	4	4	292	304.75	318
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	2450	2570	2650
Total organic carbon	milligrams per litre	4	4	1	2.25	4
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Zinc	milligrams per kilogram	1	1	0.047	0.047	0.047

Monitoring Point 18

Groundwater quality monitoring, Monitoring point labelled GMW111 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297588.6 N6184385

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	435	485.75	517
Aluminium	milligrams per litre	1	1	20.8	20.8	20.8
Arsenic	milligrams per litre	1	1	0.006	0.006	0.006
Barium	milligrams per litre	1	1	0.103	0.103	0.103

Benzene	milligrams per litre	1	1	< 0.001	< 0.001	< 0.001
Cadmium	milligrams per litre	1	1	< 0.0001	< 0.0001	< 0.0001
Calcium	milligrams per litre	4	4	92	108.5	122
Chloride	milligrams per litre	4	4	422	525.75	627
Chromium (hexavalent)	milligrams per litre	1	1	< 0.01	< 0.01	< 0.01
Chromium (total)	milligrams per litre	1	1	0.01	0.01	0.01
Cobalt	milligrams per litre	1	1	0.017	0.017	0.017
Conductivity	microsiemens per centimetre	4	4	2550	2792.5	3300
Copper	milligrams per litre	1	1	0.045	0.045	0.045
Ethyl benzene	micrograms per litre	1	1	< 0.002	< 0.002	< 0.002
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	0.023	0.023	0.023
Magnesium	milligrams per litre	4	4	76	85.75	80
Manganese	micrograms per litre	1	1	755	755	755
Mercury	milligrams per litre	1	1	< 0.0001	< 0.0001	< 0.0001
Nitrate	milligrams per litre	1	1	< 0.01	< 0.01	< 0.01

Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0125	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.8	6.975	7.1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	349	387.25	455
Standing Water Level	metres	4	4	6.2	6.275	6.39
Sulfate	milligrams per litre	4	4	122	153.75	205
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	1540	1697.5	1930
Total organic carbon	milligrams per litre	4	4	1	1.25	2
Total petroleum hydrocarbons	milligrams per litre	1	1	0.09	0.09	0.09
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Standing Water Level	metres	4	4	2-74	2.9025	3-11
Sulfate	milligrams per litre	4	4	23	25.75	28
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	991	1057.75	1140
Total organic carbon	milligrams per litre	4	4	1	1	1
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.5	<0.5	<0.5
Xylene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Zinc	milligrams per kilogram	1	1	0.006	0.006	0.006

Monitoring Point 20

Groundwater quality monitoring, Monitoring point labelled BH6 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297807.4 N6184052

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	697	729.75	777
Aluminium	milligrams per litre	1	1	0.58	0.58	0.58
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.056	0.056	0.056

Benzene	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	118	123.5	137
Chloride	milligrams per litre	4	4	850	935.5	971
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	0.012	0.012	0.012
Conductivity	microsiemens per centimetre	4	4	4160	4765	5040
Copper	milligrams per litre	1	1	0.014	0.014	0.014
Ethyl benzene	micrograms per litre	1	1	<0.002	<0.002	<0.002
Fluoride	milligrams per litre	1	1	0.8	0.8	0.8
Lead	milligrams per litre	1	1	0.004	0.004	0.004
Magnesium	milligrams per litre	4	4	121	128.75	140
Manganese	micrograms per litre	1	1	1700	1700	1700
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.07	0.07	0.07

Nitrite	milligrams per litre	1	1	0.07	0.07	0.07
Nitrogen (ammonia)	milligrams per litre	4	4	0.06	0.0775	0.12
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
pH	pH	4	4	6.6	6.825	7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	728	811	877
Standing Water Level	metres	4	4	1.24	1.415	1.54
Sulfate	milligrams per litre	4	4	251	287.5	313
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	2880	2902.5	2940
Total organic carbon	milligrams per litre	4	4	1	4.5	9
Total petroleum hydrocarbons	milligrams per litre	1	1	<0.05	<0.05	<0.05
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Zinc	milligrams per kilogram	1	1	0.024	0.024	0.024

Monitoring Point 21

Subsurface gas monitoring, Monitoring point labelled LFG MW1 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298084 N6184278

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0002	0.0004

Monitoring Point 22

Subsurface gas monitoring, Monitoring point labelled LFG MW2 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298202 N6184228

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	<0.0001	0.0003	0.0006

Monitoring Point 23

Subsurface gas monitoring, Monitoring point labelled LFG MW3 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298297 N6184244

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	<0.0001	0.0004	0.0009

Monitoring Point 24

Subsurface gas monitoring, Monitoring point labelled LFG MW4 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	<0.0001	0.0005	0.002

Monitoring Point 25

Subsurface gas monitoring, Monitoring point labelled LFG MW5 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298438 N6184381

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	<0.0001	0.0008	0.0033

Monitoring Point 26

Subsurface gas monitoring, Monitoring point labelled LFG MW6 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	<0.0001	0.0008	0.0016

Monitoring Point 27

Subsurface gas monitoring, Monitoring point labelled LFG MW7 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298470 N6184553

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0018	0.0037

Monitoring Point 28

Subsurface gas monitoring, Monitoring point labelled LFG MW8 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0012	0.0028

Monitoring Point 29

Subsurface gas monitoring, Monitoring point labelled LFG MW9 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298465 N6184645

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0044	0.0228

Monitoring Point 30

Subsurface gas monitoring, Monitoring point labelled LFG MW10 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298448 N6184684

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0008	0.0037

Monitoring Point 31

Subsurface gas monitoring, Monitoring point labelled LFG MW11 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298400 N6184695

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value

Methane	percent by volume	12	12	0.0001	0.0006	0.0014

Monitoring Point 32

Subsurface gas monitoring, Monitoring point labelled LFG MW12 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298351 N6184701

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0.0001	0.0967	1.1488

Monitoring Point 33

Stormwater monitoring point, Downstream monitoring point labelled 4 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297767 N6183396

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	3	3	41	109-67	207
Ammonia	milligrams per litre	3	3	0.01	0.10	0.26
Calcium	milligrams per litre	3	3	11	26.67	46
Chloride	milligrams per litre	3	3	16	36	57
Conductivity	microsiemens per centimetre	3	3	224	408.33	652
Dissolved Oxygen	milligrams per litre	3	3	1.45	6.33	9.69
Filterable iron	milligrams per litre	3	3	0.13	0.38	0.52

Fluoride	milligrams per litre	3	3	0·1	0·17	0·2
Magnesium	milligrams per litre	3	3	6	13	22
Nitrate	milligrams per litre	3	3	0·01	0·56	1·33
pH	pH	3	3	7·3	7·5	7·8
Potassium	milligrams per litre	3	3	4	4·33	5
Sodium	milligrams per litre	3	3	19	35·67	53
Sulfate	milligrams per litre	3	3	1	13·33	28
Temperature	degrees Celsius	3	3	13·3	20·07	26·6
Total organic carbon	milligrams per litre	3	3	5	7·33	9
Total Phenolics	milligrams per litre	3	3	<0·05	<0·05	<0·05
Total suspended solids	milligrams per litre	3	3	36	41·67	47

Monitoring Point 34

Stormwater monitoring point, Upstream monitoring point labelled 6 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297495 N6184504

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	3	3	34	107·33	183
Ammonia	milligrams per litre	3	3	0·03	0·04	0·05

Calcium	milligrams per litre	3	3	11	31.33	51
Chloride	milligrams per litre	3	3	14	34.33	52
Conductivity	microsiemens per centimetre	3	3	171	394.33	618
Dissolved Oxygen	milligrams per litre	3	3	3.7	7.9	11
Filterable iron	milligrams per litre	3	3	0.05	0.25	0.57
Fluoride	milligrams per litre	3	3	0.1	0.17	0.2
Magnesium	milligrams per litre	3	3	5	14.33	23
Nitrate	milligrams per litre	3	3	0.04	0.55	1.15
pH	pH	3	3	7.6	7.73	7.9
Potassium	milligrams per litre	3	3	3	3.33	4
Sodium	milligrams per litre	3	3	15	30.33	43
Sulfate	milligrams per litre	3	3	12	24.33	31
Temperature	degrees Celsius	3	3	12.6	18.93	25
Total organic carbon	milligrams per litre	3	3	3	5.33	7
Total Phenolics	milligrams per litre	3	3	<0.05	<0.05	<0.05
Total suspended solids	milligrams per litre	3	3	6	20.67	46

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☑ the boxes)

1 Were all conditions of the licence complied with (including monitoring and reporting requirements)? ☐ Yes ☑ No

(✓ a box)

2 If you answered 'No' to question 1, please supply the following details for each non -compliance in the format, or similar format , provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

a) What was the specific licence condition that was not complied with?

b) What were the particulars of the non -compliance?

c) What were the date(s) when the non -compliance occurred, if applicable?

d) If relevant, what was the precise location where the non -compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

e) What were the registrati on numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?

f) What was the cause of the non -compliance?

g) What action has been, or will be, taken to mitigate any adverse effects of the non -compliance?

h) What action has been, or will be, taken to prevent a recurrence of the non -compliance?

3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section G of this Annual Return

1*

* PLUS ONE DISCLOSURE REGARDING AN OFFICIAL CAUTION RECEIVED ON 21 MAR 16

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

C2 Details of Non Compliance with Licence 5862

a) What was the specific Licence condition that has not been complied with?

Licence condition L2.1 was not complied with, which states:
"For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table".
The results at Discharge Point 1 indicated a Suspended Solids (SS) reading greater than the licence concentration of 50mg/l.

b) What were the particulars of the non-compliance?

During a heavy rainfall event, a sample of water exiting Whytes Gully detention ponds indicated total suspended solids were 116 mg/L which is 66 mg/L more than the concentration limit provided in the sites Environment Protection Licence.

c) What were the date(s) when the non-compliance occurred?

25 August 2015.

d) If relevant, what was the precise location where the non-compliance occurred?

Stormwater monitoring and discharge point 1 (E297,777, N6,183,972)

e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?

Not applicable

f) What was the cause of the non-compliance?

The discharge of turbid water was caused by a heavy rainfall event in which the site was inundated with water. The major construction works relating to the new landfill cell development and associated infrastructure is understood to be a major contributor to the source of sediment in the control ponds. Additionally, the pond holding capacity was not at its optimal volume when the rainfall event took place.
The large volume of rainfall and overall turbid water witnessed throughout the catchment at this time indicated that the non-compliance did not have the potential to cause material harm to the environment as defined by Section 147 of the POEO Act (1997).

g) What action has been, or will be taken to prevent a recurrence of the non-compliance?

A Wet Weather and Stormwater Management work instruction has been created and implemented to ensure that the sediment pond capacity is maintained between rainfall events.
The Wet Weather and Stormwater Management work instruction is attached to this report.

h) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?

The water that exited the site contained suspended solids at levels above the 50 mg/L concentration limit prescribed in the sites Environment Protection Licence. Given that the entire catchment was visibly turbid and heavily laden with sediment at the time (both upstream and downstream samples taken at the same time indicated suspended solids approaching the 50 mg/L concentration limit) there was no material harm caused by the non-compliance. The Wet Weather and Stormwater Management work instruction detailed in part g) above will help to ensure future non-compliances do not take place. Additionally, siltation and erosion arresting devices have been installed, please see images below.

Image 1 Extra sediment fence

Image 2 Extra sediment fence installation

Image 3 Hay bales placed around outlet

Image 4 Outlet trash basket wrapped in geofabric

C2 Details of Disclosure for Licence 5862

a) What was the specific Licence condition that has not been complied with?

Licence condition R1.7 was not accurately reported. R1.7 states:
"Within the Annual Return, the Statement of Compliance must be certified".
Whilst the Statement of Compliance was certified, it did not accurately reflect the two penalty notices received in May 2014. Therefore this report is made for full disclosure.

b) What were the particulars of the non-compliance?

Council received an Official Caution dated 21 March 2016 for failing to identify the 2013-14 issued penalty notices within the Statement of Compliance section of the 2013-14 Annual Return.
Whilst comment and analysis was provided inside the full report (of which the Statement of Compliance is part) the non-compliances were not tallied inside the Statement of Compliance.

c) What were the date(s) when the non-compliance occurred?

The incidents took place on 22 May 2014 and the Annual Report (period 29 May 2013 to 28 May 2014) was completed over many weeks with the majority of the report completed prior to this event.

d) If relevant, what was the precise location where the non-compliance occurred?

Not applicable, this was an administrative non-compliance

e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?

Not applicable

f) What was the cause of the non-compliance?

The penalty notices were issued at the very end of the reporting period, whilst investigations into the cause of the penalty notices were still being completed and whilst the Annual Return was concurrently being finalised. Whilst the incidents were described in the body of the report, the Annexure which contained the Statement of Compliance was filled in by a different member of staff, who assumed that the Penalty Notices were received outside of the reporting period and therefore accidently omitted them from the Statement of Compliance details.

g) What action has been, or will be taken to prevent a recurrence of the non-compliance?

Relevant Council staff have been trained in the Wollongong Waste and Resource Recovery Park's Environment Protection Licence and reporting requirements. This training is aimed at building team knowledge and understanding the specific reporting sections within an Annual Environment Management Report, including the difference between the "Annual Return" section and the "Annual Report" as a whole. Further to this, Council is currently developing site Work Instructions that will help detail all Site reporting requirements.

h) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?

The 2015-16 Annual Environment Management Report refers to the error in the previous report Annexure, which for all intents and purposes supersedes the previous report.
Council acknowledges the importance of accurate reporting in the Annual Returns and endeavours to provide true and complete records when submitting these documents.
This error was in no way an attempt to conceal the non-compliance (note that the non-compliance was referred to inside the written portion of the Annual Report), nor there be any benefit in doing so as the penalties were made public through the local media and are also available to the public on the Environment Protection Authority's website

E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Is the PIRMP available at the premises?

(✓ a box) ☑ Yes ☐ No

3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box) ☑ Yes ☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address: www.wollongong.nsw.gov.au/services/household/pages/wastesitesanalyticalmonitoringdata.aspx

4 Has the PIRMP been tested?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on: 18/5/2016

5 Has the PIRMP been updated?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on: 31/3/2016

6 How many times has the PIRMP been activated in this reporting period? NIL

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on: __/__/____

The EPA's guidelines for preparation of pollution incident response management plans are available at

http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm

F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box) ☑ Yes ☐ No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box) ☑ Yes ☐ No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address WWW.Wollongong.nsw.gov.au/services/household/pages/wastesiteanalyticalmonitoringdata.aspx

The EPA's written requirements for publishing pollution monitoring data are available at http://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

G Statement of Compliance - Environmental Management Systems and Practices

1 Do you have an environmental management system (EMS) certified to IS0 14001 or any other demonstrated equivalent system[1]? (see note below on demonstrated equivalent)

(✓ a box) ☐ Yes ☑ No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

2 When was the last check of the EMS[2] completed (see note below on check of EMS)? __ / __ / ____

3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box) ☐ Yes ☐ No

4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box) ☐ Yes ☐ No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to http://www.epa.nsw.gov.au/licensing/EMCP.htm for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box) ☑ Yes ☐ No

6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box) ☑ Yes ☐ No

7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box) ☑ Yes ☐ No

8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box) ☑ Yes ☐ No

8a If yes, how often? QUARTERLY

9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box) ☐ Yes ☑ No

10 Have you established and implemented an environmental improvement or management plan?

(✓ a box) ☑ Yes ☐ No

11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this

(✓ a box) ☑ Yes ☐ No

[1] Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:
http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf

[2] Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

H Statement of Compliance - Environmental Improvement Works

Before reporting on environmental improvement works please consider the following:

Environmental improvement works must meet the following criteria:

- They are not required to comply with licence conditions or legislative requirements.
- They have been undertaken voluntarily, and are in addition to any works required to comply with any licence conditions or legislative requirements under the Protection of the Environment Operations Act 1997 or its regulations.
- They relate to the licensed activity at the licensed premises.
- They aim to reduce air, water, noise pollution or incident potential at the premises.
- They were completed in the reporting period covered by this annual return. They are not ongoing.

If the works reported in this annual return do not meet the criteria set out above they will not be included in the calculation of the environmental management category for this licence.

1 Have you voluntarily completed any environmental improvement works in this licence reporting period that have resulted in demonstrated environmental improvements at the premises?

(✓ a box) ☐ Yes ☒ No

If you answered 'Yes', please provide the following supporting information:

Brief description of works.
Demonstration of environmental improvement resulting from the works at the premises. Include details of: - Controls in place before works undertaken - New controls put in place - Description of environmental improvements (e.g. reducing air, water, noise pollution or incident potential) due to the works. - Where possible, quantitative data (e.g. monitoring) to demonstrate the improved environmental outcome.
Date when works were completed (Note: ongoing works are not applicable) __ __ / __ __ / __ __ __ __ Estimated cost of works:

I Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. **Please tick (✓) the box** next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:		the Annual Return must be signed and certified:
an individual	☐	by the individual licence holder, or
	☐	by a person approved in writing by the EPA to sign on the licence holder's behalf
a company	☐	by affixing the common seal in accordance with Corporations Act 2001, or
	☐	by 2 directors, or
	☐	by a director and a company secretary, or
	☐	if a proprietary company that has a sole director who is also the sole company secretary – by that director, or
	☐	by a person delegated to sign on the company's behalf in accordance with the Corporations Act 2001 **and** approved in writing by the EPA to sign on the company's behalf.
a public authority (other than a council)	☐	by the Chief Executive Officer of the public authority, or
	☐	by a person delegated to sign on the public authority's behalf in accordance with its legislation **and** approved in writing by the EPA to sign on the public authority's behalf.
a local council	☑	by the General Manager in accordance with s.377 of the Local Government Act 1993, or
	☐	by affixing the seal of the council in a manner authorised under that Act.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of $250,000 for a corporation or $120,000 for an individual.

I/We

- *declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and*
- *certify that the information in the Statement of Compliance in sections A, C, D, E, F, G and H and any pages attached to Section C is correct and not false or misleading in a material respect.*

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:

For the reporting period 29-May-2015 to 28-May-2016 or ___/___/___ to ___/___/___

SIGNATURE: _____ SIGNATURE: _____

NAME: (printed) DAVID FARMER NAME: (printed) _____

POSITION: GENERAL MANAGER POSITION: _____

DATE: 21 / 07 / 2016 DATE: ___/___/___

SEAL(if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED