Helensburgh Waste Disposal Depot

Environment Protection Licence 5861

Annual Report

Period 29 May 2015 – 28 May 2016

Reference: Z16/135962

Wollongong City Council
Locked Bag 8821
WOLLONGONG DC NSW 2500
Telephone 02 4227 7111
Facsimile 02 4227 7277
www.wollongong.nsw.gov.au

CONTENTS

ABBREVIATIONS

ANZECC	Australian and New Zealand Environment Conservation Council
Ca	Calcium
$CaCO_3$	Calcium Carbonate
CFU	Colony Forming Units
CH_4	Methane
Cl	Chloride
Cr	Chromium
DC	Development Consent
DO	Dissolved Oxygen
EPL	Environmental Protection Licence
K	Potassium
LEMP	Landfill Environmental Management Plan
Mg	Magnesium
Na	Sodium
NH_3	Ammonia
OEH	The Office of Environment & Heritage
Ppm	Parts per Million
SO_4	Sulfate
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
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 ceased accepting waste at the Helensburgh Waste Disposal Depot (the site) after 30 June 2012. Subsequent to closure the site has been capped with no less than 300mm of cover material in anticipation of a full site rehabilitation construction commencing in 2015. The rehabilitation construction will incorporate an impervious liner into the site cap to reduce leachate infiltration levels and to aid the speed at which the sites waste contamination levels stabilise.

The site is located on Nixon Place, Helensburgh on NSW Department of Lands titled land for which Council holds a licence agreement. The site is situated at the northern extent of Council's governance area and is located on approximately 6.4 hectares of land extending across portions of Lots 621 and 915 of DP 752033.

Council holds an Environmental Protection Licence (EPL) number 5861, for 'Waste Disposal – Application to Land' for the site. Despite the sites closure on 30 June 2012, Council still operates in accordance with the sites Landfill Environmental Management Plan (LEMP) in accord with the requirements of the sites EPL and Development Consent (DC).

1.2 SITE HISTORY

The site operated for over fourty years. Prior to the establishment of waste disposal operations, the site was vacant bushland. In the initial years of operation, the site functioned as a trench and fill operation, with a significant amount of waste incinerated within the trenches. It is understood that from the 1960's until approximately the early 1990's, the site operated as a sanitary depot accepting mainly nightsoil and putrescible wastes. Limited environmental controls were in-place at this time. The site continued to accept these types of waste until 1991, when putrescible waste ceased to be accepted. From 1991 to 2012, the site was only permitted by Council to accept "General Solid Non Putrescible" style wastes e.g. furniture, wood, paper, plastics etc. (although the EPL allows the site to accept putrescible wastes if required). In regard to the sites landform, following completion of the trench and fill operations, landfilling operations shifted to land raise operations which involved the construction of a small mound created from the deposited waste materials. Final land raising operations were completed in the site's central and southern area towards the end of the sites functional life.

In its final year of operation, the site received approximately 7,463 tonnes of waste, of which approximately 2,222 tonnes was sent to landfill (excluding cover material). The remainder (approximately 5,241 tonnes) was recycled. Material used for daily covering of the waste was mainly obtained from a combination of clean fill materials delivered to the site and material sourced on the site. Council also used landfill lids on the site in order to reduce the amount of daily cover required. The lids comprised a portable rigid steel frame covered by heavy duty fabric, which were lifted on and off partly filled areas of waste at the end of each day's operations, reducing daily cover requirements at this site by approximately half. Since closure the lids have been transferred to Whytes Gully for continued beneficial use.

1.3 OBJECTIVES OF THE ANNUAL REPORT

Condition R1.1 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 this review.

1.4 RELEVANT DOCUMENTS

This annual report refers to information and data from the following documents:

- Helensburgh Waste Disposal Depot – Annual Return for Period 29 May 2014 to 28 May 2015. By Wollongong City Council July 2015.
- Helensburgh Waste Disposal Depot – Annual Return for Period 29 May 2013 to 28 May 2014. By Wollongong City Council July 2014.
- Helensburgh Waste Disposal Depot – Annual Return for Period 01 June 2012 to 31 May 2013. By Wollongong City Council July 2013.
- Helensburgh Waste Disposal Depot – Annual Return for Period 01 June 2011 to 31 May 2012. By Wollongong City Council July 2012
- Helensburgh Waste Disposal Depot – Annual Return for Period 01 June 2010 to 31 May 2011. By Wollongong City Council July 2011.
- Helensburgh Waste Disposal Depot – 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 NSW (EPA) has issued an *Environmental Protection Licence* (Licence No. 5861) for the landfill and recycling operations on site. The licence, issued under the *Protection of the Environment Operations Act 1997,* requires an annual return to be submitted to the EPA, detailing:

a) Statement of compliance; and
b) Monitoring and complaints summary.
c) Tabulated results of all monitoring data required 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) Identification of any deficiencies in environmental performance and action taken.
h) Recommendations on improving the sites environmental performance.

The EPL Annual Returns for the 2009 to 2015 reporting periods were reviewed to provide a background to this report. The Annual Returns can be summarised as follows:

01 June 2009 to 31 May 2010

B1. Pollution complaints - One.
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. *Three missed conductivity measurements*
2. *One round of groundwater monitoring missed*
3. *Two missed ammonia measurements*
4. *One round of groundwater monitoring missed*
5. *Two missed ammonia measurements*
6. *One round of groundwater monitoring missed*
7. *Two missed ammonia measurements*
8. *One round of surface water monitoring missed*
9. *Two missed ammonia, faecal coliforms and dissolved oxygen tests*
10. *Four missed potassium tests*

01 June 2010 to 31 May 2011

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

01 June 2011 to 31 May 2012

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

01 June 2012 to 31 May 2013

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

29 May 2013 to 28 May 2014

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

29 May 2014 to 28 May 2015

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

29 May 2015 to 28 May 2016

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

A potential problem existed prior to 2011 with seemingly regular missed analytical testing regimes over the previous two years. Subsequently, Council formally tendered for the environmental testing at the site, which now ensures regular testing routines are in place under contract performance requirements.

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

- Amendment of the text description to include 'part lots' within the Licenced Area, October 2014.
- Incorporation of additional ground water monitoring wells, gas migration monitoring wells and final closure capping profile on 20 May 2013.
- Scheduled Activity and Waste Classification structure altered on 17 October 2008.
- Environmentally sensitive or inappropriate landfilling classification removed from licence on 12 June 2008.
- Environmentally sensitive or inappropriate landfilling classification added to licence on 18 March 2008.
- Clarification of noise appropriated operating hours on 16 May 2006.
- Slag and asphalt chippings added to appropriate cover materials list on 17 May 2005.

3 REVIEW OF LANDFILL MONITORING DATA

3.1 SURFACE WATER MONITORING

3.1.1 Tabulated Results

As per the sites EPL, stormwater overflow events and the Pony Club stormwater detention pond were monitored with the following results:

Table 3.1.1(a) Showing stormwater overflow monitoring results

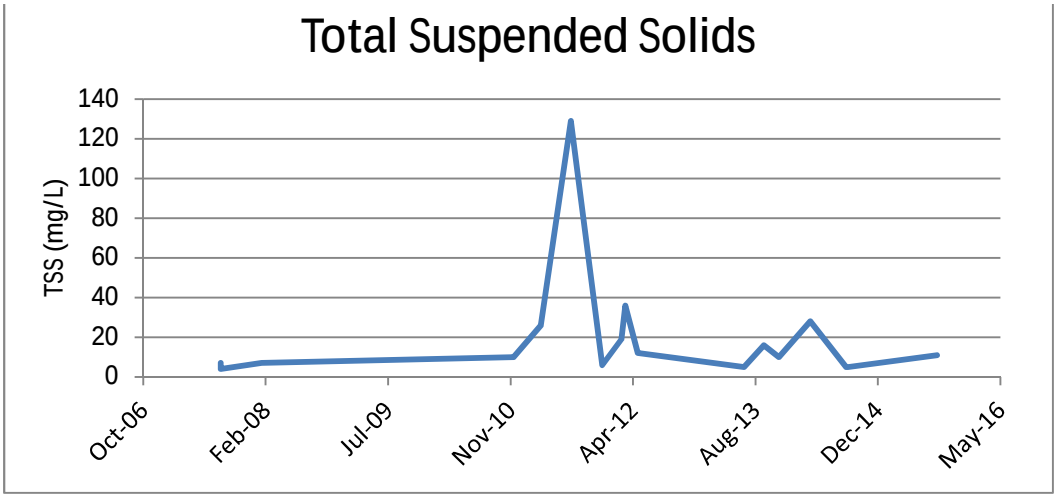
Analyte	26/8/2015
Suspended Solids	11
pH	7

Table 3.1.1(b) Showing quarterly stormwater quality in the pony club pond

Analyte	Unit	Aug-15	Nov-15	Feb-16	May-16
Conductivity	µS/cm	386	404	472	708
Dissolved Oxygen	mg/L	10.5	8.72	8.25	8.42
Faecal Coliforms	CFU/100mL	<2	240	470	88
Nitrogen (Ammonia)	mg/L	0.44	0.01	1.79	9.7
Potassium	mg/L	5	6	10	22
Redox Potential	mV	-29	36	-10	-67
Total Dissolved Solids	mg/L	237	202	260	416
Total Organic Carbon	mg/L	6	6	7	21
pH	pH	7.1	7.5	6.8	7.6

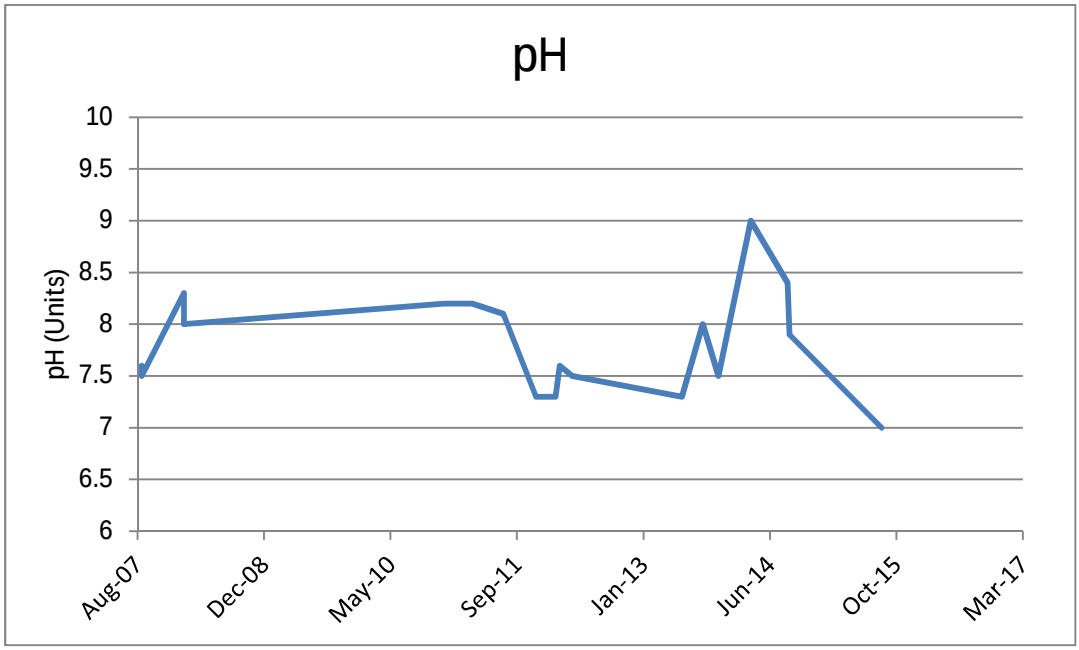
3.1.2 Data Presentation Stormwater overflow

3.1.2.1 Total suspended Solids



Apart from an individual spike in July 2011, the onsite stormwater treatment meets EPL requirements, the result from the 26 August 2015 was measured at 11mg/l.

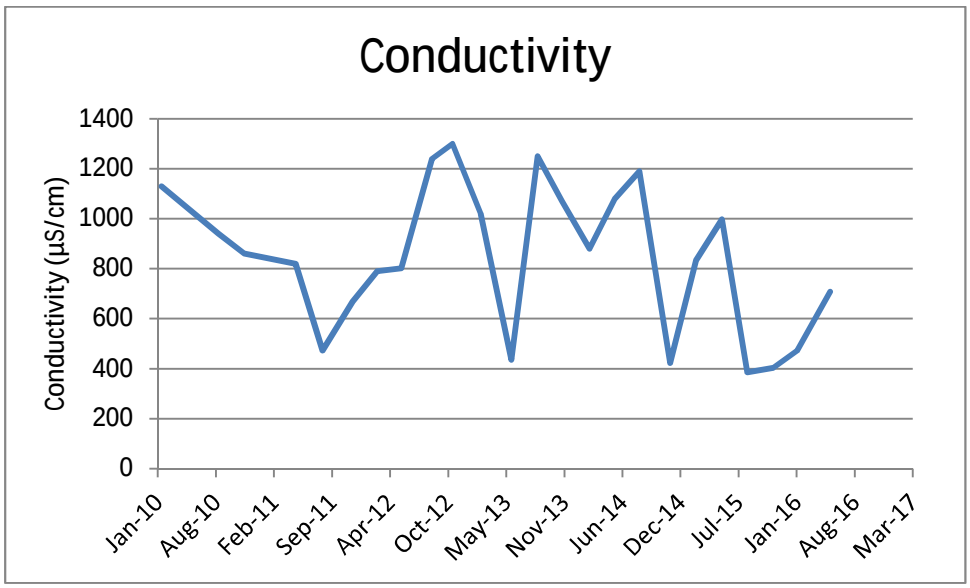
3.1.2.2 pH



The pH derived from onsite stormwater has traditionally performed well within EPL requirements. The pH has sample taken during the reporting period returned a reading of 7 which is within the specified range.

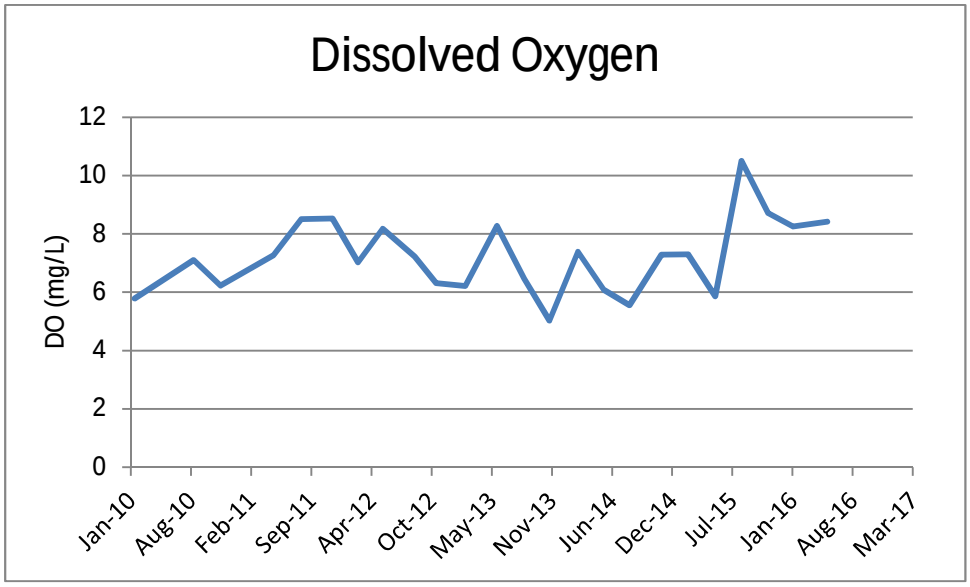
3.1.3 Quarterly stormwater quality in the Pony Club pond

3.1.3.1 Conductivity and dissolved oxygen



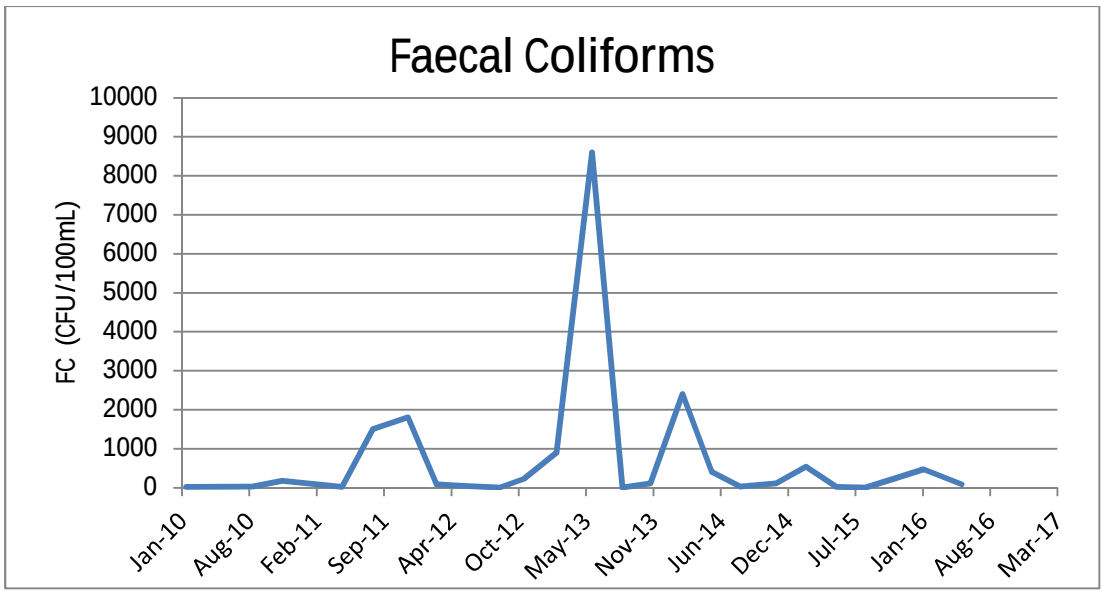
Conductivity is a measure of the waters ability to pass electrical current, usually though positively or negatively charged inorganic dissolved solids (e.g. sodium, magnesium, calcium, iron). The conductivity results for the Pony Club pond have been slowly rising in this reporting period in line with previous trends, these will continue to be closely monitored.

3.1.3.2 Dissolved Oxygen



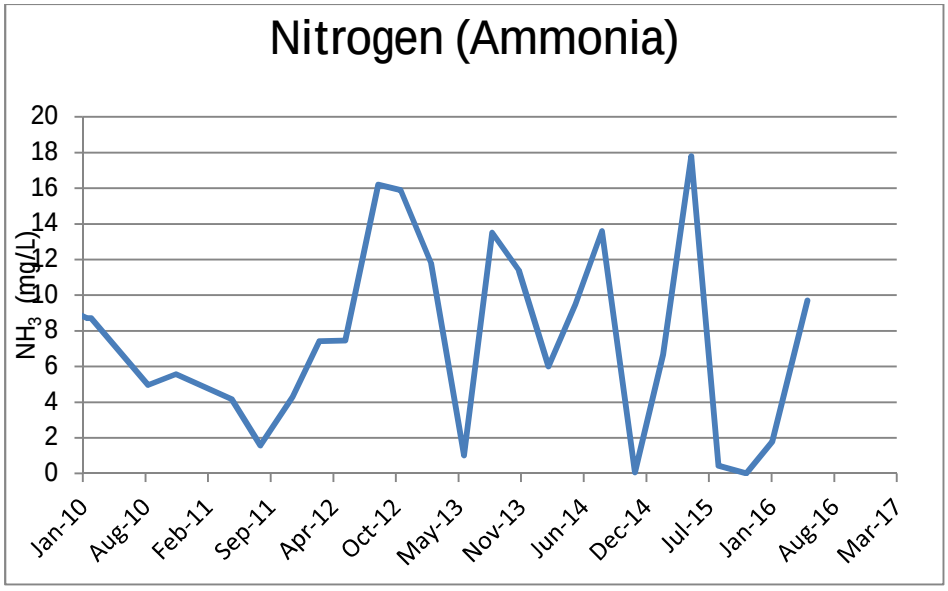
Dissolved oxygen levels can be depleted by biological activity associated with the nitrification process (common in leachate). The dissolved oxygen levels have started to taper down toward historic levels, the following years monitoring will need to be reviewed closely to ensure that the data continues to trend in the historic ranges.

3.1.3.3 Faecal coliforms data presentation



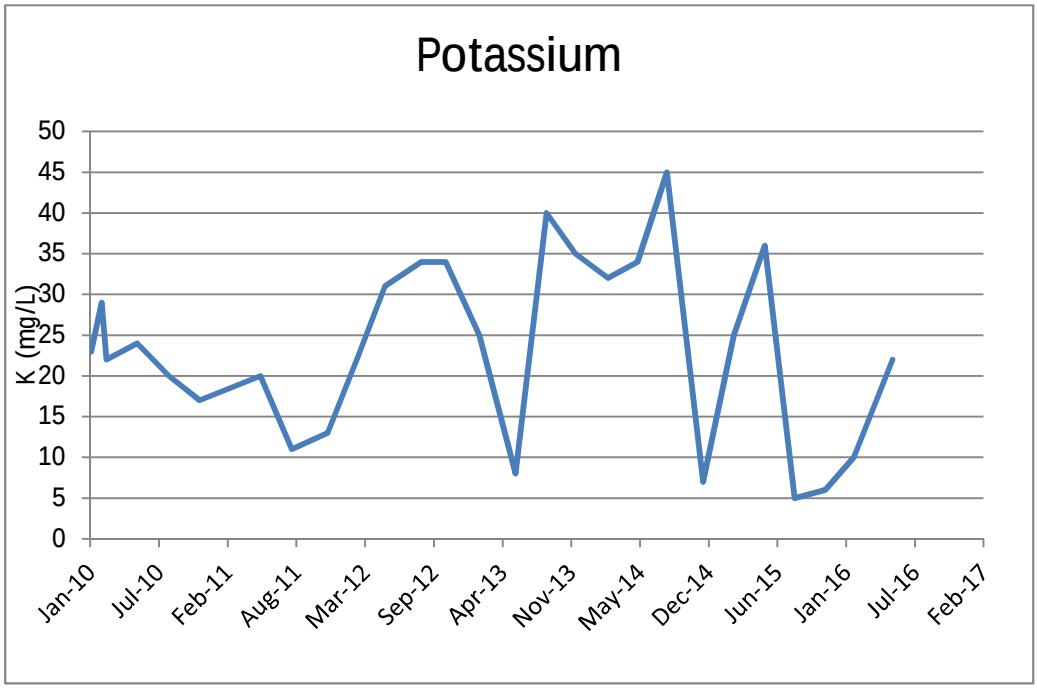
Coliforms are bacteria that live in animal intestines that can be found in excrement. The results displayed indicate that animal excrement may have been present in the pond in late 2011, May 2013 and again in February 2014. The site is exposed to off leash dogs, horses (as a Pony Club) and deer.

3.1.3.4 Nitrogen as ammonia



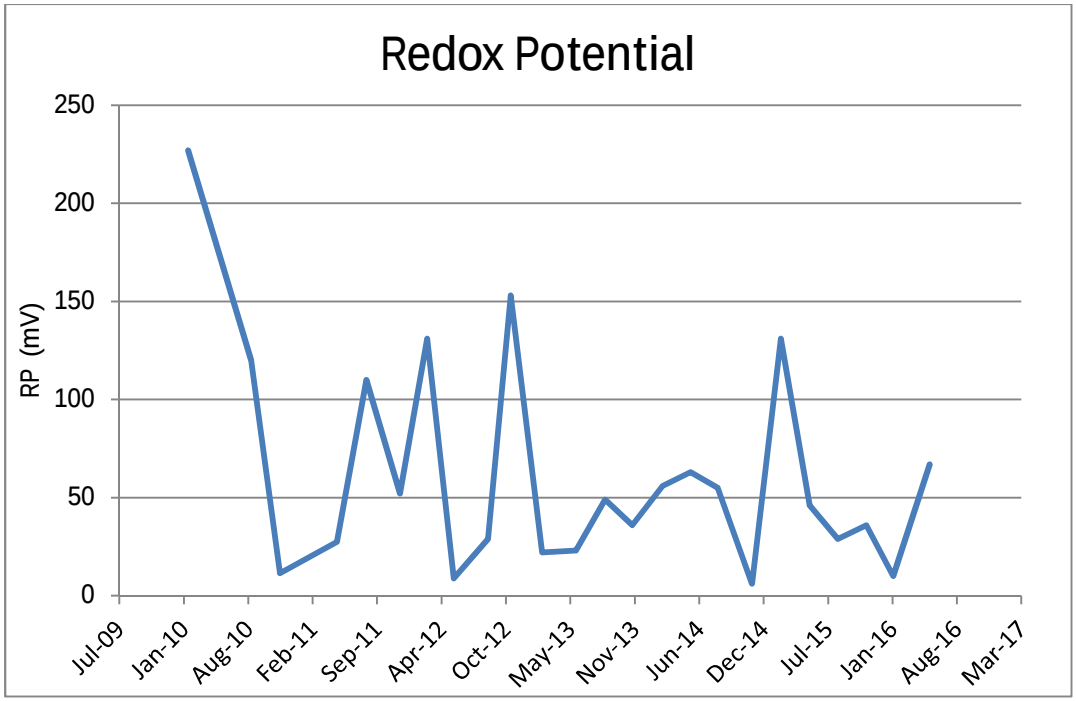
Nitrogen (as Ammonia) has a relatively long history available for comparison. The trend has been ultimately stable over time fluctuating at a maximum between 2 and 17 mg/L. This sampling period is between that range. Therefore, there is no indication that leachate is entering the Pony Club pond.

3.1.3.5 Potassium



Potassium is present in bodies of water outside coastal areas generally through weathering of clays and agricultural purposes (leaching of fertiliser). This reporting period shows that the data is in line with previous trends.

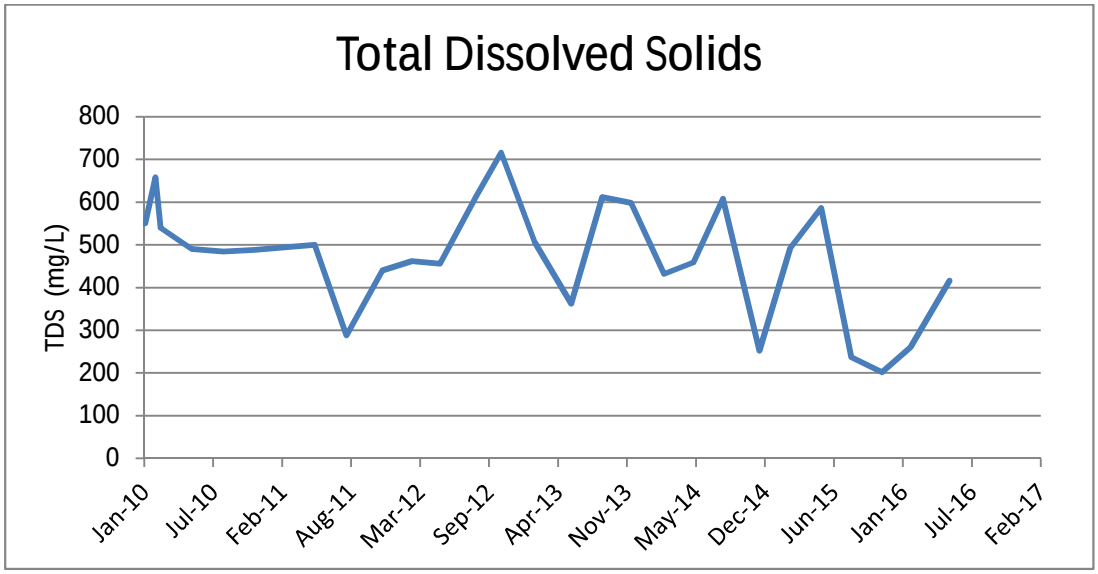
3.1.3.6 Redox Potential



The Redox data from this sampling period are in line with historical trends.

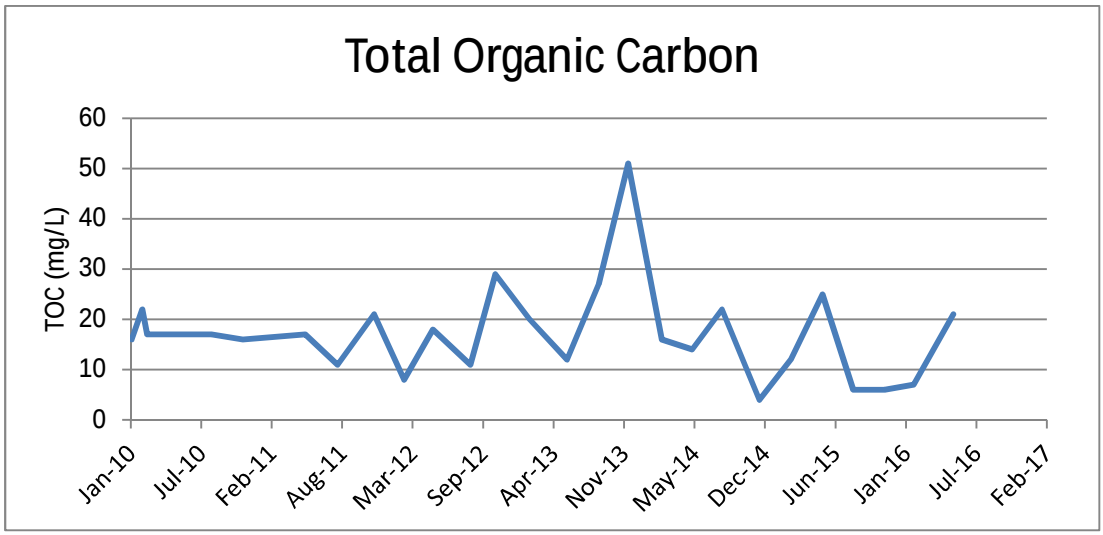
Redox reactions involve the transfer of electrons from a donor to a receptor and can be useful in determining if aerobic or anaerobic activity is occurring in a system.

3.1.3.7 Total dissolved solids



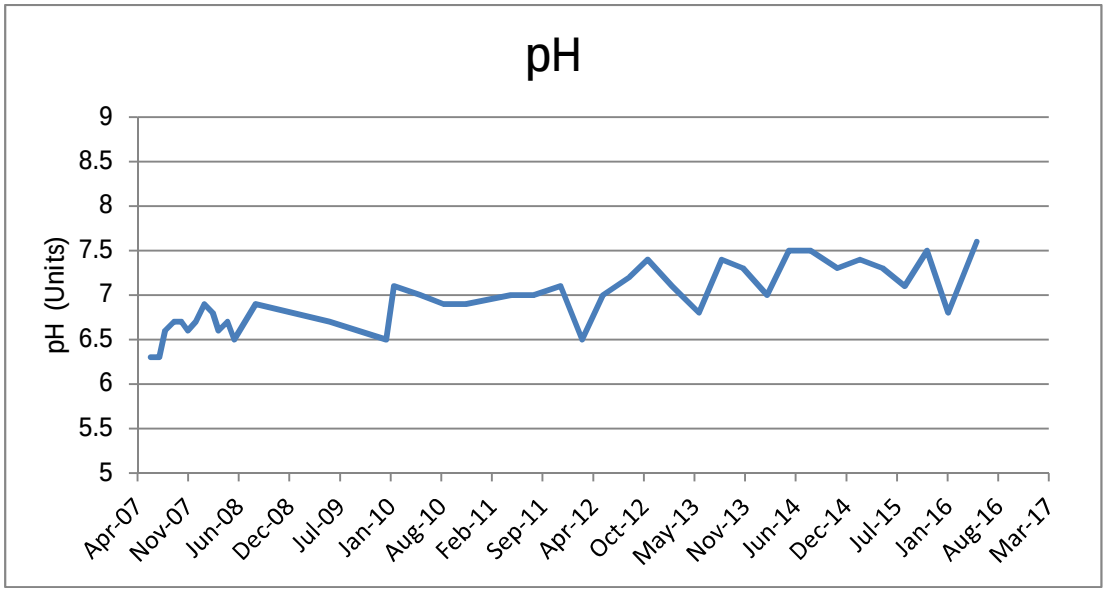
The *2011 Australian Drinking Water Guidelines 6* states that total dissolved solids levels of less than 600mg/L indicate good quality drinking water. The dissolved solids in the Pony Club pond are in line with historical trends and at levels considered good for consumption in terms of dissolved solids. High levels of dissolved solids can be sourced from salts derived from leachate infiltration.

3.1.3.8 Total Organic Carbon



Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of contamination by natural compounds derived from the landfilling of organic matter. The amount of total organic carbon during this reporting period has remained within historical ranges.

3.1.3.9 pH



Over the relatively long history of data presented the pH levels there seems to be a rising trend bringing the current pH within optimal levels for the natural environment.

3.1.3 Stormwater Results Interpretation

From the data analysed for the Pony Club stormwater pond, all results are stable over the time period of available data. Despite the exhaustive list of analytes required to be tested in this ultimately minor stormwater pond, no abnormal results have been encountered. Therefore, the leachate system on site is not considered to be affecting the stormwater quality in the nearby Pony Club stormwater detention pond. Further, it can be accordingly demonstrated that the sites sediment and stormwater pond infrastructure is performing adequately and as desired.

3.2 GROUND WATER MONITORING

3.2.1 Tabulated Results

Table 3.1.1(a) Quarterly analyte testing results for August 2015

	Monitoring Points								
Analyte	Units/ Ref	5	6	7	12	13	14	15	16
Alkalinity	mg/L	<1	201	<	10	4	20	10	<1
Calcium	mg/L	36	52	<1	9	10	8	10	4
Chloride	mg/L	111	12	100	12	27	12	14	33
Magnesium	mg/L	30	26	6	9	8	5	5	5
Nitrogen	mg/L	0.03	0.03	0.03	0.02	0.02	0.08	0.04	0.03
Potassium	mg/L	<1	2	<1	2	4	2	28	<1
Sodium	mg/L	64	20	115	28	29	9	12	31
Water Level	m	3.23	3.16	2.33	2.77	2.8	2.63	2.63	4.5
Sulfate	mg/L	143	11	94	71	34	14	50	24
TDS	mg/L	459	247	359	161	157	88	156	127
TOC	mg/L	5	7	<1	<1	2	<1	<1	<1
pH	pH	4.8	4.4	7	5	5.2	5.5	5	4.5

Table 3.1.1(b) Quarterly analyte testing results for November 2015

	Monitoring Points								
Analyte	Units/ Ref	5	6	7	12	13	14	15	16
Alkalinity	mg/L	<1	100	<1	44	27	12	6	<1
Calcium	mg/L	29	28	<1	22	10	6	7	4
Chloride	mg/L	51	19	113	16	12	18	15	37
Magnesium	mg/L	12	13	5	12	3	3	3	5
Nitrogen	mg/L	0.05	0.03	0.09	<0.01	<0.01	0.22	<0.01	<0.01
Potassium	mg/L	6	2	1	<1	2	3	20	<1
Sodium	mg/L	33	20	106	25	11	10	10	24
Water Level	m	3.17	2.93	3.64	2.63	2.85	2.54	2.88	5.48
Sulfate	mg/L	137	22	89	80	16	14	39	23
TDS	mg/L	323	209	349	214	134	84	141	128
TOC	mg/L	5	11	4	4	3	2	6	<1
pH	pH	4.5	6.2	4.2	5.1	5.6	4.9	4.6	4.2

Table 3.1.1(c) Quarterly analyte testing results for February 2016

	Monitoring Points								
Analyte	Units/ Ref	5	6	7	12	13	14	15	16
Alkalinity	mg/L	4	86	<1	212	44	14	3	<1
Calcium	mg/L	25	26	<1	74	21	7	7	4
Chloride	mg/L	59	16	73	18	14	12	12	36
Magnesium	mg/L	20	13	6	23	5	4	3	5
Nitrogen	mg/L	0.13	<0.01	0.42	<0.01	0.01	<0.01	<0.01	0.02
Potassium	mg/L	<1	2	2	2	3	2	22	<1
Sodium	mg/L	40	18	91	24	13	9	9	25
Water Level	m	2.68	2.4	2.23	2.05	2.59	2.24	2.5	3.87
Sulfate	mg/L	116	16	96	40	18	14	34	23
TDS	mg/L	339	244	327	358	125	73	113	123
TOC	mg/L	3	9	3	5	4	2	4	<1
pH	pH	4.5	6.5	4.3	5.9	5.6	4.8	4.5	4

Table 3.1.1(d) Quarterly analyte testing results for May 2016

	Monitoring Points								
Analyte	Units/ Ref	5	6	7	12	13	14	15	16
Alkalinity	mg/L	<1	203	<1	13	21	10	3	<1
Calcium	mg/L	23	45	<1	8	14	6	6	3
Chloride	mg/L	127	20	81	15	24	19	15	38
Magnesium	mg/L	18	24	4	6	5	3	3	4
Nitrogen	mg/L	0.06	0.03	0.06	<0.01	<0.01	<0.01	0.01	0.02
Potassium	mg/L	<1	5	1	3	4	4	19	1
Sodium	mg/L	36	18	88	23	14	10	8	22
Water Level	m	3.4	3	4.56	2.9	3.32	3.3	3.4	5
Sulfate	mg/L	103	5	95	67	27	19	36	24
TDS	mg/L	328	354	324	147	143	77	127	107
TOC	mg/L	7	11	3	7	3	4	4	1
pH	pH	5.1	6.8	4.4	5.1	5.4	5.4	5	4.6

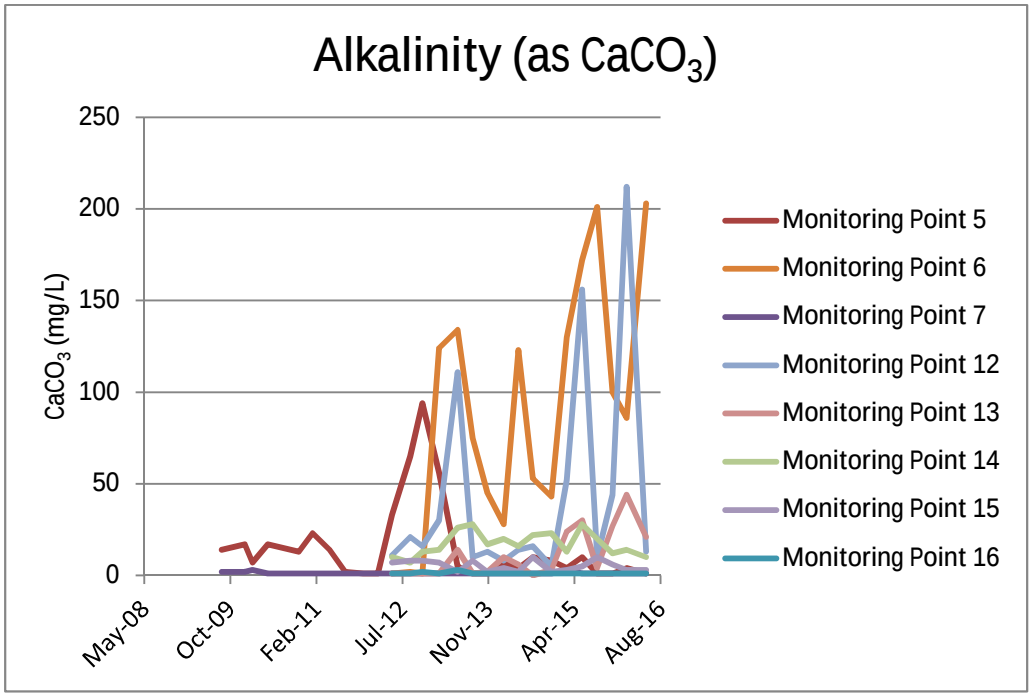
Table 3.1.1(e) Annual analyte testing August 2015 results

Analyte	Units /Ref	Monitoring Points							
		5	6	7	12	13	14	15	16
Aluminium	mg/L	1.98	0.014	2.21	13.2	1.6	0.09	0.04	0.59
Arsenic	mg/L	0.002	0.005	<0.001	0.005	0.002	<0.001	<0.001	<0.001
Barium	mg/L	0.0.4	0.09	0.018	0.006	0.008	0.002	0.004	0.005
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/L	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Chromium (hex.)	mg/L	<0.01	<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	0.002	<0.001	<0.001	<0.001
Cobalt	mg/L	0.008	0.008	0.001	<0.001	<0.001	0.002	<0.001	0.007
Copper	mg/L	0.012	0.003	0.007	0.008	0.005	0.004	0.002	0.006
Ethyl Benzene	µg/L	<2	<2	<2	<2	<32	<2	<2	<2
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	mg/L	0.034	0.001	0.003	0.004	0.008	0.002	0.002	<0.001
Manganese	mg/L	0.133	0.751	0.048	0.005	0.013	0.016	0.046	0.037
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nitrate	mg/L	0.16	0.01	0.58	0.1	0.07	0.13	2.15	0.5
Nitrite	mg/L	<0.01	<0.01	<0.01	0.1	0.07	0.13	2.15	<0.01
OCP	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OPP	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2
Total Phenolics	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TPH	µg/L	<50	<50	50	<50	50	<50	50	<50
Xylene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2
Zinc	mg/L	2.86	0.012	0.039	0.009	0.029	0.018	0.017	0.021

Site investigations by GHD in 2011 have confirmed a predominant approximate west to east groundwater flow direction towards the adjacent Hacking River. The groundwater flow direction should be used to contextualise monitoring bore locations and elevated results, please refer to the sites Environmental Monitoring Locations located in Annexure A of this document.

3.1.2 Data Presentation – Quarterly Monitoring

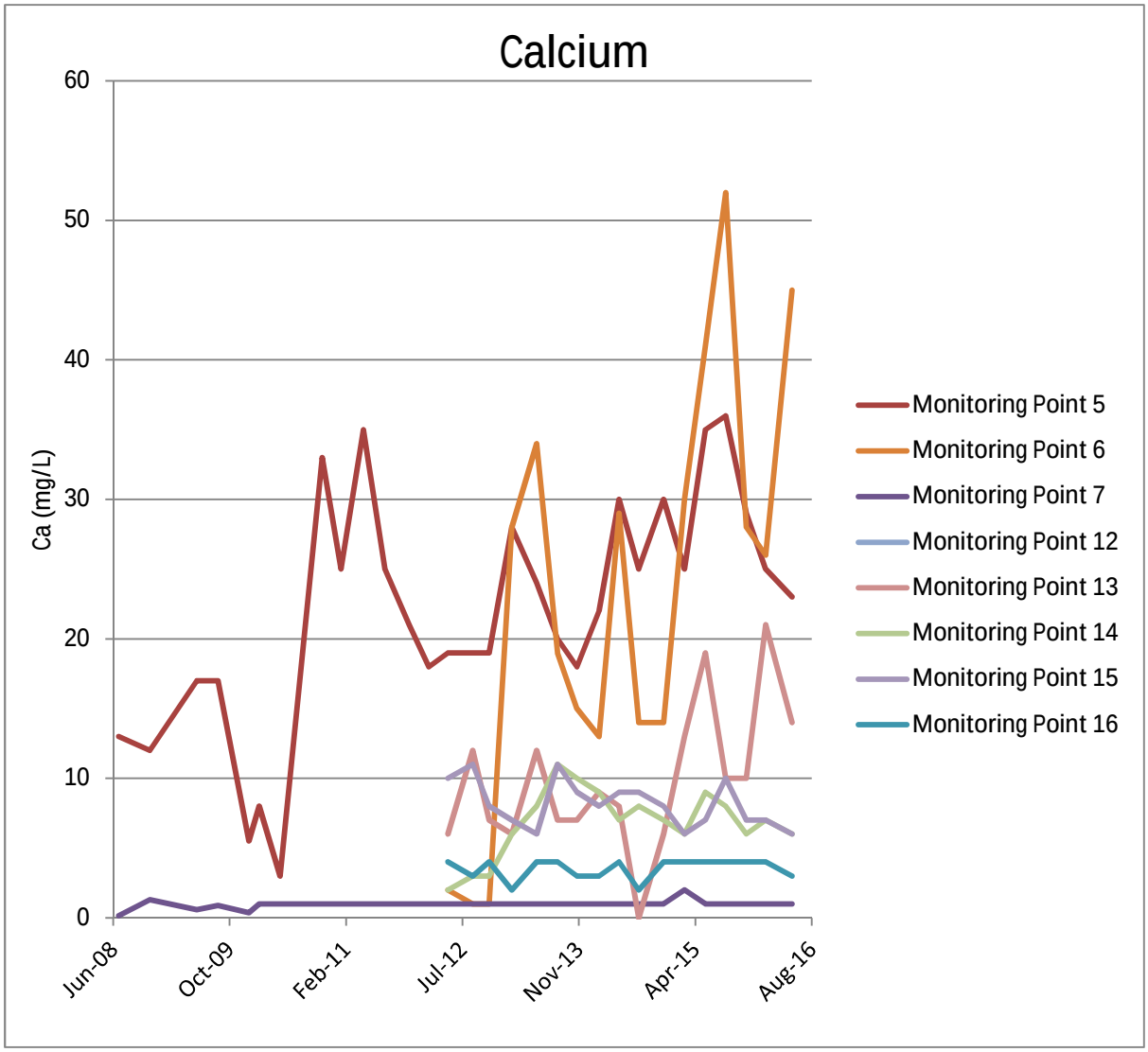
3.1.2.1 Alkalinity



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.

Monitoring point 6 is potentially displaying early signs of an elevating trend. Further monitoring of point 6 should be closely scrutinised to determine if a trend is emerging. It should however be noted that monitoring points 5 and 12 are indicative of groundwater entering the site whilst point 6 is indicating of groundwater departure from the site.

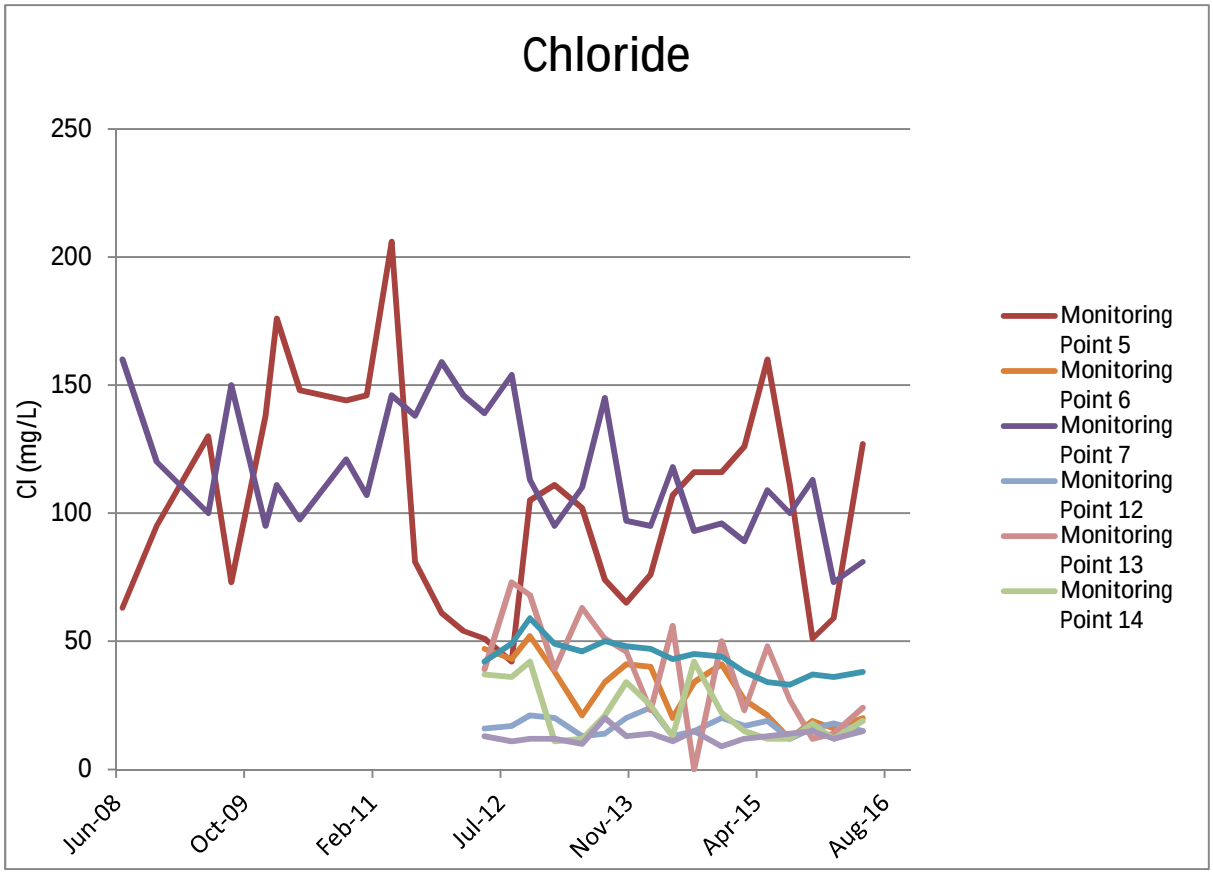
3.1.2.2 Calcium



The groundwater monitoring wells show individually stable trends for calcium levels. The calcium levels sampled would be considered 'soft' in the 0-60mg/L area. 'Hard' water would be considered in the region of 120-180mg/L.

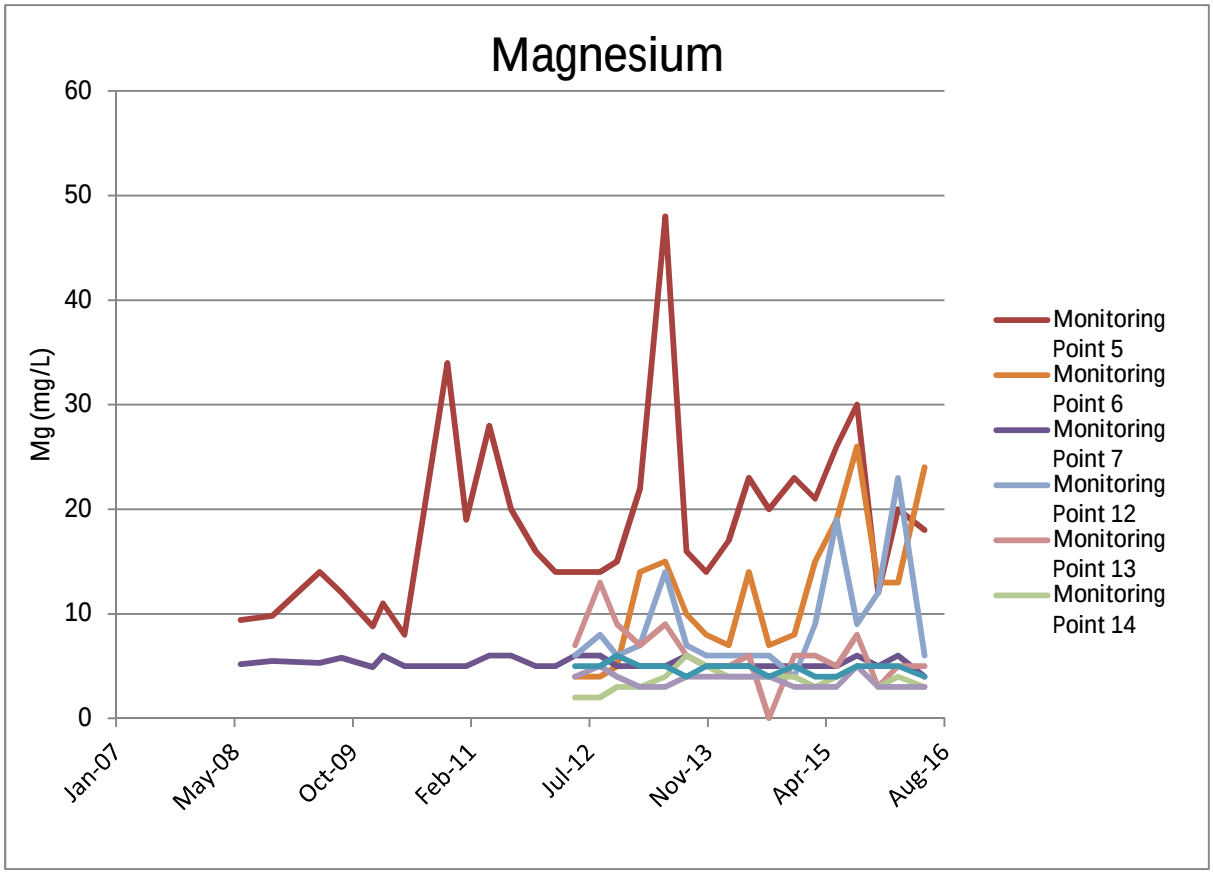
Monitoring Points 5 (incoming) and 6 (outgoing) are showing relatively higher levels, Monitoring Point 6 is showing a rising trend that will need to be monitored but still at levels that are considered to be low.

3.1.2.3 Chloride



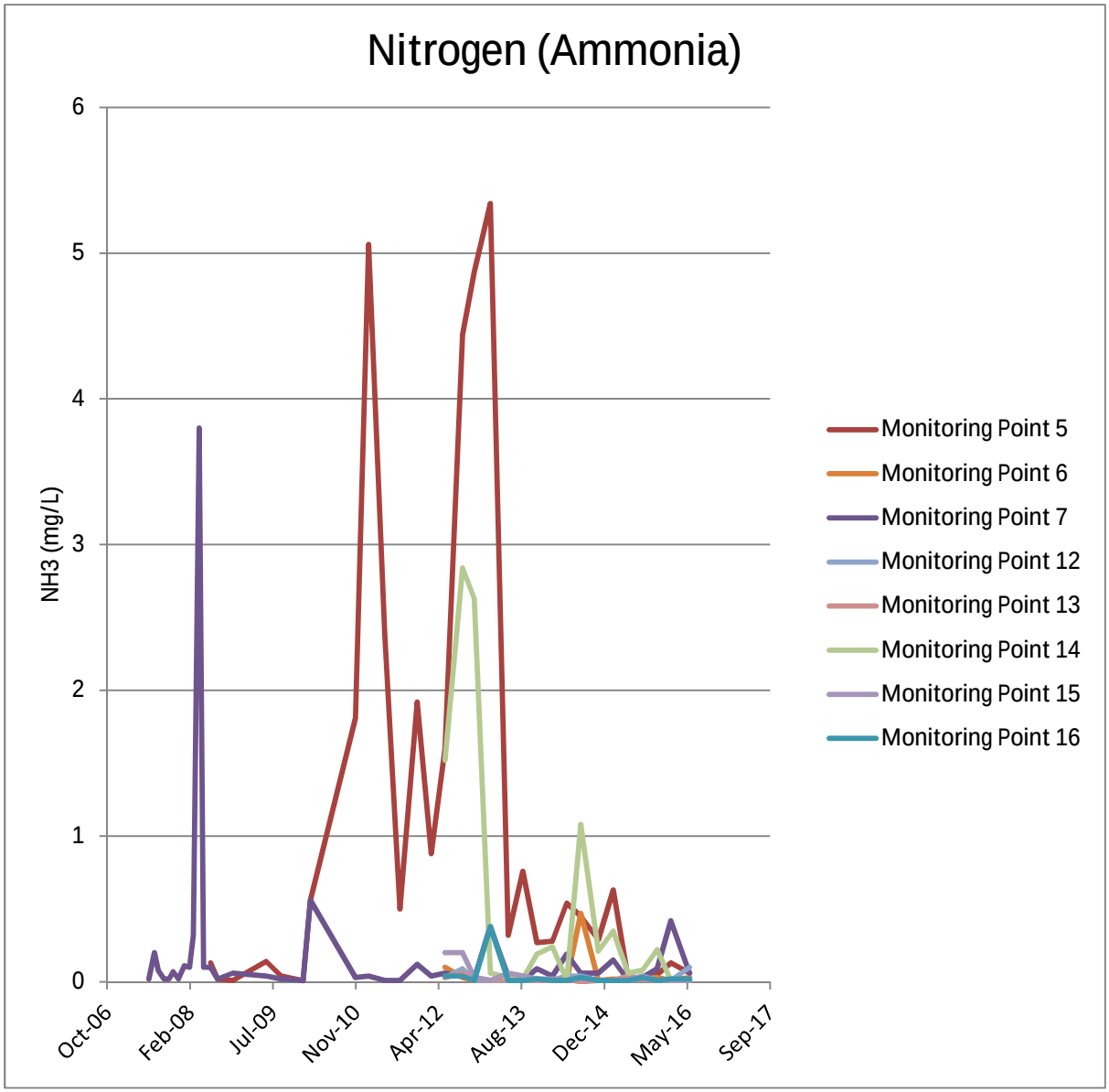
The trends for chloride monitoring have been in line or lower than the historical levels over the data range available. Large quantities of inorganic ions such as chloride can be an indicator of leachate contamination of groundwater. A sudden increase in these ions can act as early warning system. The sampling history for chloride suggests that it does not indicate leachate presence in the groundwater. In fact the chloride levels are below the 250mg/L aesthetic criteria that are described in the *2011 Australian Drinking Water Guidelines 6*.

3.1.2.4 Magnesium



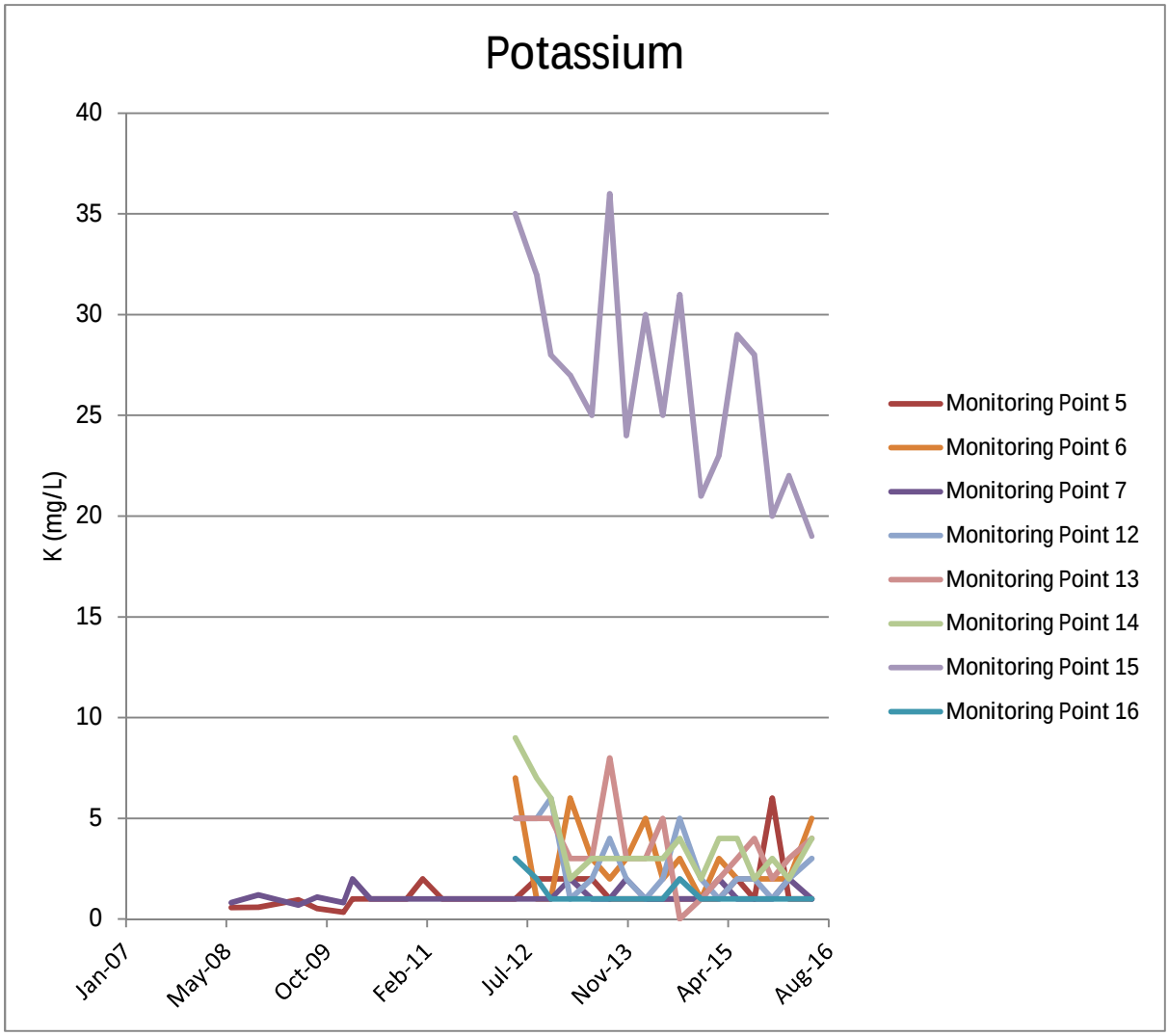
Groundwater monitoring well results are in line with historical levels and have maintained consistent levels with the exception of point 5, which is located up gradient of the site. However, point 5 is still considered to be at relative low levels. The magnesium levels sampled would be considered 'soft' in the 0-60mg/L area. 'Hard' water would be considered in the region of 120-180mg/L.

3.1.2.5 Nitrogen as ammonia



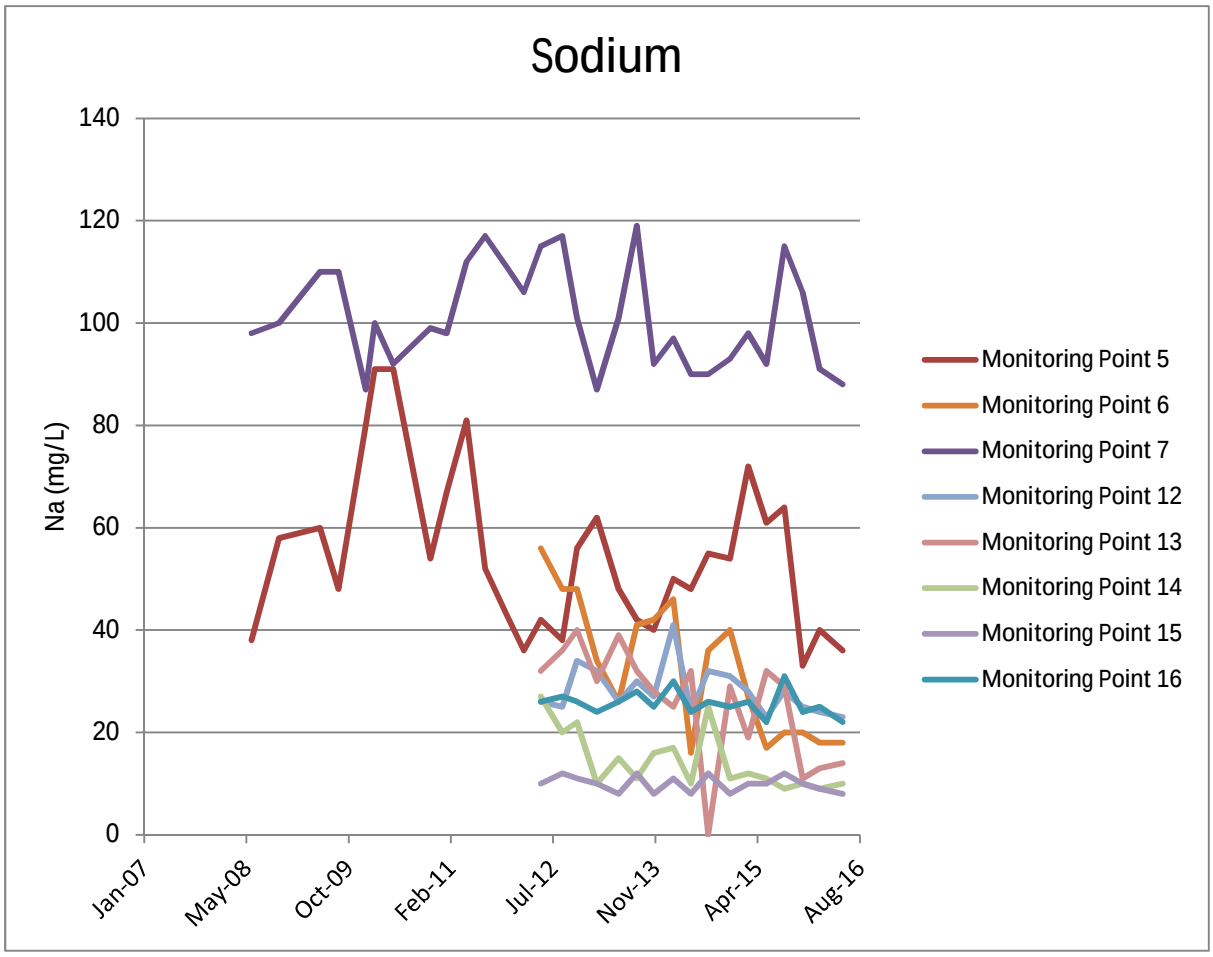
The groundwater monitoring wells for this reporting period show that the results are tracking the same as previous years. The relatively low results for ammonia in down gradient Monitoring Points indicate that the groundwater departing the site is not affected by Ammonia, which is perhaps the clearest signature of leachate.

3.1.2.6 Potassium



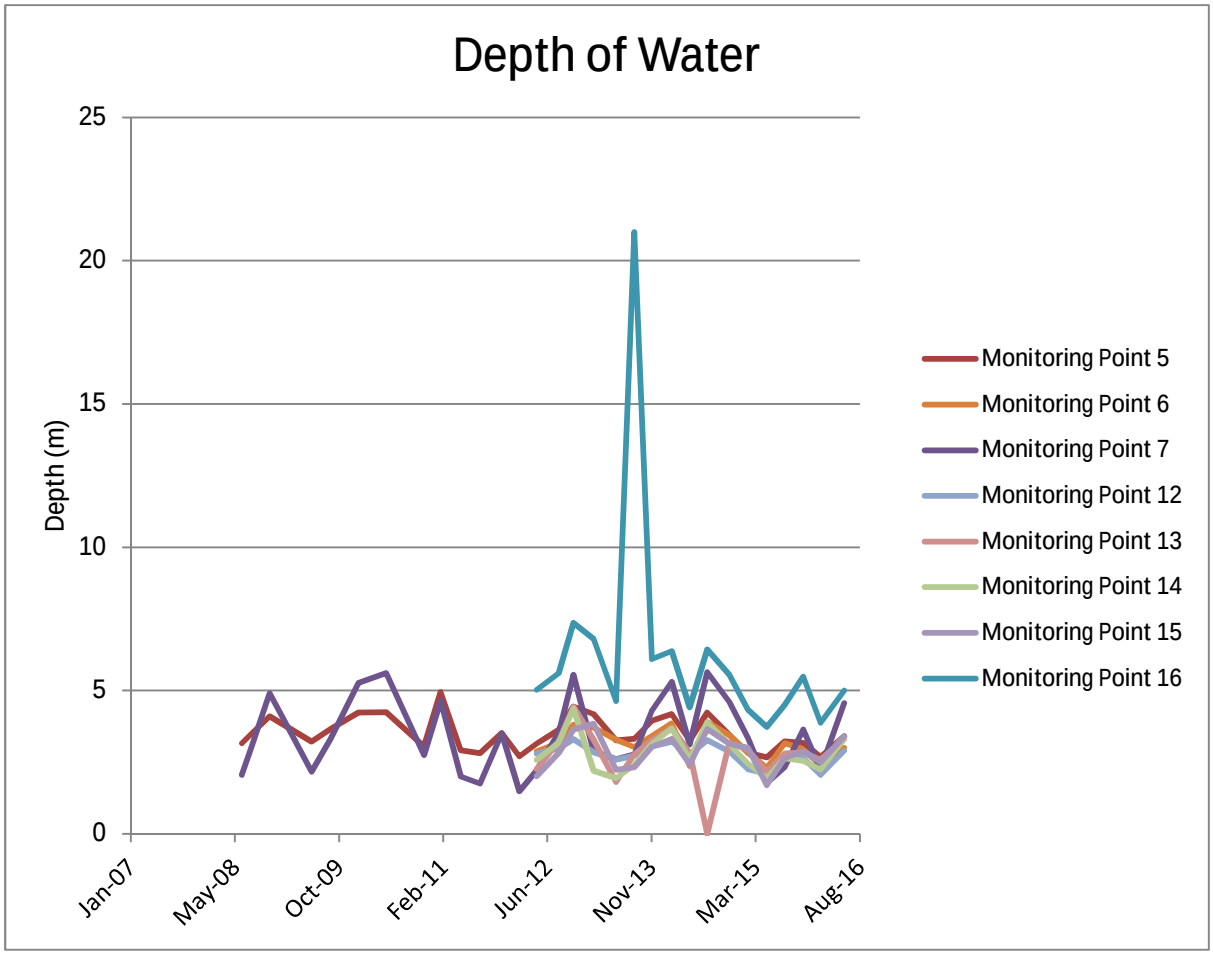
Potassium is present in groundwater systems outside coastal areas generally through weathering of clays and agricultural purposes (leaching of fertiliser). Potassium may also be present in the breakdown of glass and especially cathode ray tubes. Groundwater monitoring wells indicate that potassium levels in the groundwater have not increased relative to historic levels over the available results period. The breakdown of clay materials on the down gradient slope towards the Hacking River may be the reason for the relative elevation of potassium in monitoring point 15.

3.1.2.7 Sodium



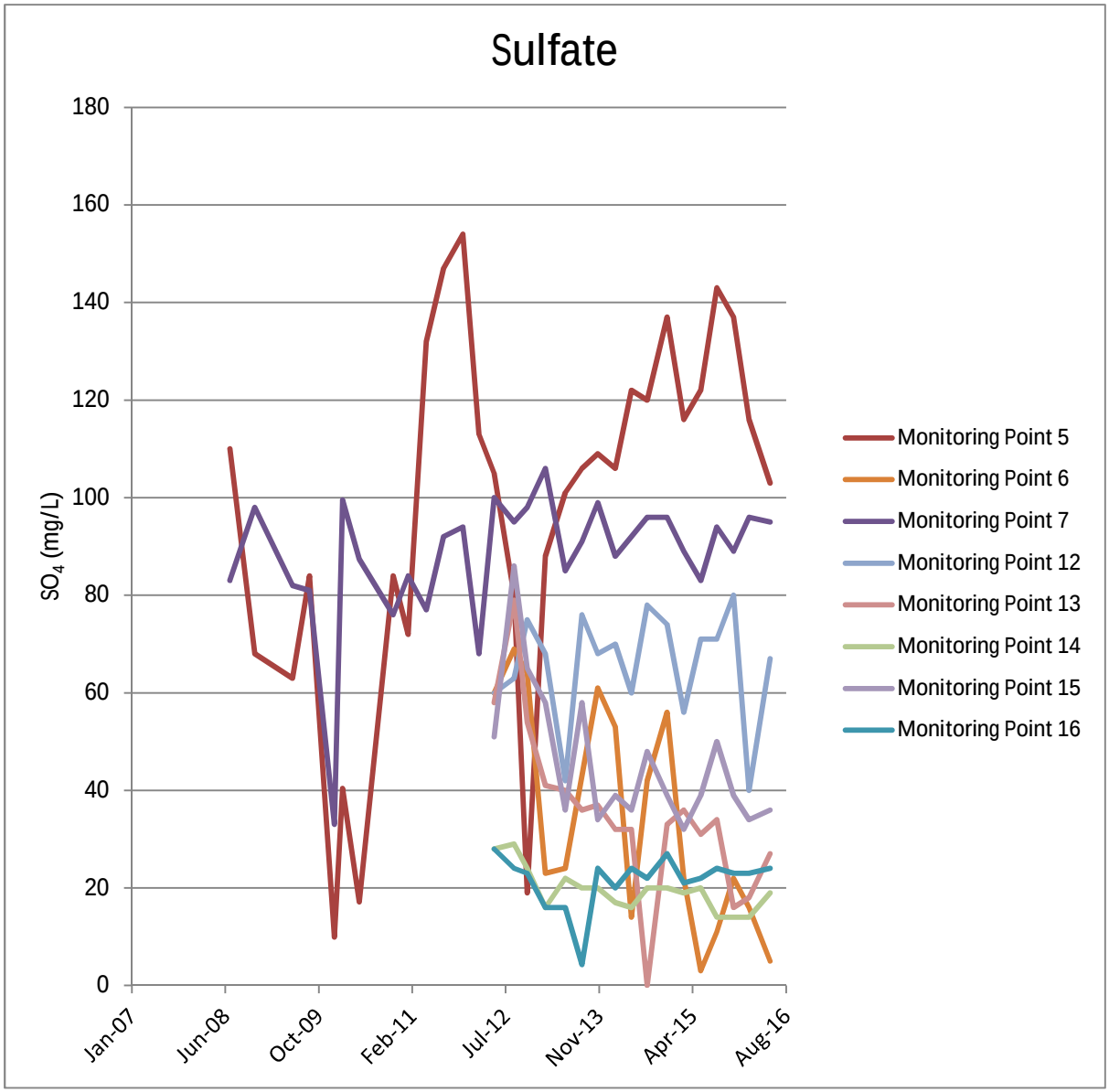
The trend for sodium has been below 120mg/L over the history of available results. High sodium levels are another indicator of leachate infiltrating the groundwater. The *2011 Australian Drinking Water Guidelines 6* set a maximum level of sodium in drinking water at 180mg/L for aesthetic reasons. The sodium results experienced in the groundwater at Helensburgh indicate that the groundwater is not contaminated by leachate.

3.1.2.8 Standing water level



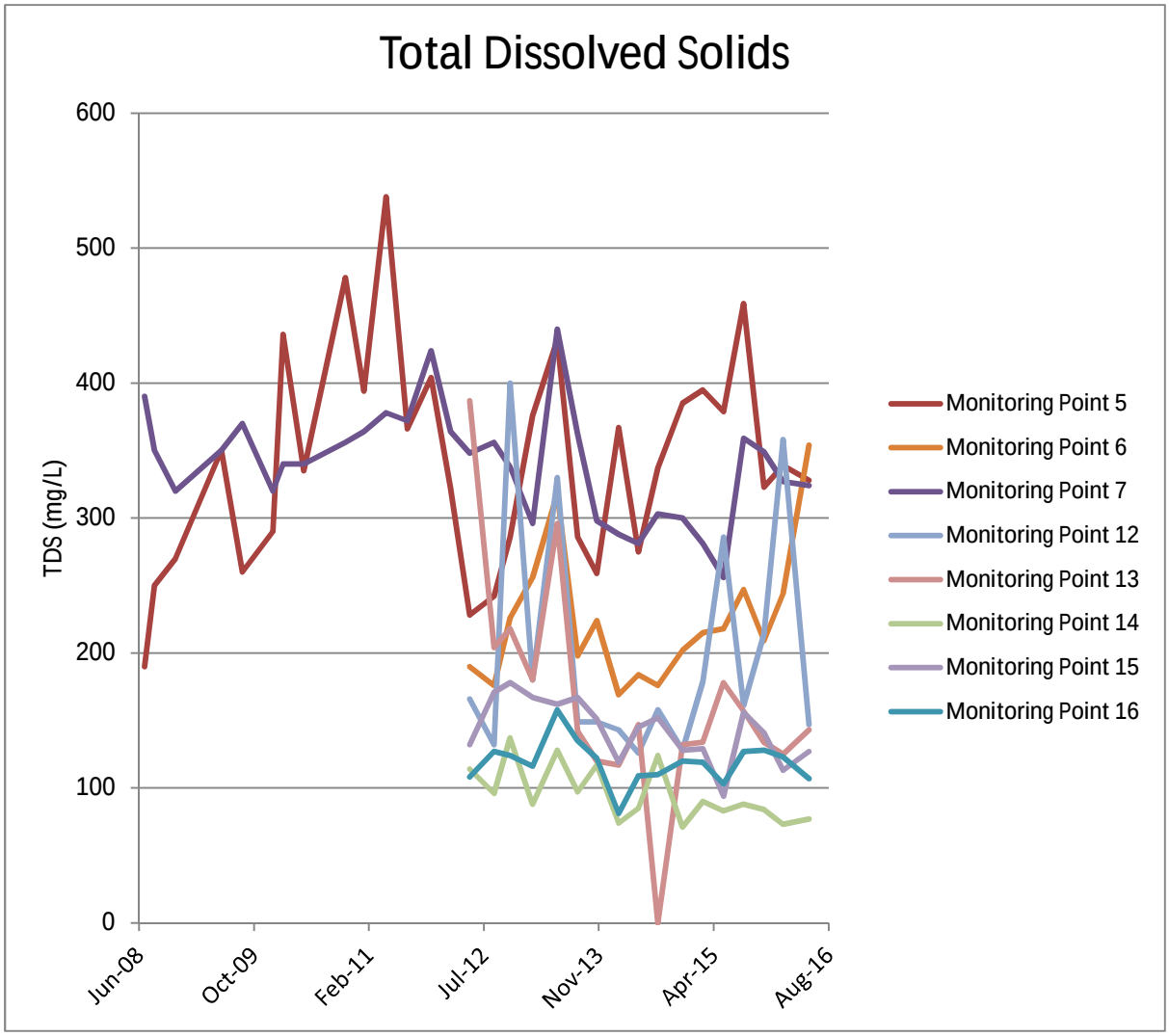
Groundwater level trends have been fairly stable albeit a spike in August 2013, following this levels returned to normal. Samples from this reporting period appear consistent across the numerous monitoring points.

3.1.2.9 Sulfate



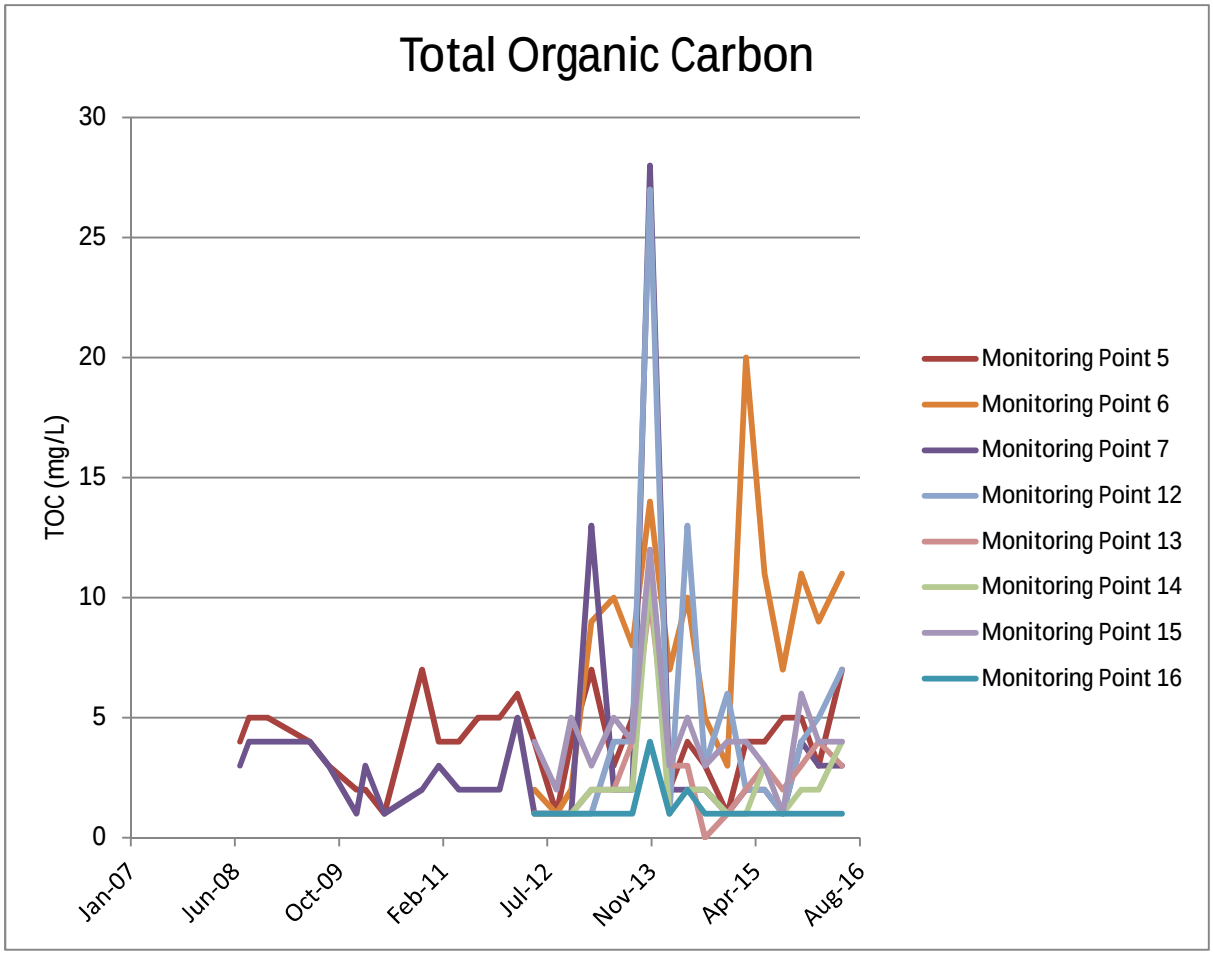
The *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500mg/L. The sulfate levels in the groundwater monitoring wells are in line with the historical levels and are below the drinkable water maximum standard. Inorganic ions such as sulfate provide a good indication of groundwater contamination by landfill leachate. A sudden increase in these ions can act as early warning system.

3.1.2.10 Total dissolved solids



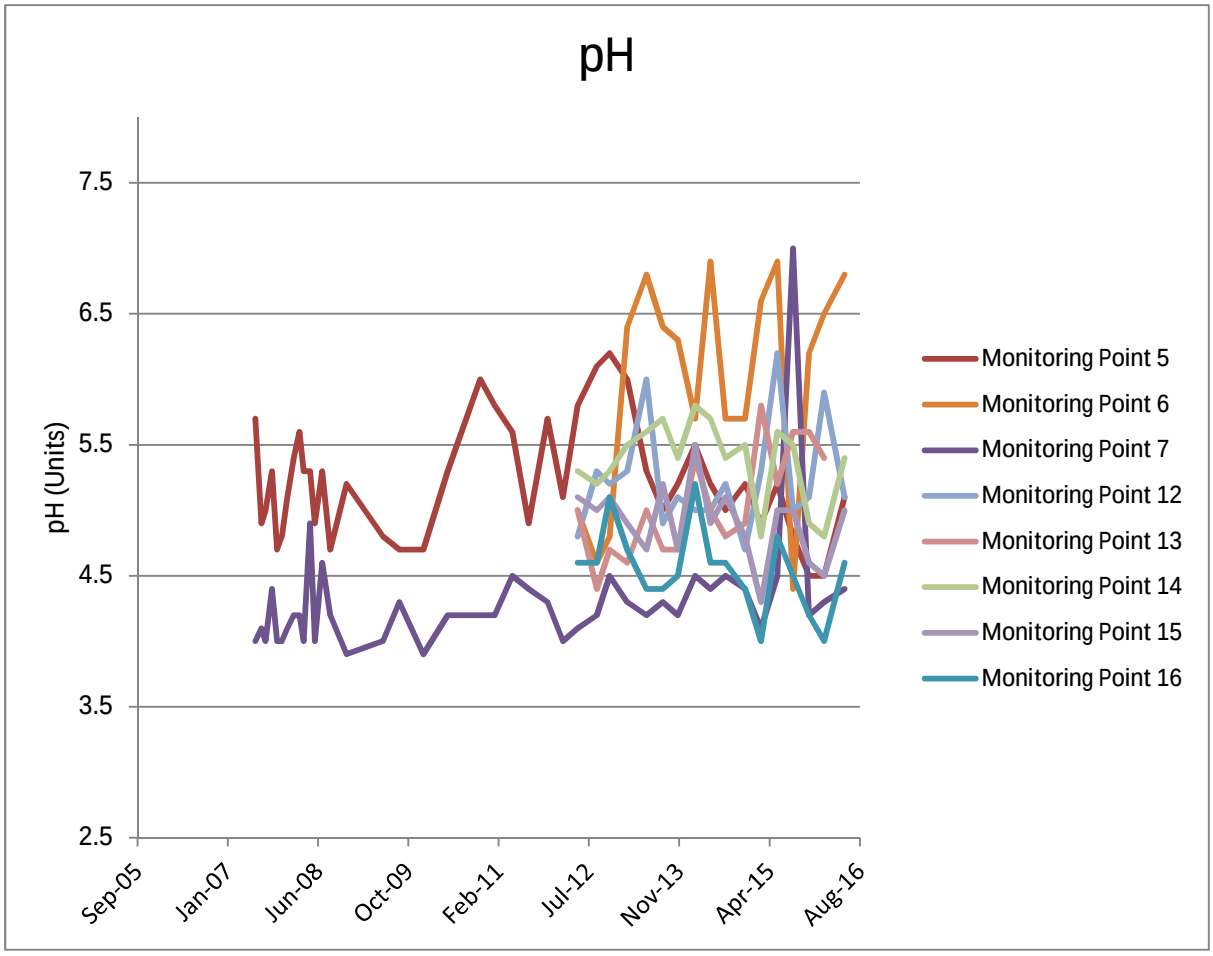
The *2011 Australian Drinking Water Guidelines 6* states that total dissolved solids levels of less than 600mg/L indicate good quality drinking water. The dissolved solids levels in the groundwater monitoring wells are in line with historical trends. Monitoring point 6 is starting to trend up and this will need to be monitored in the following years data. High levels of dissolved solids can be sourced from salts derived from leachate infiltration.

3.1.2.11 Total organic carbon



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 matter. Data from the reporting period shows a similar slight rising trend, this will need to be observed to ensure that there is no pattern emerging. It should also be noted that organic materials have not been landfilled at the Helensburgh site since 1991.

3.1.2.12 pH

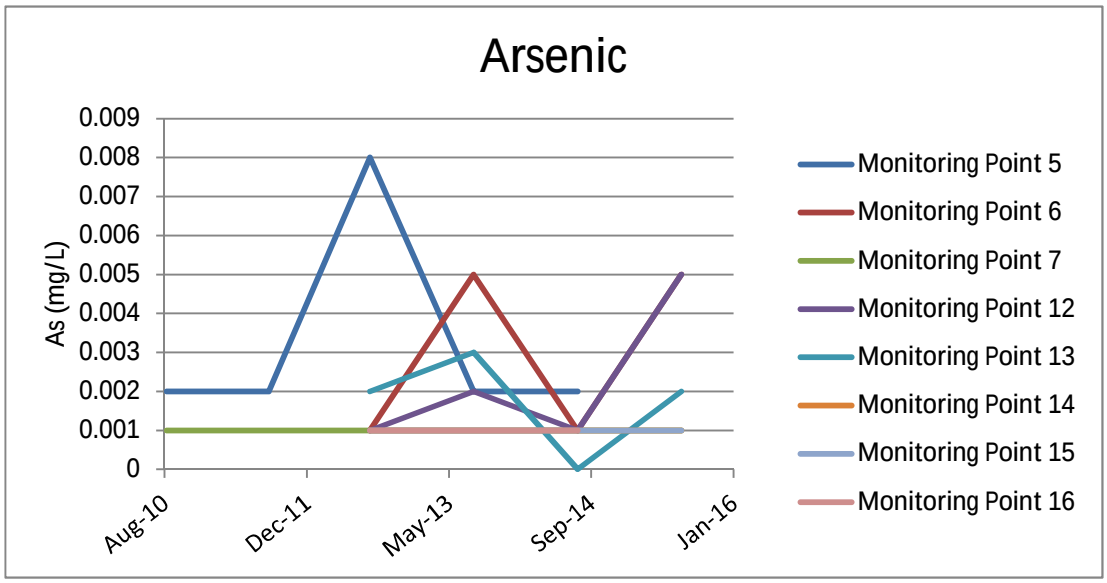


The pH levels indicated in the groundwater monitoring wells range from 4-7 units. The relatively low pH found naturally in the groundwater on site give an increased propensity for heavy metals to breakdown and travel through the system. The rehabilitation program is scheduled for 2016/17.

3.2.2 Data Presentation – Annual Monitoring

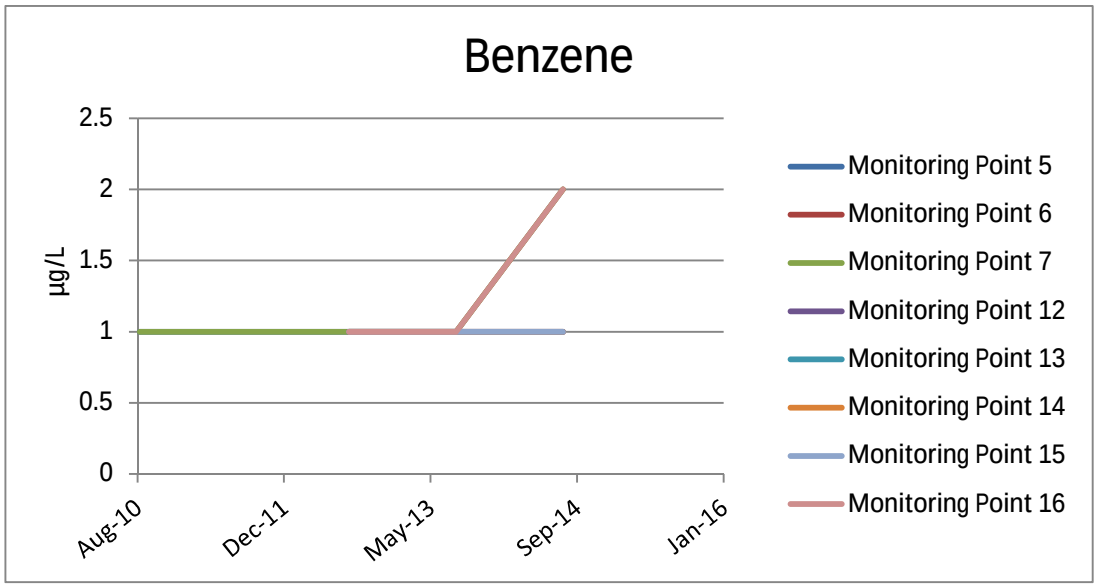
There is now six years' worth of annual groundwater regime sampling data available. Many of the sampled analytes over the five year sampling period have displayed such low contamination level that the results have been near or below detectable limits. There is little sense in graphically displaying analytes that hover on or below laboratory detectable limits.

3.2.2.1 Arsenic



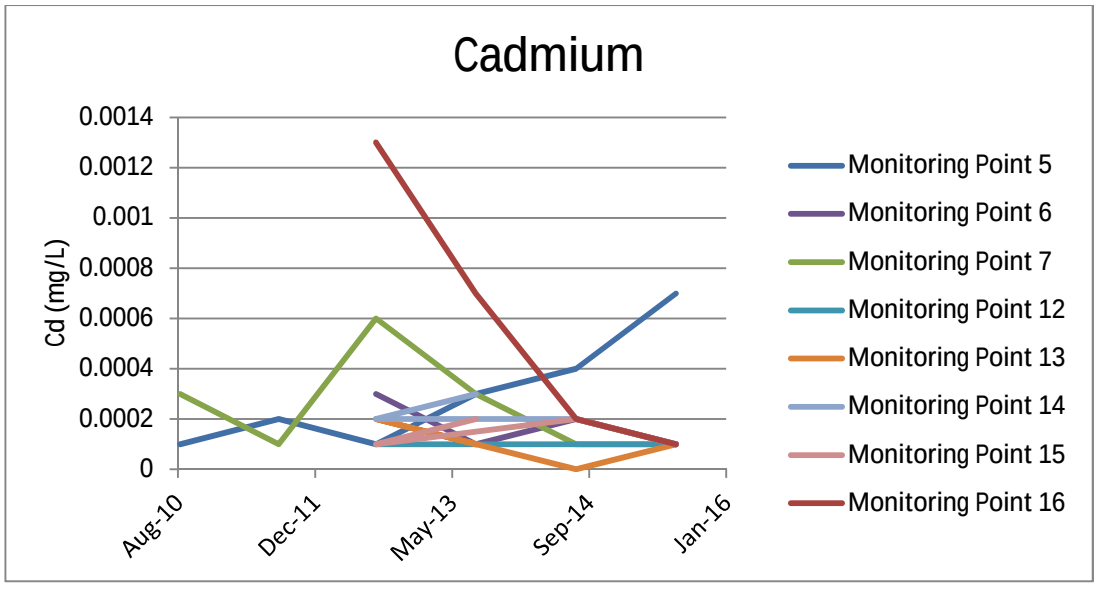
Results from this sampling period show that arsenic is present in light concentrations all of which are quite low.

3.2.2.2 Benzene



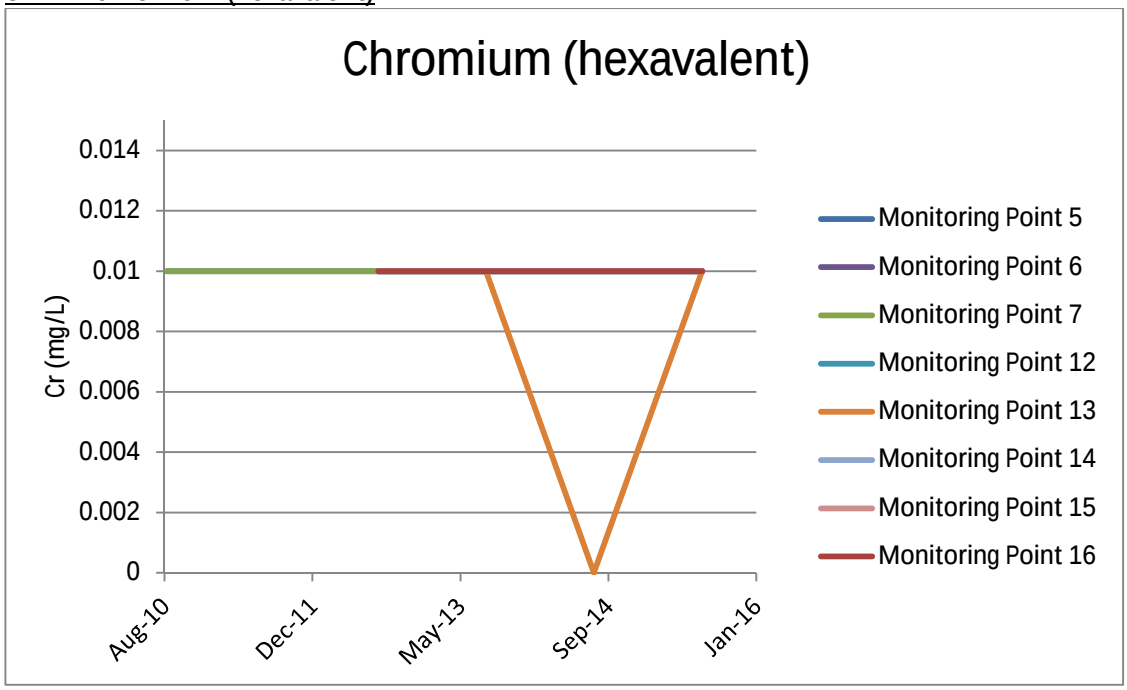
Results from this sampling period show that Benzene is present at points 15, 16, 17 however, in minor concentrations all of which are quite low.

3.2.2.3 Cadmium



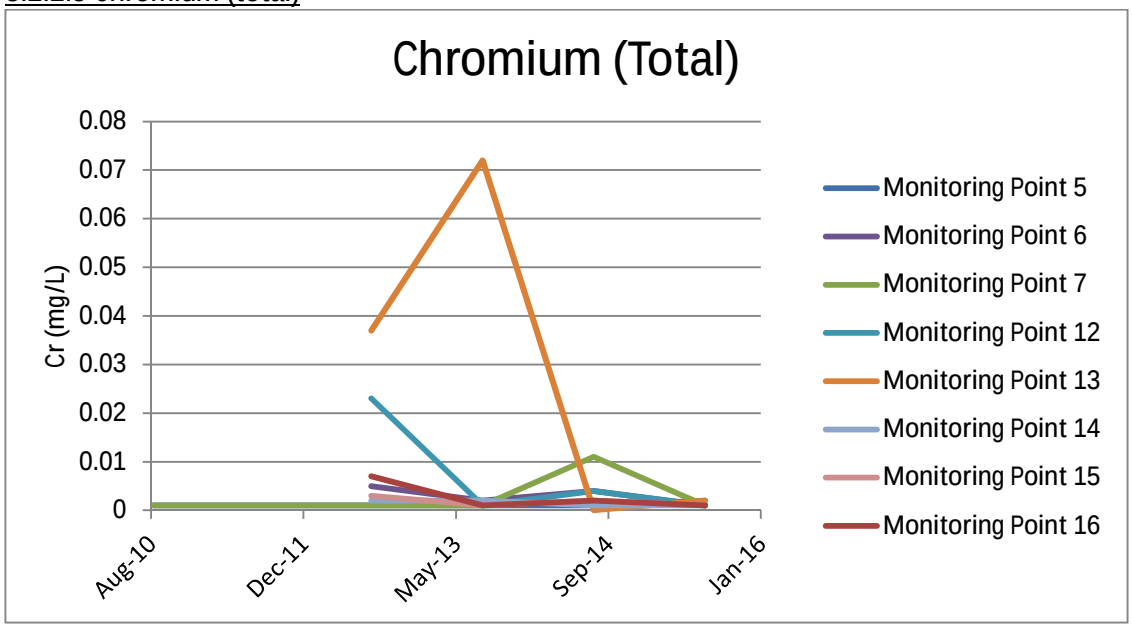
Results from this sampling period show that Cadmium is present in minor concentrations which are quite low.

3.2.2.4 Chromium (hexavalent)



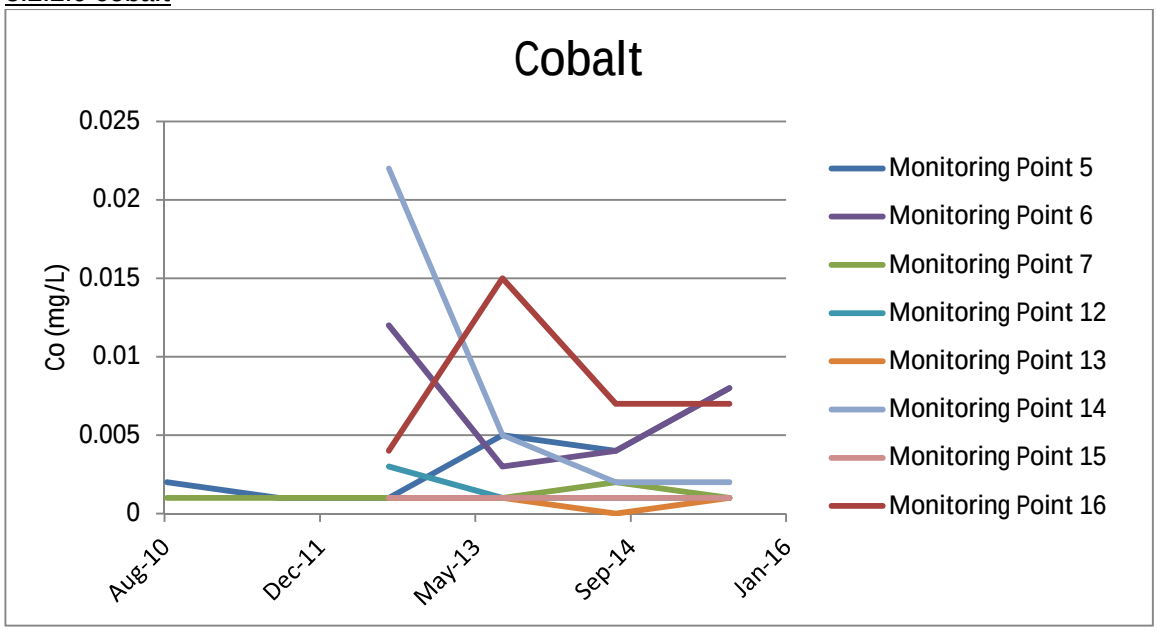
Results from this sampling period show that Chromium is present at points 7, 13 and 16 in minor concentrations which are quite low.

3.2.2.5 Chromium (total)



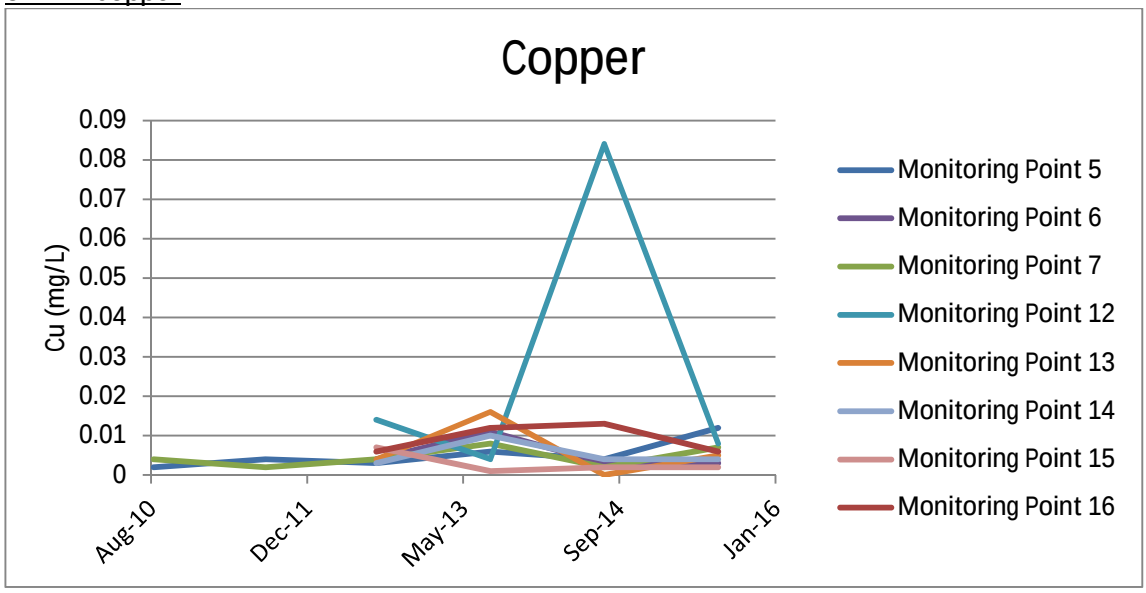
Results from this sampling period show that Chromium is present in minor concentrations which are quite low.

3.2.2.6 Cobalt



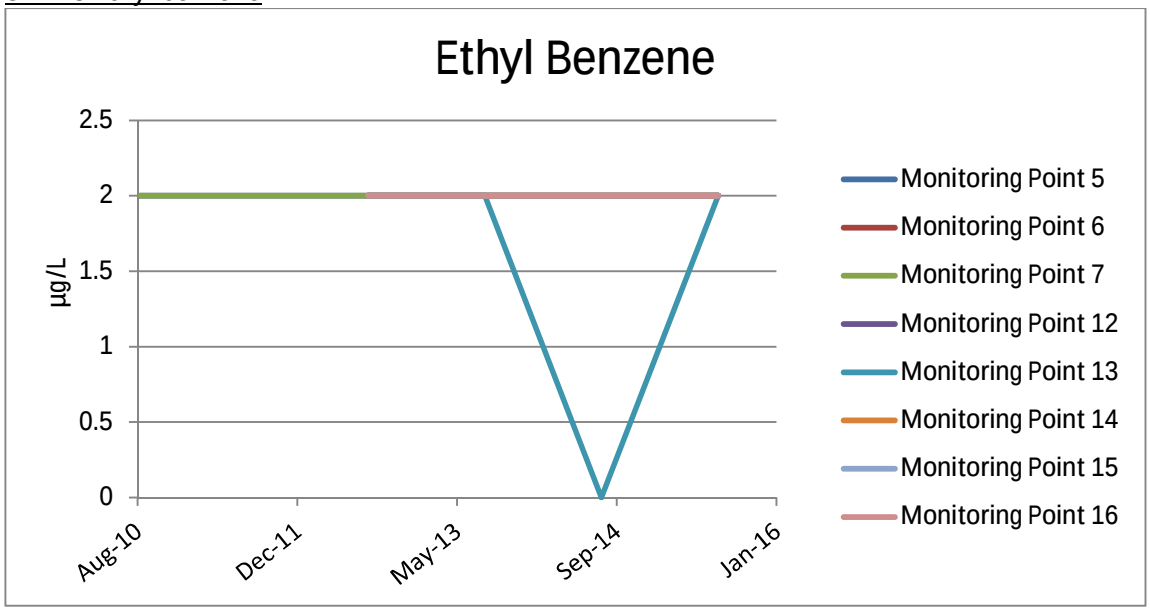
Results from this sampling period show that Cobalt is present in minor concentrations which are quite low.

3.2.2.7 Copper



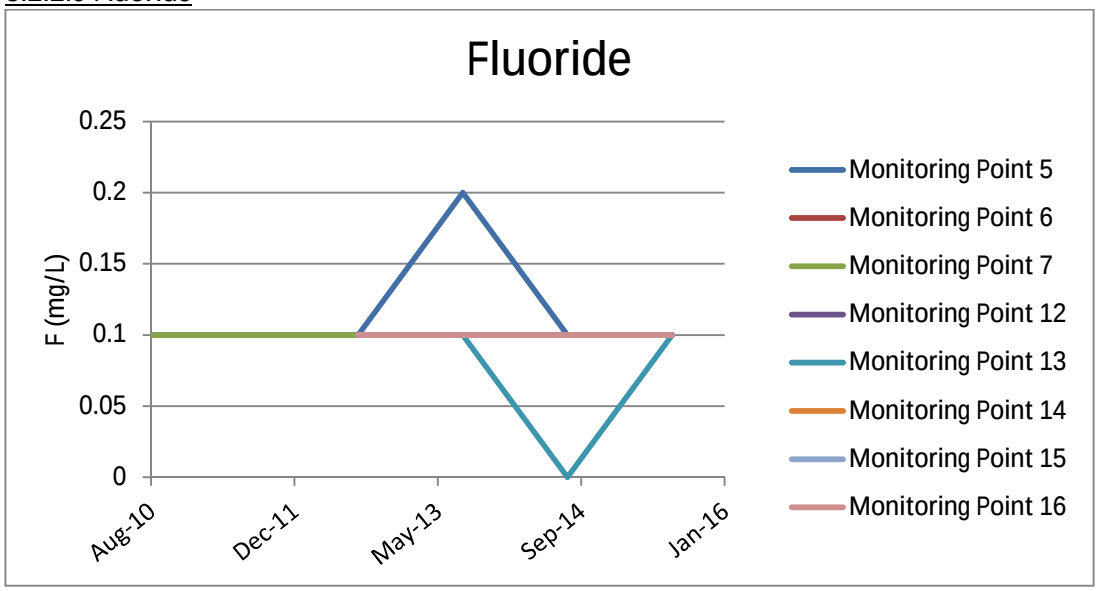
Results from this sampling period show that Copper is present in minor concentrations which are quite low. Monitoring point 12 has returned to the lower levels following the spike in September 2014.

3.2.2.8 Ethyl benzene



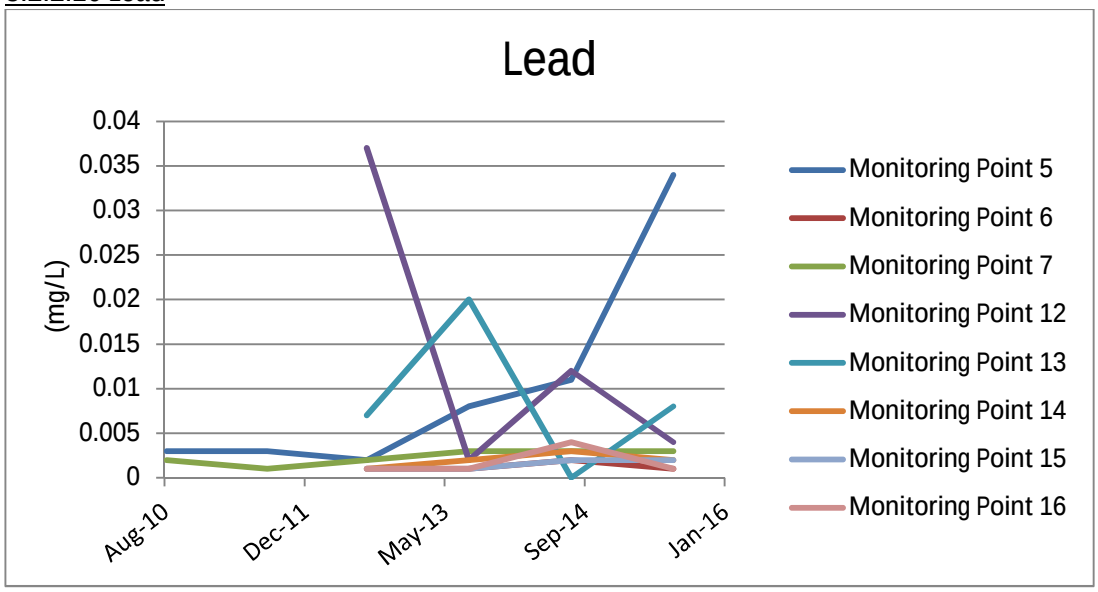
Results from this sampling period show that Ethyl Benzene is present at points 2, 13 and 16 in minor concentrations which are quite low.

3.2.2.9 Fluoride



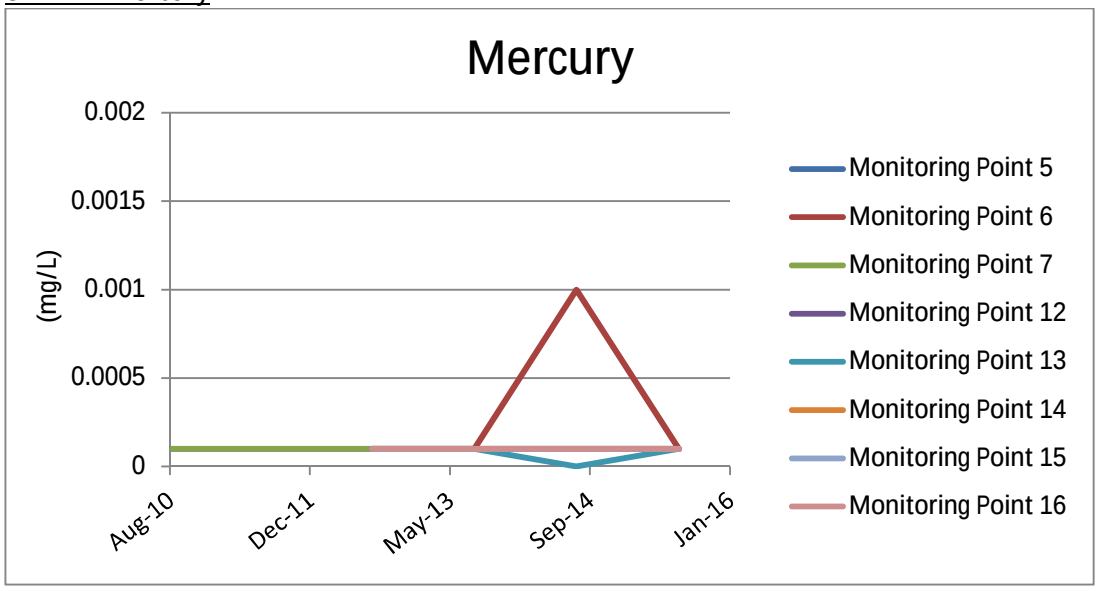
Results from this sampling period show that Flouride is present at points 5, 7, 13 and 16 in minor concentrations which are quite low.

3.2.2.10 Lead



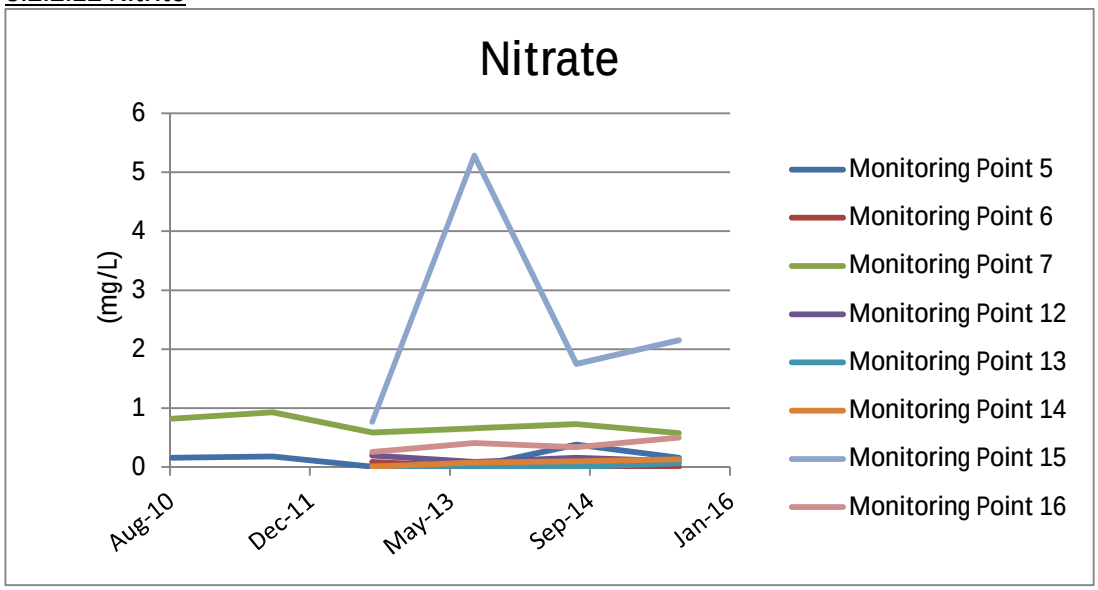
Results from this sampling period show that Lead is present in minor concentrations which are quite low. Monitoring Point 5 will need to be monitored closely as it is rising above trending data. The rehabilitation program is scheduled for 2016/17.

3.2.2.11 Mercury



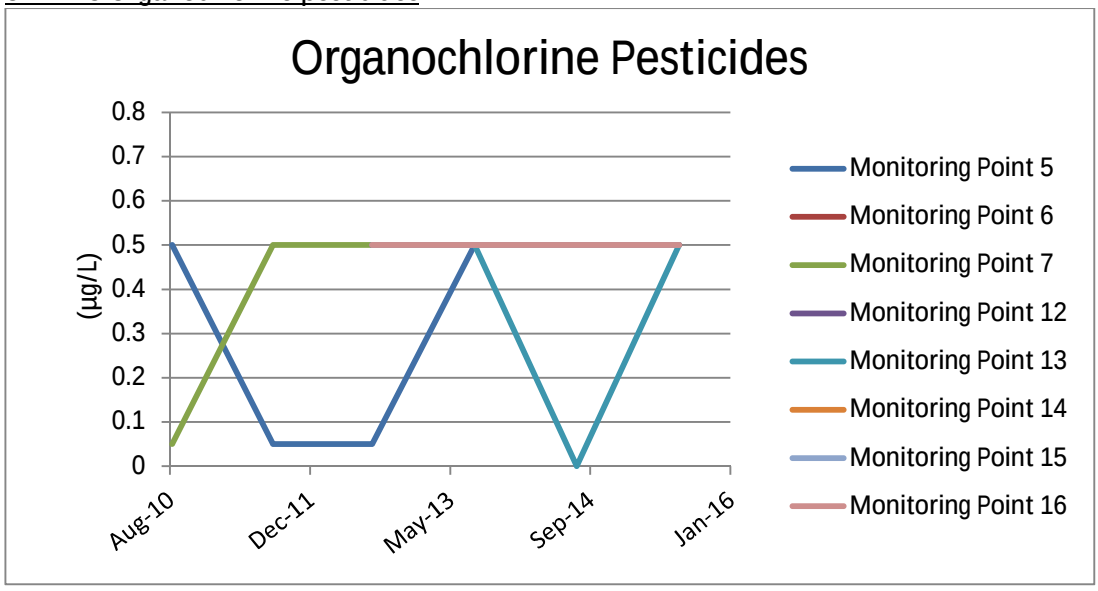
Results from this sampling period show that Mercury is present in minor concentrations which are quite low.

3.2.2.12 Nitrite



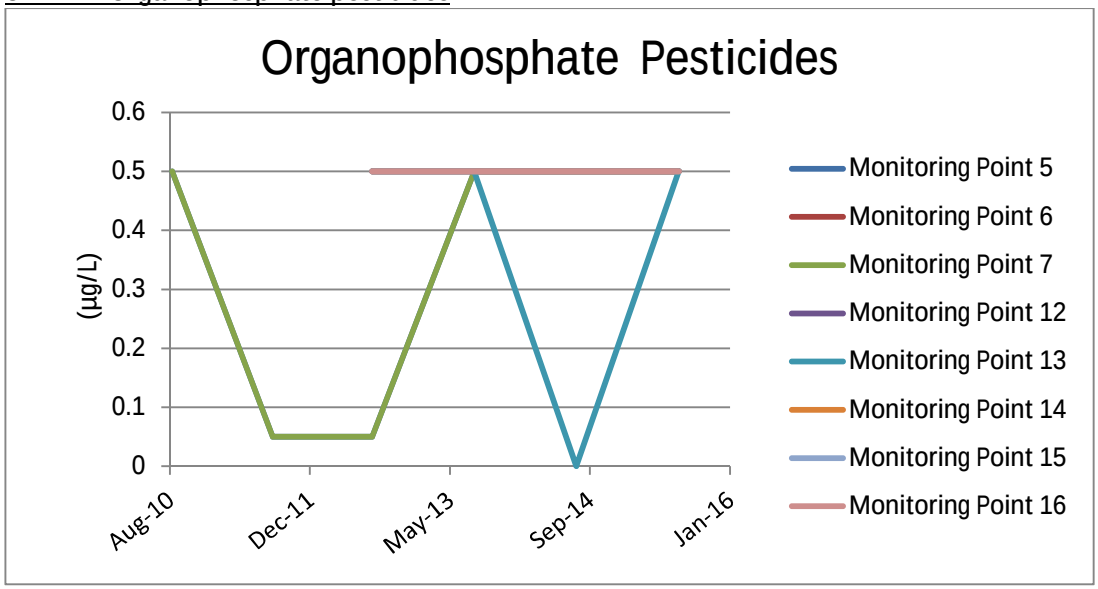
Results from this sampling period show that Nitrite is present in minor concentrations which are quite low. Monitoring Point 15 has peaked in May 2013, and have declined but is showing a slight rise following this sampling period, this will need to be watched before the rehabilitation program begins in 2016/17.

3.2.2.13 Organochlorine pesticides



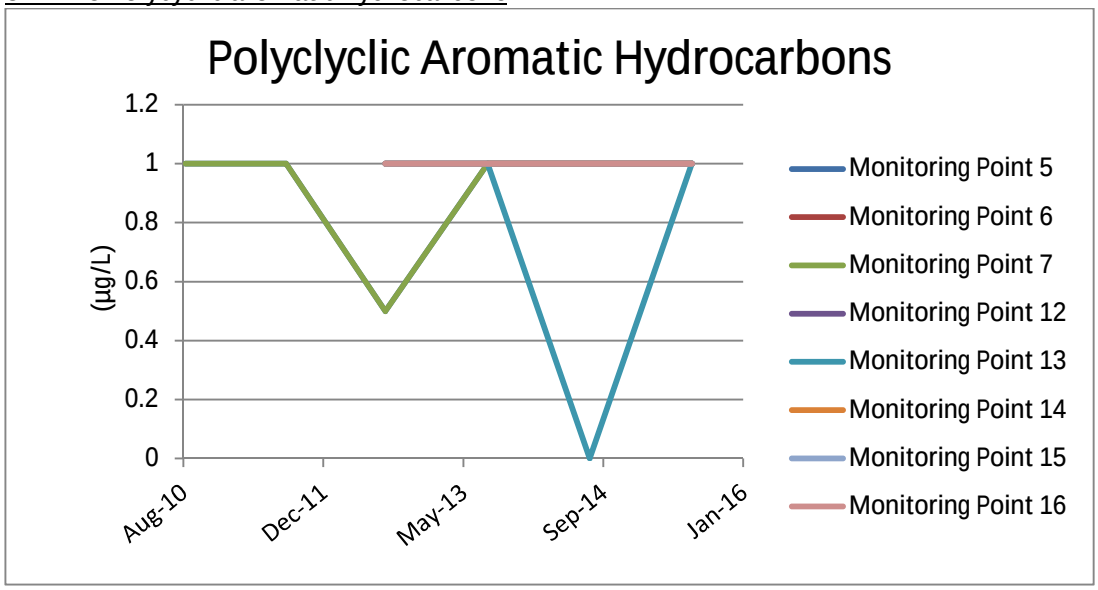
Results from this sampling period show that Organochlorine pesticides are present in minor concentrations which are quite low.

3.2.2.14 Organophosphate pesticides



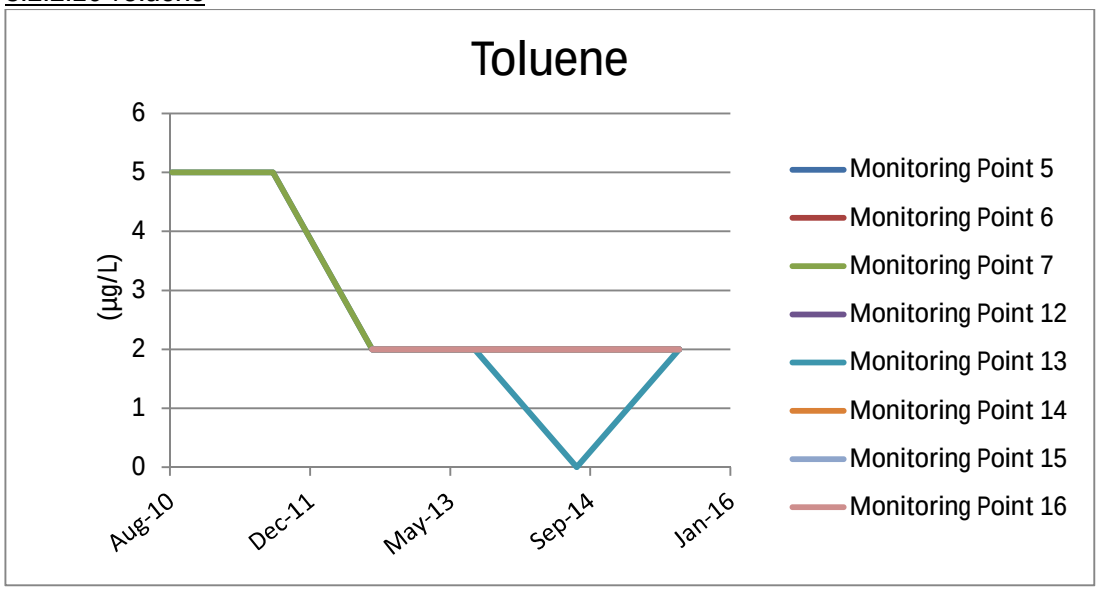
Results from this sampling period show that Organophosphate pesticides are present in minor concentrations which are quite low.

3.2.2.15 Polycyclic aromatic hydrocarbons



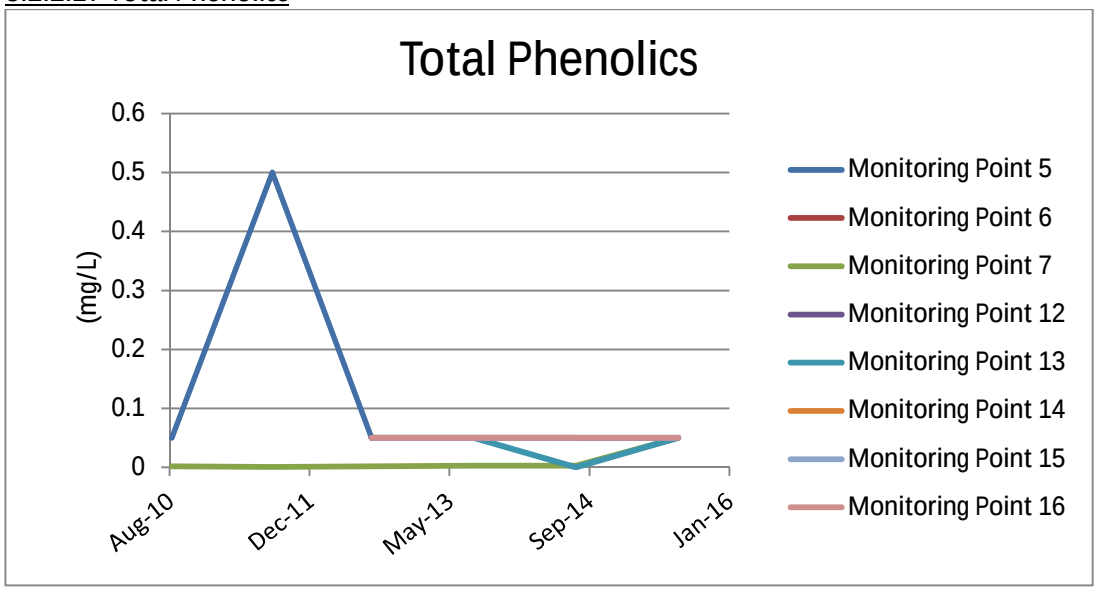
Results from this sampling period show that Polycyclic aromatic hydrocarbons is present in minor concentrations which are quite low. Monitoring Point 13 has started to rise this will need to be watched before the rehabilitation program begins in 2016/17.

3.2.2.16 Toluene



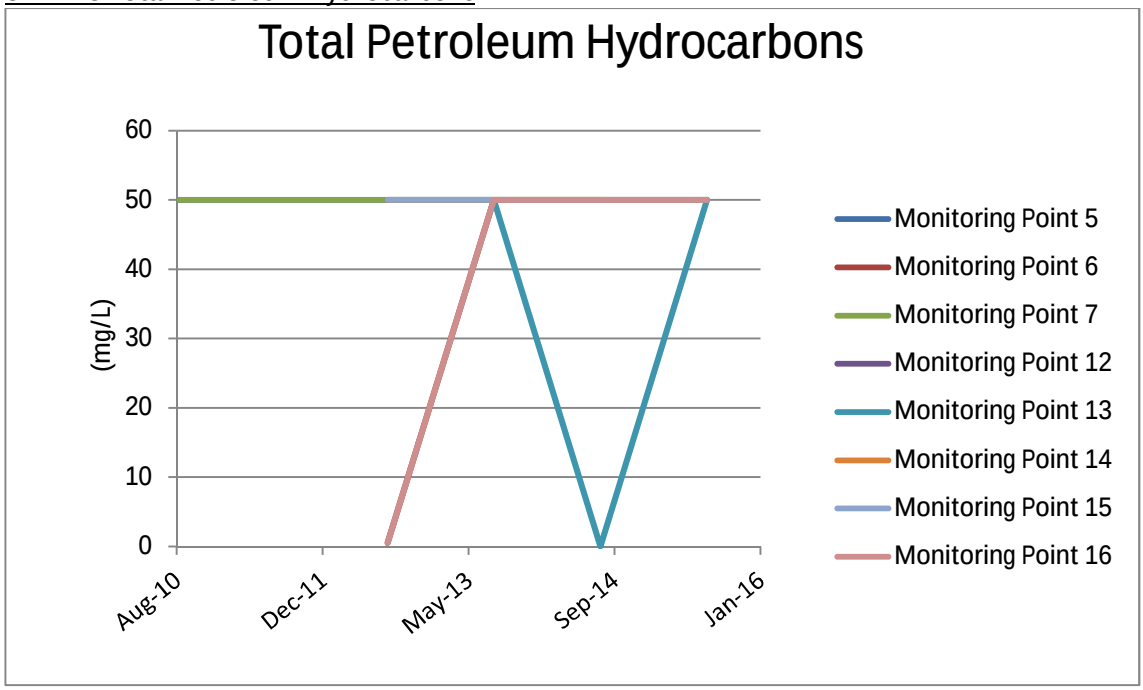
Results from this sampling period show that Toluene is present in minor concentrations which are quite low. Monitoring Point 13 has started to rise this will need to be watched before the rehabilitation program begins in 2016/17.

3.2.2.17 Total Phenolics



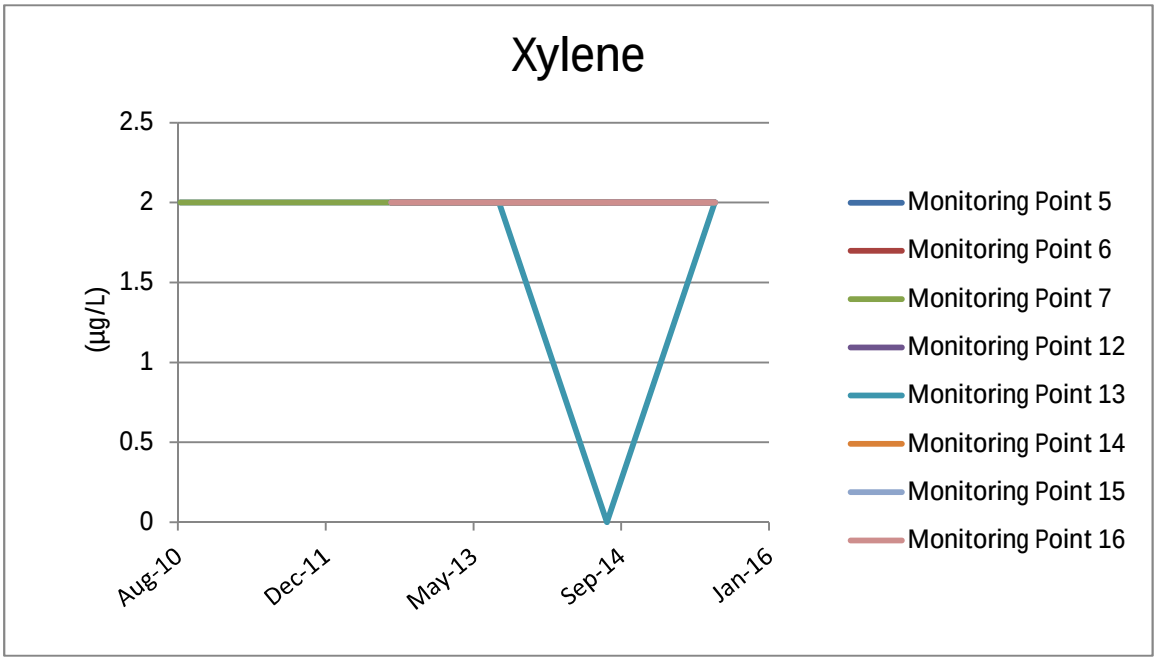
Results from this sampling period show that Total Phenolics is present in minor concentrations which are quite low.

3.2.2.18 Total Petroleum Hydrocarbons



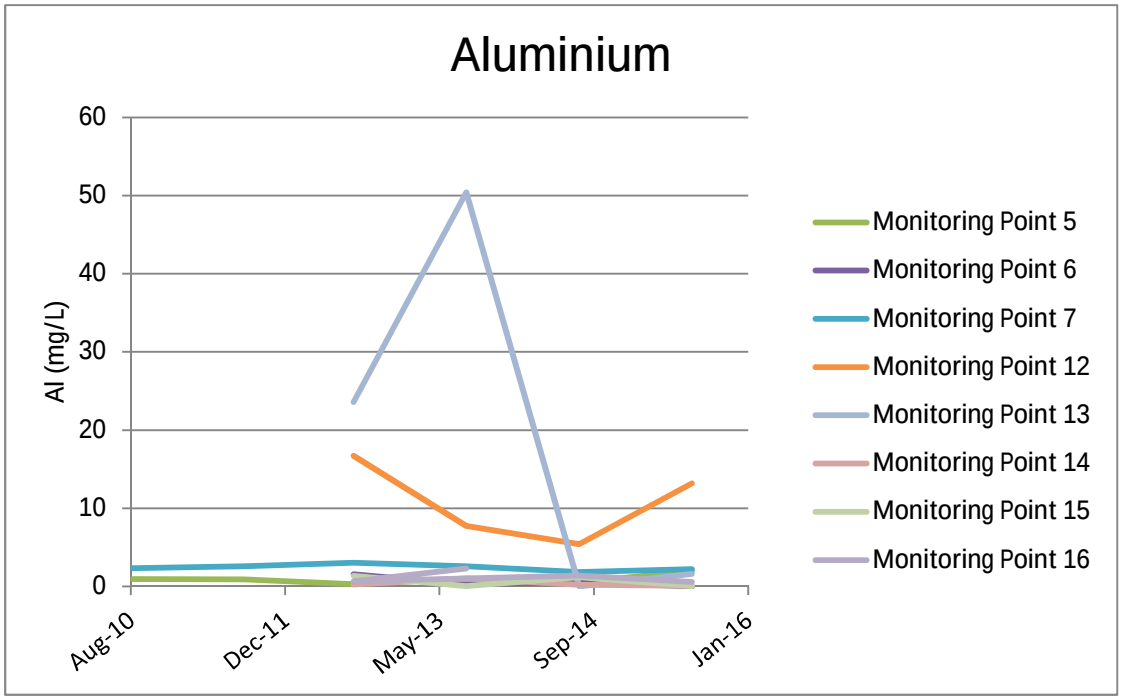
Total Petroleum hydrocarbons have not risen above the 50mg/L since testing commenced, this year is in line with this upper limit.

3.2.2.19 Xylene



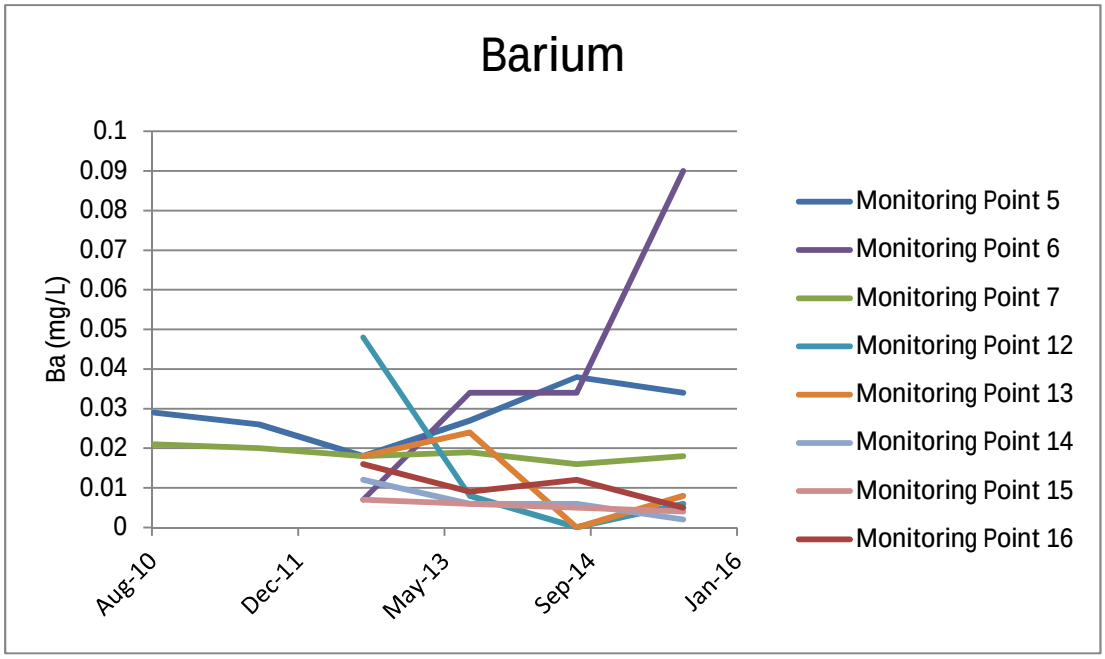
Results from this sampling period show that Xylene is present in minor concentrations which are quite low. Monitoring Point 13 has started to rise this will need to be watched before the rehabilitation program begins in 2016/17.

3.2.2.20 Aluminium



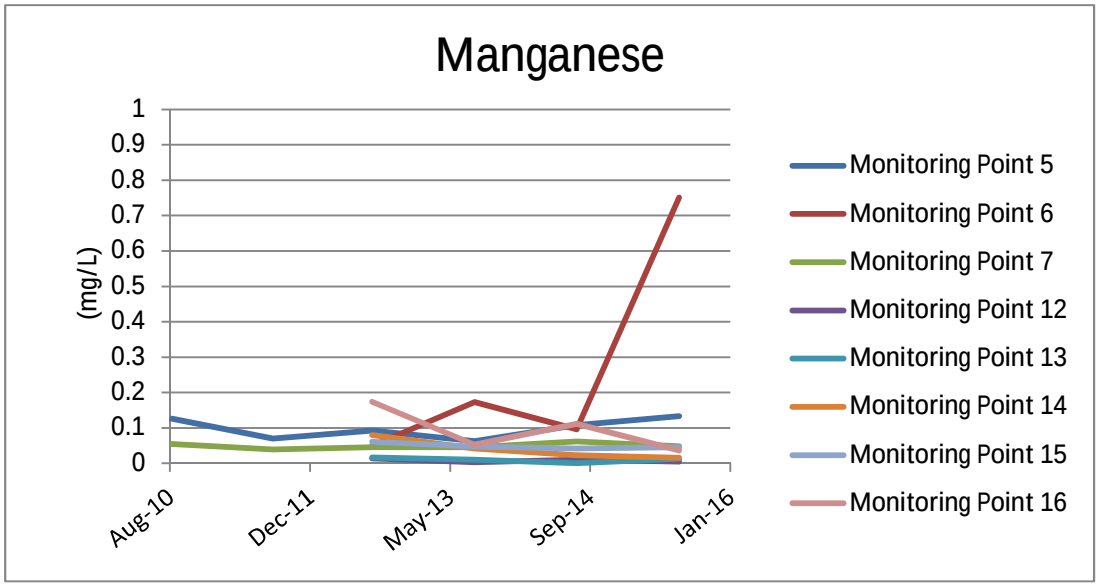
Aluminium levels in the sampled groundwater monitoring wells have traditionally been maintained at a consistent low level. However, relative higher levels of aluminium detected in Monitoring Points 12 and 13 in 2013 which both represent the groundwater flow prior to intercepting the former landfill site. Anthropogenic sources of aluminium in groundwater are generally related to low pH runoff and colliery based leachate.

3.2.2.21 Barium results presentation



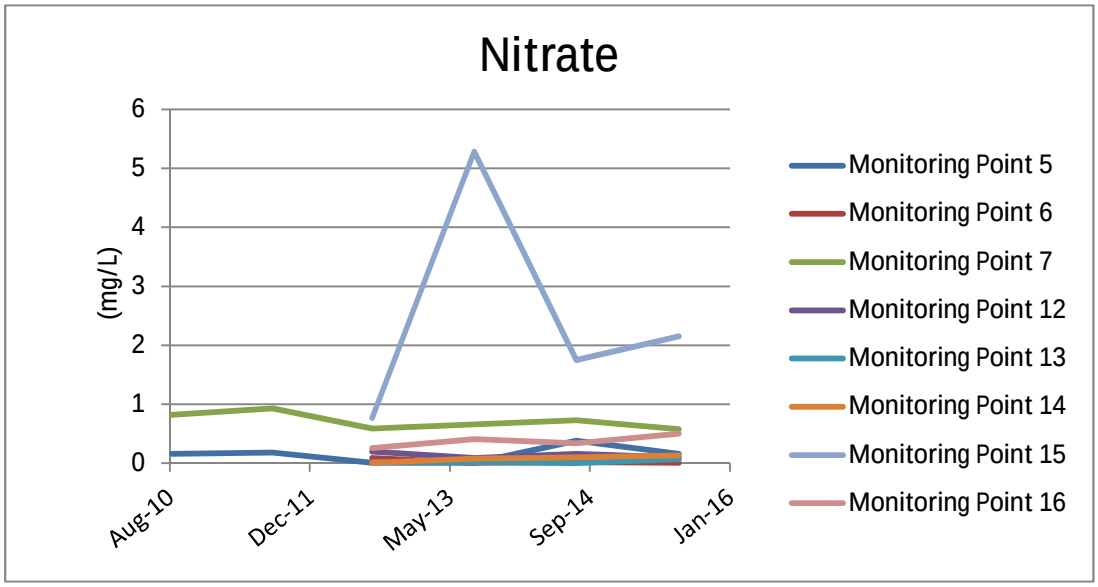
The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 2 mg/L of barium is safe for consumption. Anthropogenic sources of barium in groundwater include bleaches, dyes and drillers mud. Barium levels are therefore extremely low and relatively stable in the sites groundwater, monitoring point 6 will need to be monitored as it is rising sharply.

3.2.2.22 Manganese results presentation



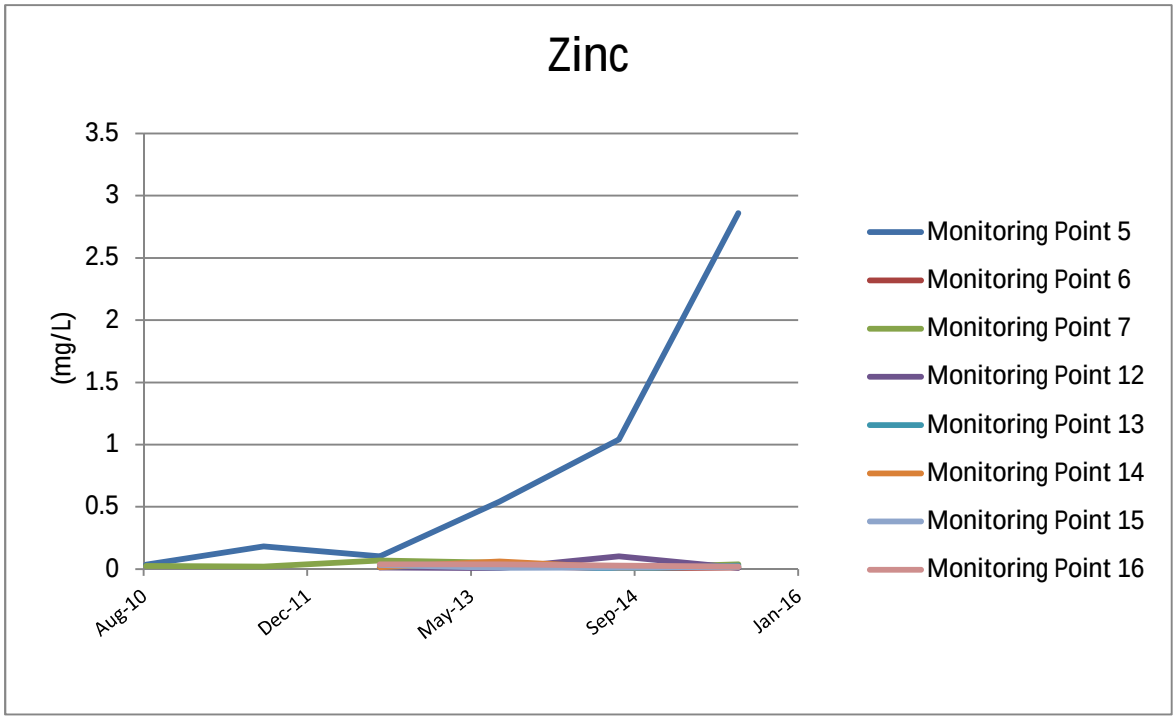
The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 0.5 mg/L of manganese is safe for consumption. Manganese can be a strong indicator of landfill leachate in groundwater leached from hazardous waste sites and often derived from battery disposal. Monitoring point 6 is 0.75mg/l, and has started to rise this will need to be watched before the rehabilitation program begins in 2016/17

3.2.2.23 Nitrate results presentation



The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 50 mg/L of nitrate is safe for consumption. Denitrification is a process common in leachate treatment with 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. The relatively low levels of nitrate sampled particularly in downstream monitoring points 6, 7 and 15, indicate that landfill leachate is not present in the groundwater.

3.2.2.24 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 the extremely low levels of zinc detected indicate that landfill leachate is not intercepting the groundwater system around the site. Monitoring Point 5 is showing a steady increase, however this Sample Point is upstream of the landfill in respect to the flow of groundwater.

3.2.3 Groundwater Testing Results Interpretation

Results indicate that there has been no definitive increase in concentration levels for any of the analytes detailed when compared to the historical results and trends (where available). The following table indicates the analytes that should be closely monitored for developing trends over the next twelve months:

Analyte	Monitoring Point	Regime	Next Sample
Alkalinity	6, 14	Quarterly	August 2016
Potassium	15	Quarterly	August 2016
Total Organic Carbon	6	Quarterly	August 2016
pH	5,6	Quarterly	August 2016
Zinc	5	Annual	August 2016

On reflection, key indicators of landfill leachates potential ingress into ground water including 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.

3.3 TRADE WASTE MONITORING RESULTS

As required in Clause M6.2 in the sites sampling in accordance with Wollongong City Councils Trade Waste Agreement with Sydney Water are tabulated below

DATE	Unit	17/06/2015	30/06/2015	22/07/2015	31/08/2015	4/09/2015	30/09/2015
Meter Reading (start)		22919.03	23061.7	23756.09	23859.27	23885.01	23959.73
Meter Reading (finish)		22921.89	23107.23	23781.02	23883.92	23905.02	23966.17
TWDF		100	100	100	100	100	100
Volume Dishcharged	KL	2.86	45.53	24.93	24.65	20	6.44
Volume Dishcharged (corrected)	KL	2.86	45.53	24.93	24.658	20	6.44
Discrete Start pH (start)	pH unit		6.9	6.6	6.7	6.5	7.4
Total Dissolved Solids	mg/L	793	780	852	702	552	728
Suspended Solids (SS)	mg/L	5	5	10	11	7	8
Iron	mg/L	0.38	5.13	5.53	2.3	4.26	0.56
Ammonia as N	mg/L	0.8	13.6	31.2	19.6	6.1	2.7
pH Finish	pH unit	7.8	6.9	6.9	8.1	7.1	7.4
Temperature		15	15	14	14		18

DATE	Unit	22/10/2015	12/11/2015	28/02/2016	30/03/2016	26/05/2016
Meter Reading (start)		24339.85	24675.88	25213.16	25218.98	25234.77
Meter Reading (finish)		24354.14	24691.76	25213.29	25218.99	25272.41
TWDF		100	100	100	100	100
Volume Dishcharged	KL	14.3	15.9	0.13	0.01	37
Volume Dishcharged (corrected)	KL	14.3	15.9	0.13	0.01	37.6
Discrete Start pH (start)	pH unit	6.4	6.3	0.1	7	7.5
Total Dissolved Solids	mg/L	897	676	942	890	878
Suspended Solids (SS)	mg/L	25	17	32	22	71
Iron	mg/L	7.3	9.98	7.85	9.19	25.9
Ammonia as N	mg/L	21.6	17	30.4	36.2	16.7
pH Finish	pH unit	6.8	6.6	6.9	7	7.5
Temperature		18	19	26	23	19

3.4 LEACHATE POND MONITORING

3.4.1 Tabulated Results

As per the EPL, the leachate pond was monitored with the following results:

Analyte	Units	Apr 16
Alkalinity (as Calcium Carbonate	mg/L	566
Aluminium	mg/L	<0.01
Arsenic	mg/L	<0.001
Barium	mg/L	0.0102
Benzene	µg/L	<1
Cadmium	mg/L	<0.0001
Calcium	mg/L	90
Chloride	mg/L	55
Chromium (Hexavalent)	mg/L	<0.01
Chromium (Total)	mg/L	<0.001
Cobalt	mg/L	<0.001
Conductivity	µS/cm	1280
Copper	mg/L	0.008
Ethyl Benzene	µg/L	<2
Fluoride	mg/L	<0.1
Lead	mg/L	<0.001
Magnesium	mg/L	41
Manganese	mg/L	0.185
Mercury	mg/L	<0.0001
Nitrate	mg/L	0.29
Nitrite	mg/L	0.02
Nitrogen (Ammonia)	mg/L	21.5
Organochlorine pesticides	µg/L	<0.5
Organophosphate pesticides	µg/L	<0.5
Phosphorus (Total)	mg/L	0.05
Polycyclic Aromatic Hydrocarbons	µg/L	<1
Potassium	mg/L	41
Sodium	mg/L	94
Sulfate	mg/L	42
Toluene	µg/L	<2
Total Phenolics	mg/L	<0.05
Total Dissolved Solids	mg/L	647
Total Organic Carbon	mg/L	23
Total Petroleum Hydrocarbons	µg/L	<50
Total Suspended Solids	mg/L	14
Xylene	µg/L	<2
Zinc	mg/L	0.007
pH	pH	6.7

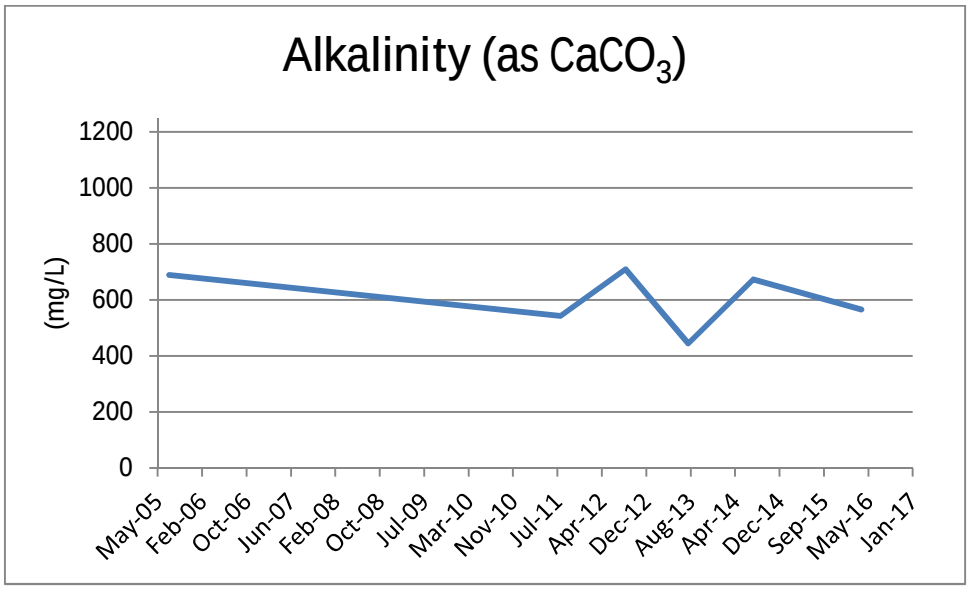
There is minimal history available for many of the analytes tested in the leachate dam at the Helensburgh Waste Disposal Depot. The data presented is only where there is a documented history of any results to draw comparisons to. All analytes that are sampled but not modelled are either near or below testable laboratory limits or isolated results that do not have historical data with which to compare.

3.4.2 Data Presentation

Please Note: only analytes with tangible results are modelled. Those not modelled below are:

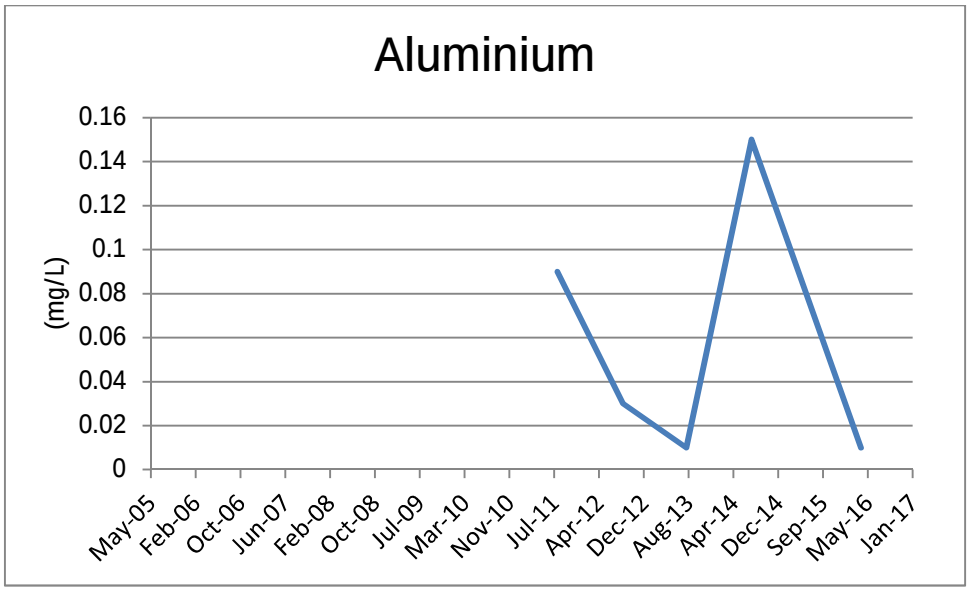
- Benzene
- Cadmium'
- Chromium (Hexavalent)
- Ethyl Benzene
- Lead
- Mercury
- Organochlorine pesticides
- Organophosphate pesticides
- Xylene
- Total Phenolics
- Toluene
- Polycyclic Aromatic Hydrocarbons

3.4.2.1 Alkalinity as Calcium



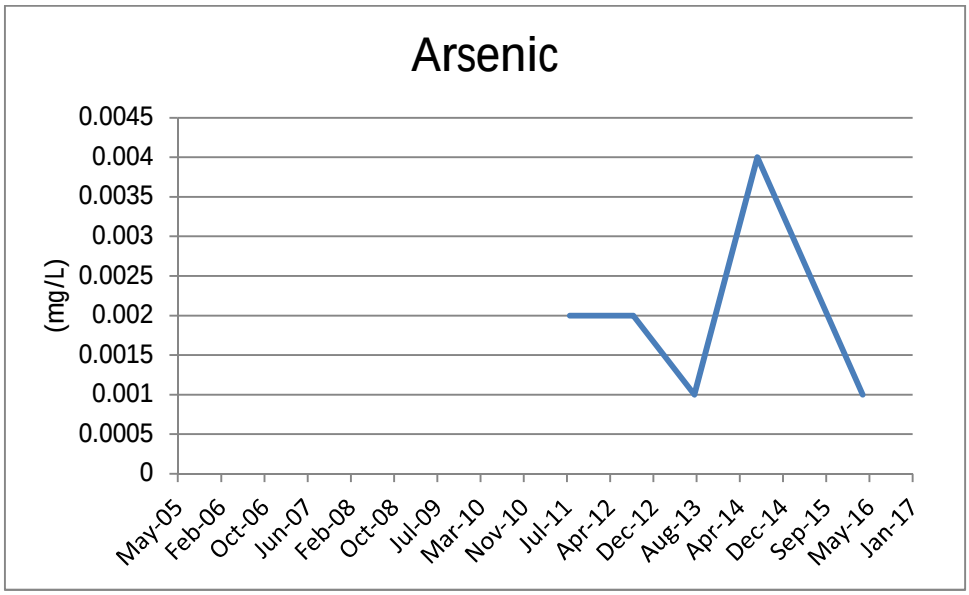
Alkalinity levels in the sites leachate are approximately 4 times higher than the highest groundwater result. Therefore indicating that leachate is probably not escaping the storage pond.

3.4.2.2 Aluminium



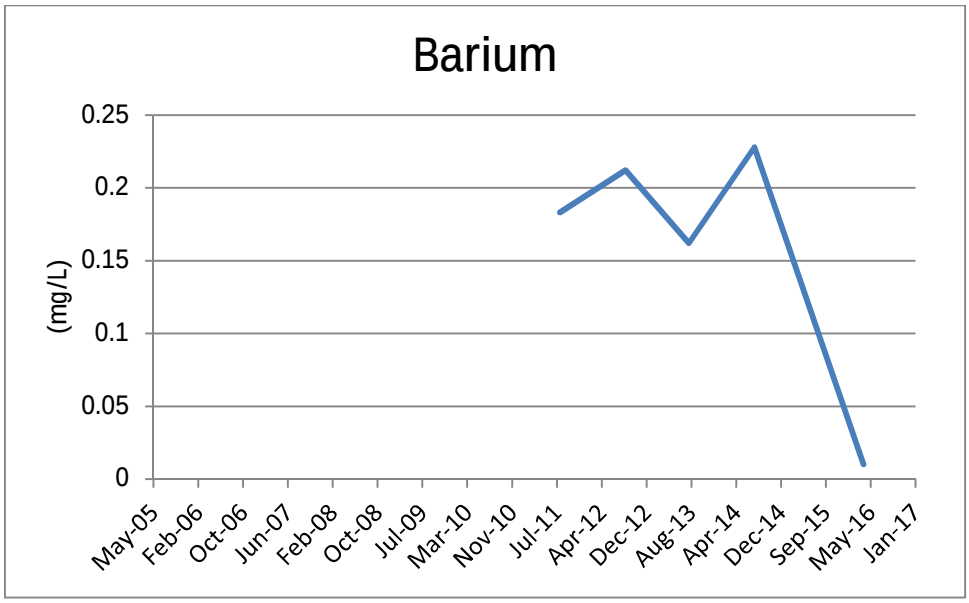
There are low levels of Aluminium in the Leachate Pond. Samples in the boreholes surrounding the leachate dam are higher, but that does not conclude that there is leachate migration.

3.4.2.3 Arsenic



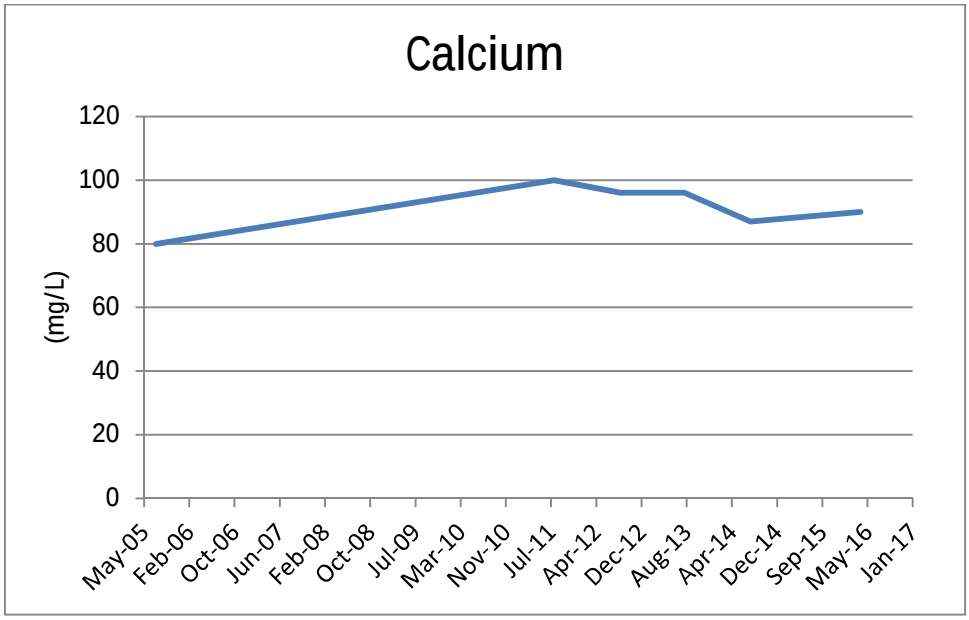
There are low levels of Arsenic in the Leachate Pond. Arsenic found in the surrounding boreholes is in line slightly higher than the leachate pond but not consistent enough to say it is from the leachate.

3.4.2.4 Barium



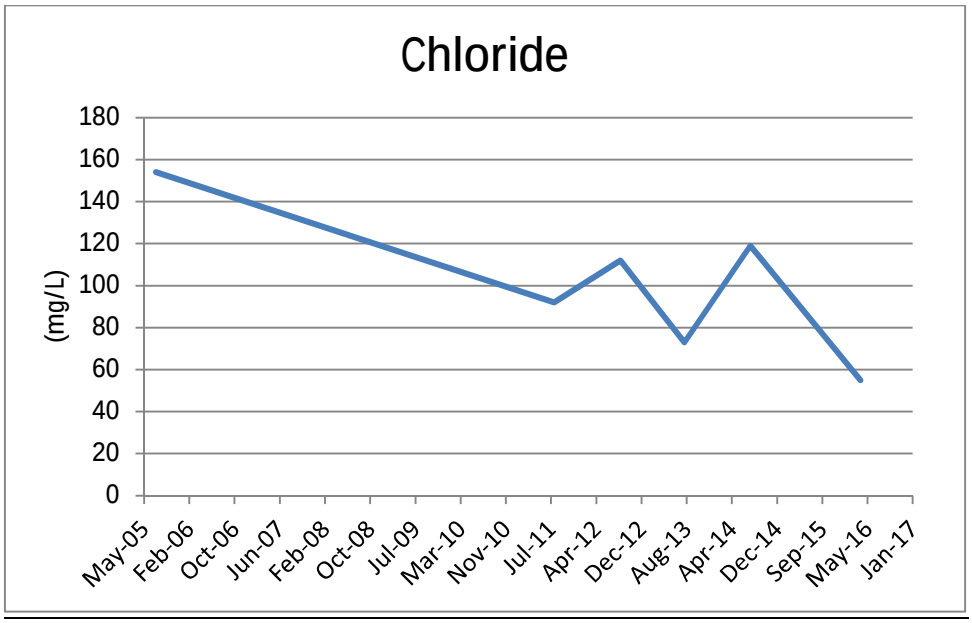
There are low levels of Barium in the Leachate Pond. Samples in the boreholes surrounding the leachate dam are higher, but that does not conclude that there is leachate migration.

3.4.2.5 Calcium



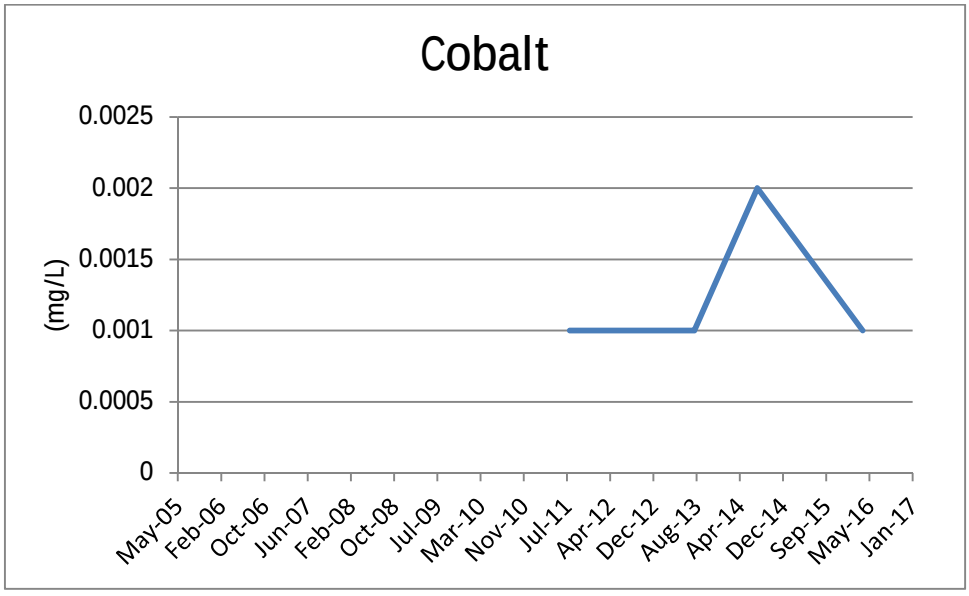
Calcium sampling is within this period has been stable and in line with previous years.

3.4.2.6 Chloride



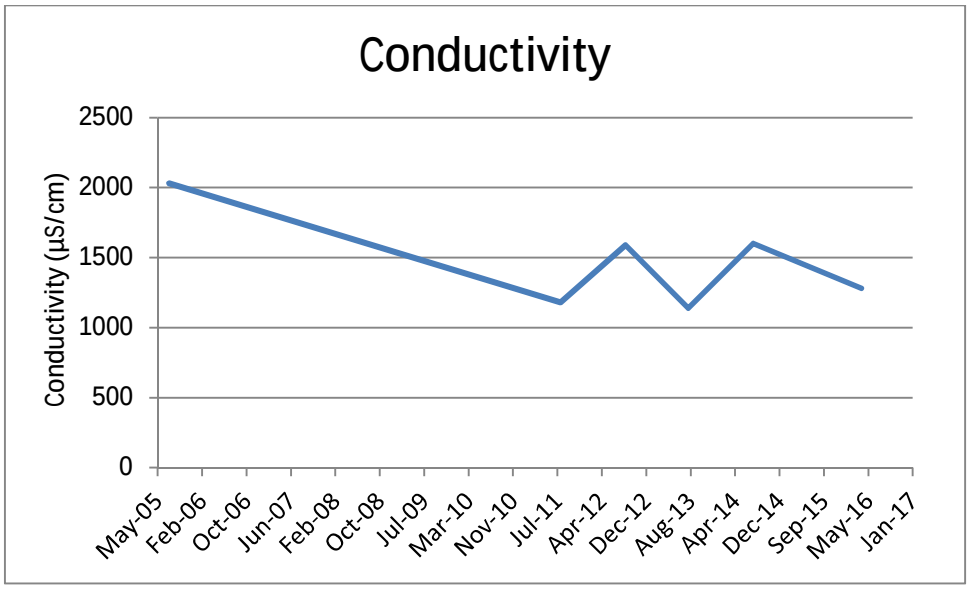
Chloride sampling has been showing a downward trend, which has been continuing into this sampling period.

3.4.2.7 Cobalt



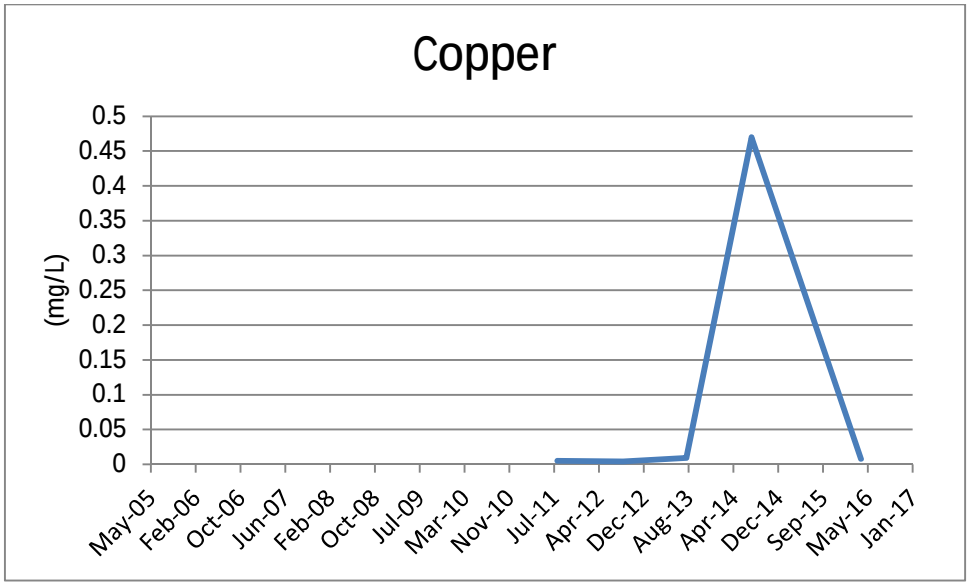
Cobalt spiked in April 2014, but has since returned to low levels.

3.4.2.8 Conductivity



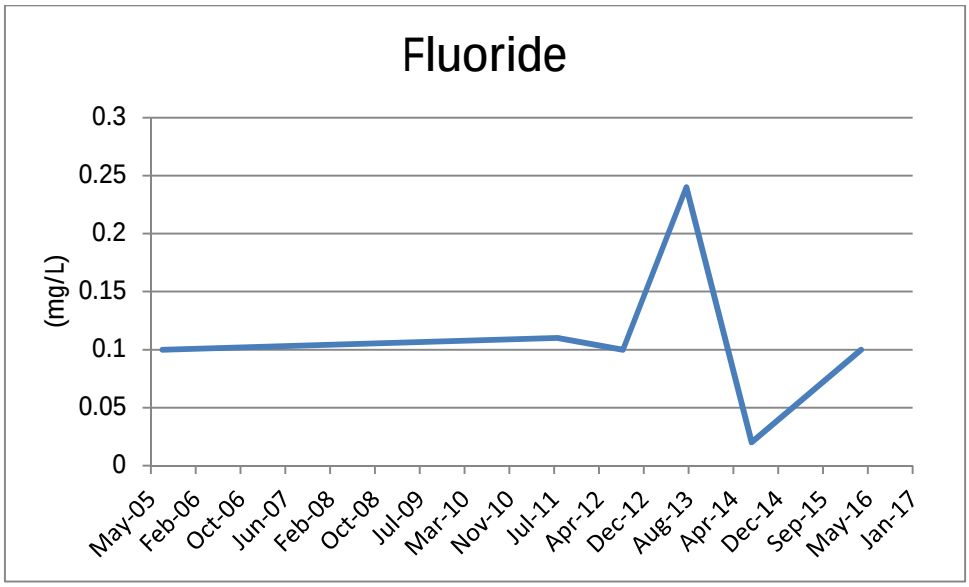
Electrical conductivity levels are higher than the surrounding stormwater pond, suggesting that leachate is being effectively contained and treated.

3.4.2.9 Copper



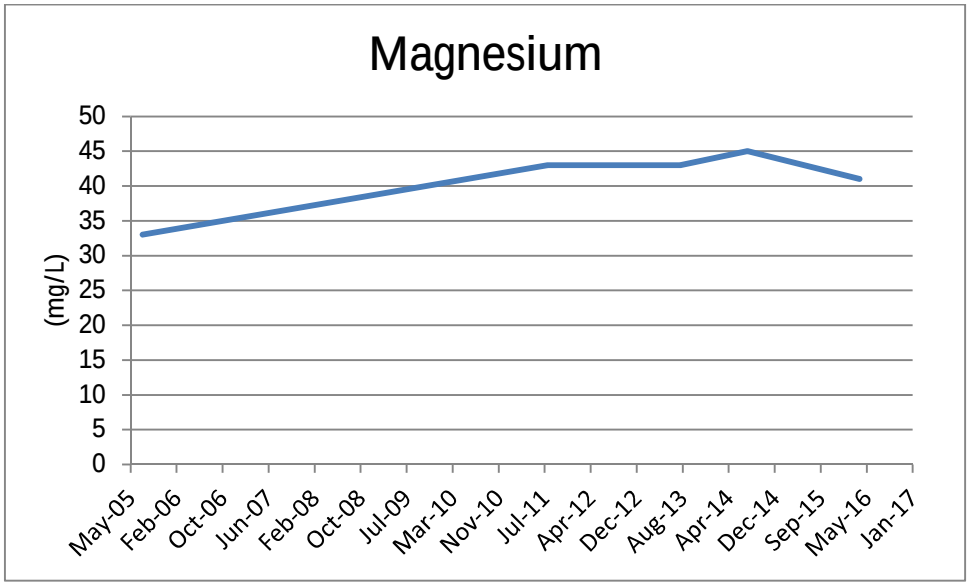
Copper levels spiked in April 2014, but have since returned to previous low levels.

3.4.2.10 Fluoride



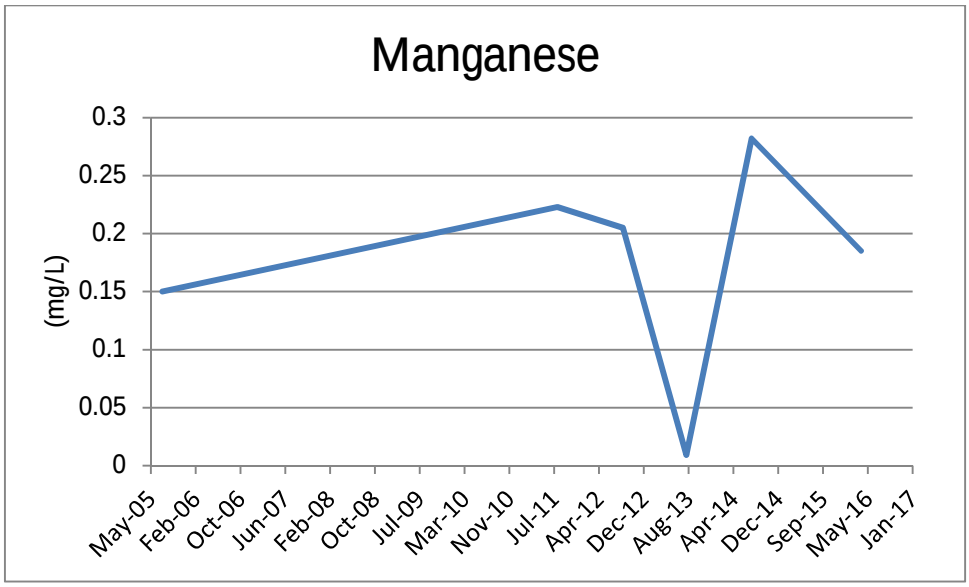
Fluoride was trending down until April 2014, but has since began to rise, Flouride in the surrounding bore holes is less then 0.1mg/L so this is a good indicator that the leachate is being captured.

3.4.2.11 Magnesium



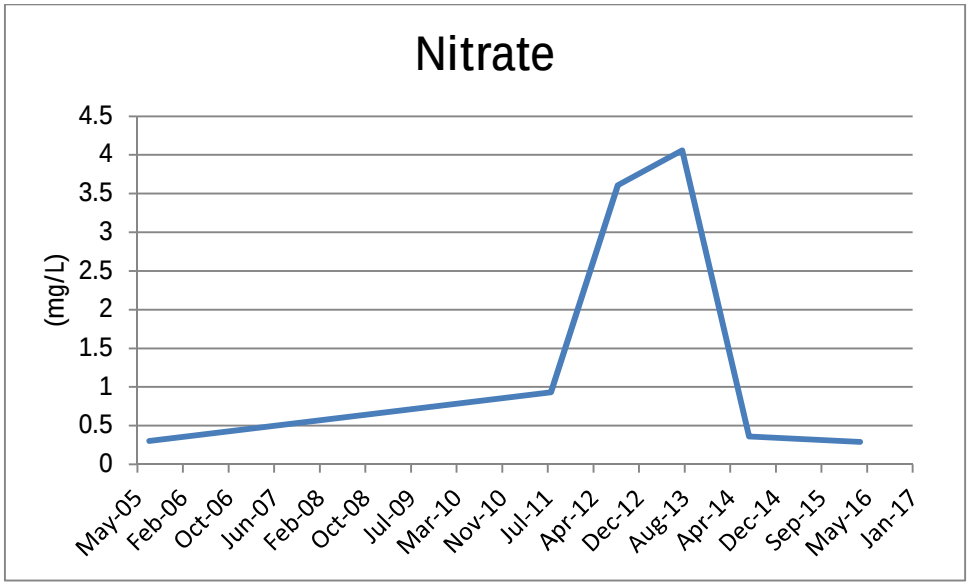
Magnesium levels have started to trend down in the last few years, sampling in this period show that this trend is continuing.

3.4.2.12 Manganese



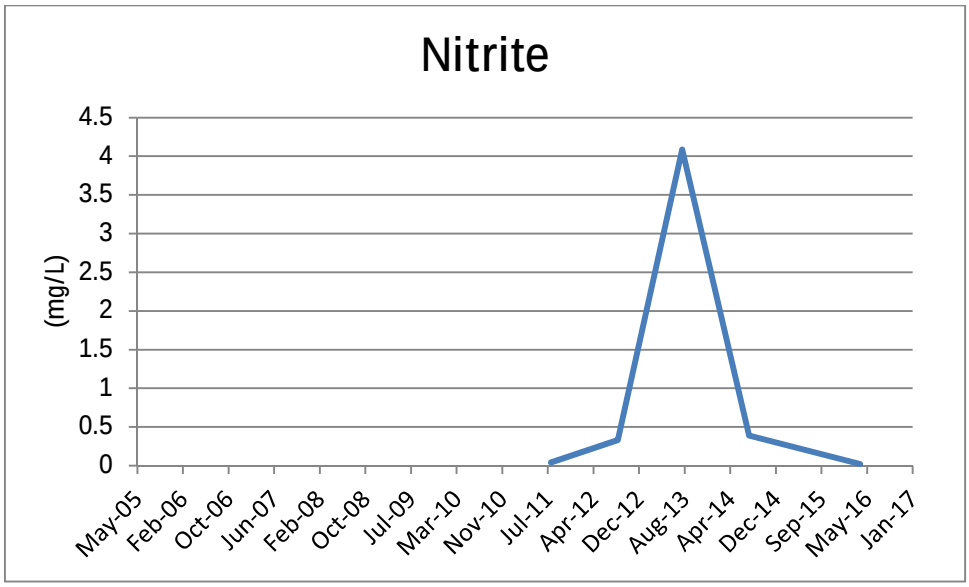
Manganese sampling during this reporting period has continued to downward trend of data. However, sampling carried out in the surrounding boreholes returned a slightly higher reading, this was will need to followed closely in further sampling to establish if there is a trend.

3.4.2.13 Nitrate



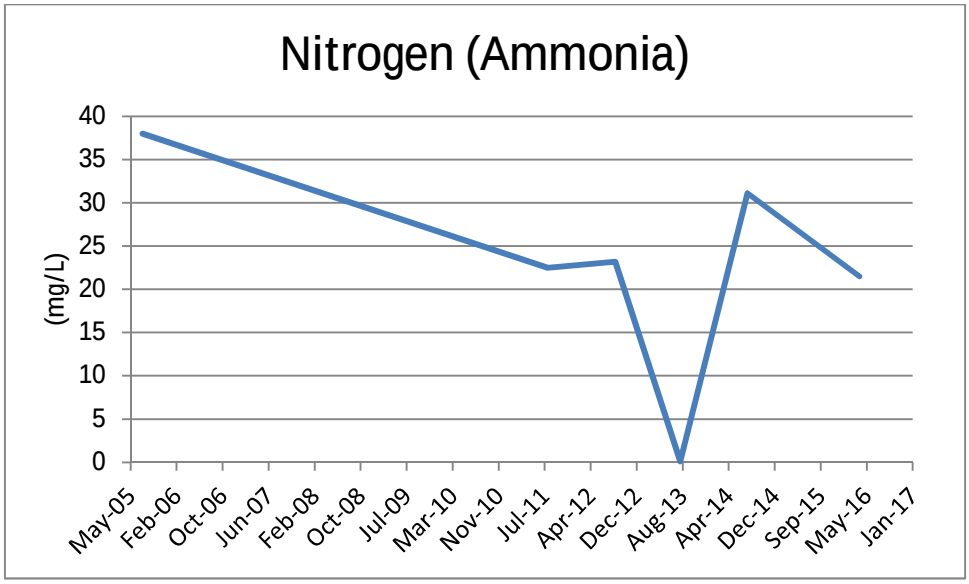
Nitrate sampling peaked in August 2013, and has since been declining, from December 2014 it has been on a slight plateau and this sampling is indicative of the last few years.

3.4.2.14 Nitrite



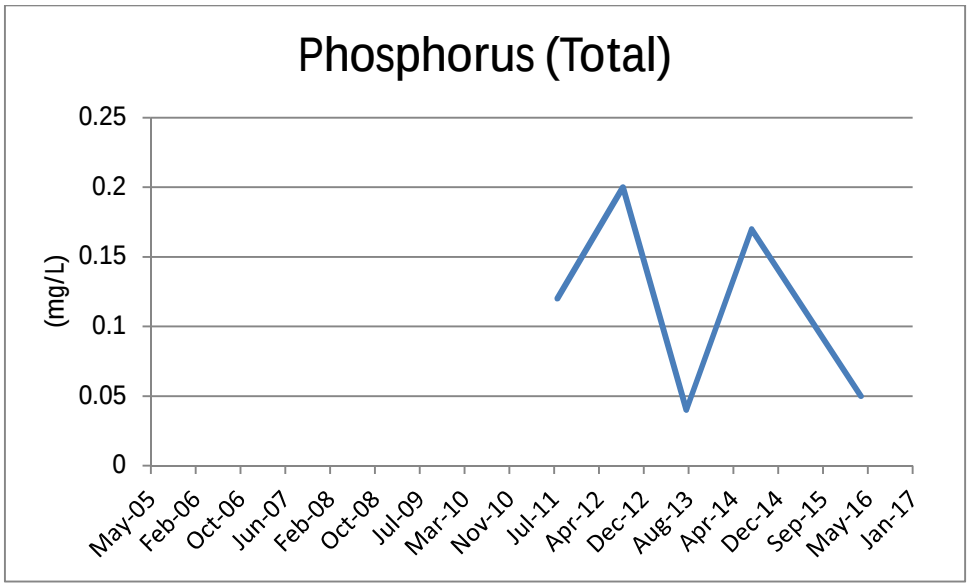
Nitrite sampling peaked in August 2013, and has since been declining, from December 2014 it has been on a slight plateau and this sampling is indicative of the last few years.

3.4.2.15 Nitrogen (Ammonia)



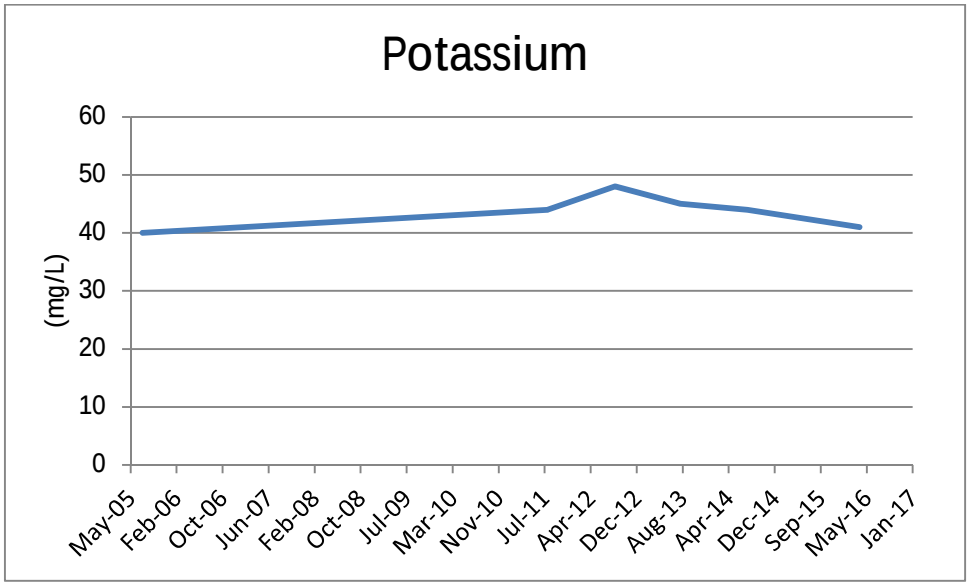
Nitrogen has continued on the downward trend since April 2014, this sampling period follows that downward trend.

3.4.2.16 Phosphorus (Total)



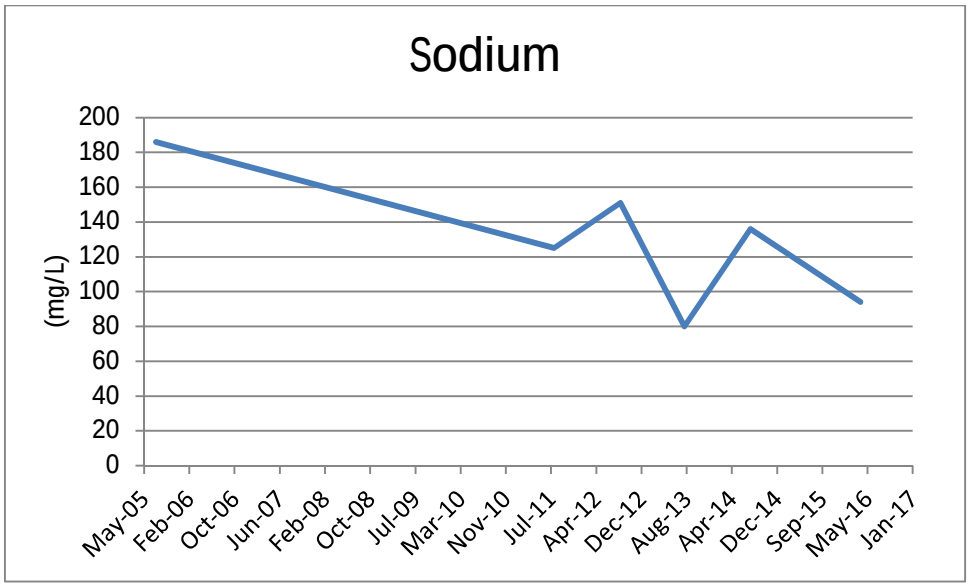
Phosphorus has been erratic in the past sampling, however all at low levels. This sampling period has returned levels consistent with a downward trend.

3.4.2.17 Potassium



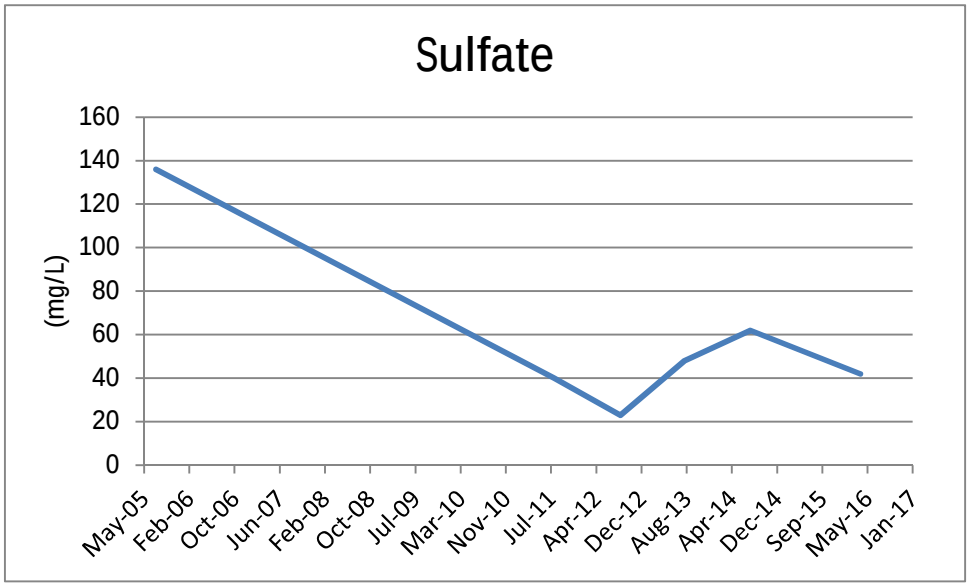
Potassium has continued to plateau since April 2012, This year's sampling is consistent with previous years.

3.4.2.18 Sodium



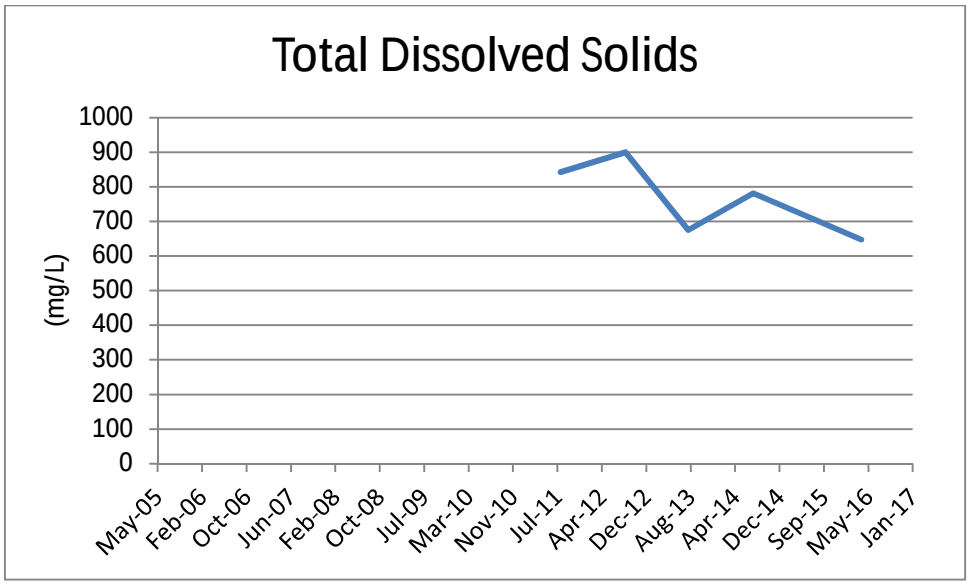
Sodium has been trending downwards since the sampling commenced in May 2005. This year's results follow this trend.

3.4.2.19 Sulfate



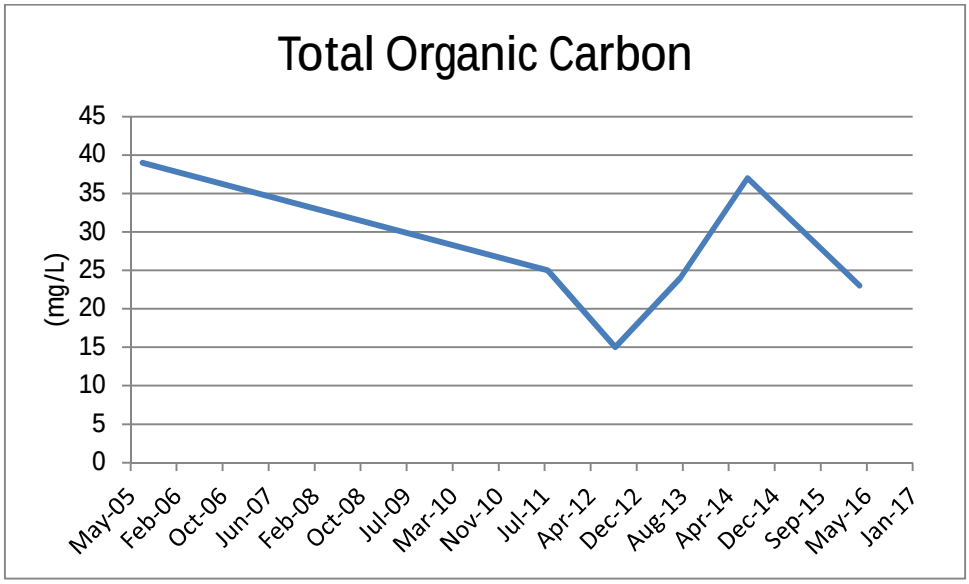
Sulfate has been trending downwards since the sampling commenced in May 2005. There was a spike in April 2014, but following this spike the results returned to the downward trend, this sampling period is continuing to following this trend.

3.4.2.20 Total Dissolved Solids



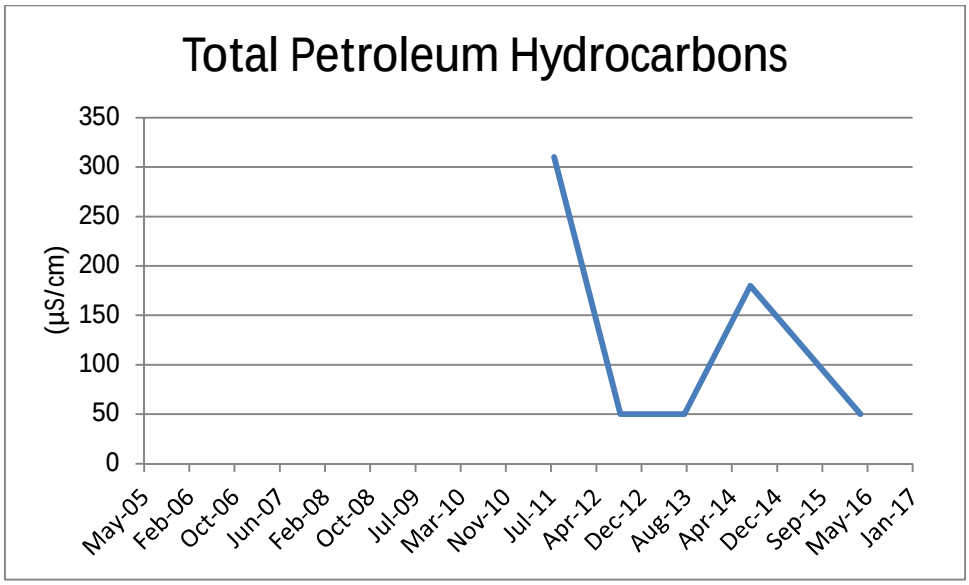
Total dissolved solids have been trending downwards since sampling commenced. This periods sampling has continued to trend down.

3.4.2.21 Total Organic Carbon



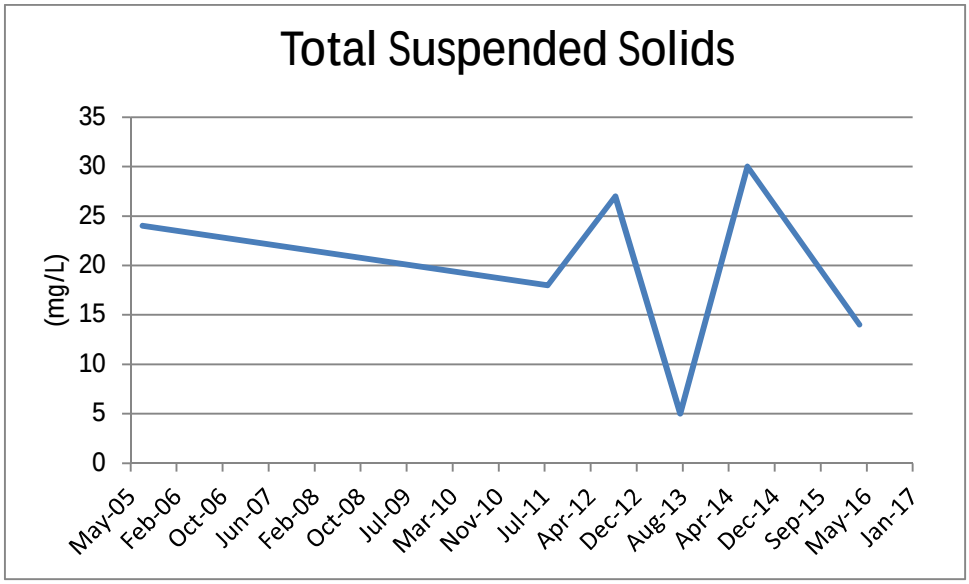
Sampling for this period has continued to show a downward trend.

3.4.2.22 Total Petroleum Hydrocarbons



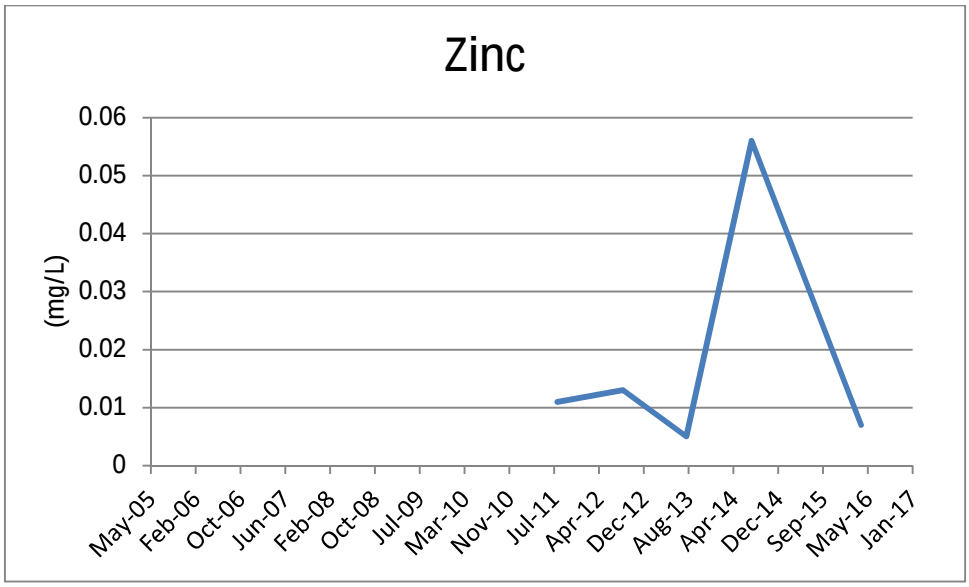
Total Petroleum Hydrocarbons have continued to trend down since December 2014. This sampling period follows this downward trend.

3.4.2.23 Total Suspended Solids



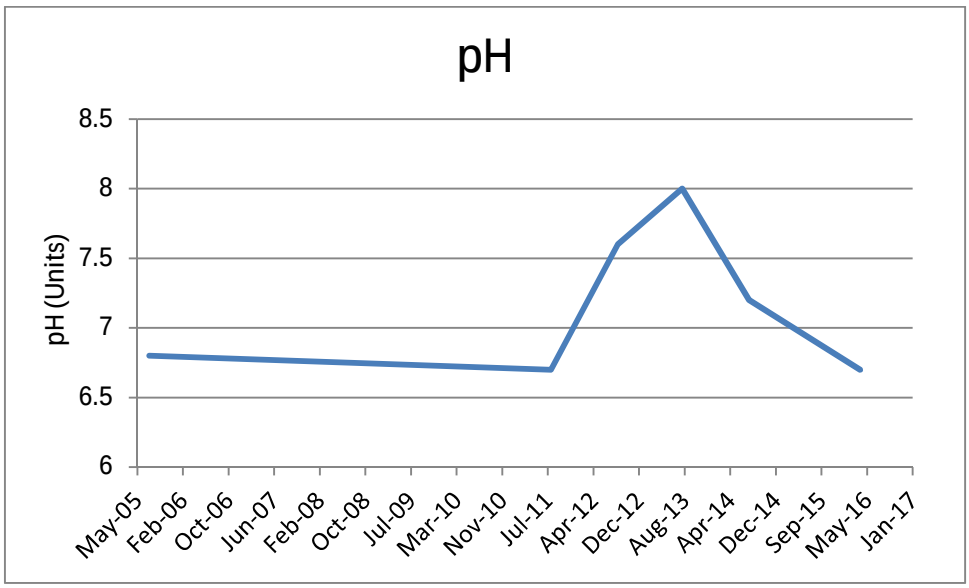
Total Suspended Solids have been declining since April 2014, this years sampling has continued to decline as per the trend.

3.4.2.24 Zinc



Zinc sampling has continued to follow a sharp downward trend since April 2014. This year's sampling is consistent with previous years.

3.4.2.25 pH



pH levels in the leachate pond have remained stable over a relatively long sample period. The pH averages around 7.5 which would foster the aerobic nitrification process in the leachate.

Data history for the plotted analytes shows the majority of analytes are consistent. Calcium, magnesium, potassium, total organic carbon and total suspended solids are all found at levels higher than the surrounding groundwater or the surface water pond, suggesting that leachate is being effectively contained and treated.

3.4.3 Leachate Pond Results Interpretation

The results for the leachate pond water shows that the composition of the leachate may have improved slightly in regard to environmental consequence, the slight increase in some analytes in this reporting

period are still below results from 8 years ago. The overall positive trend reflects the increased environmental controls implemented on site and the ban on putrescible waste types many years prior.

Further, the benefits of sampling leachate quality in a leachate pond are minimal aside from potential comparison to surrounding stormwater pond quality. But even in this instance, the extent of the analytes tested is far more onerous than would be used to indicate cross contamination.

3.5 AIR EMISSIONS MONITORING

3.5.1 Tabulated Results

Table 3.5.1(a) Methane monitoring results.

Date	Results Above Recommended Threshold 500ppm	Accumulation Above Recommended Threshold 1250ppm
14/8/2015	0	0

Presented results are the numbers of individual results derived from monthly sampling that are above the EPA Benchmark Technique recommended threshold levels for further action regarding surface emissions (500 ppm) and accumulation levels (1,250 ppm).
Table 3.5.1(b) Methane monitoring results in Migration Monitoring Assets

Methane Concentration (ppm) - Landfill Gas Migration Monitoring Bores				
Monitoring Point Number	August 2012 (ppm)	August 2013 (ppm)	August 2014 (ppm)	August 2015 (ppm)
4	0.6	1.3	1.2	0.3
9	<0.1	0.5	0.4	0.1
10	70.6	3.5	3.9	1.7
11	1.7	2.3	2.0	2.3

Presented results are the methane concentration measured in the strategically placed gas migration monitoring bores for the previous three reporting periods.

3.5.2 Data Presentation

No data has been presented due to the fact that no emissions above EPA threshold levels for recommended further investigation were found on the site, nor have any results above these thresholds ever been found despite monthly testing completed voluntarily in past years.

3.5.3 Air Emissions Monitoring Results Interpretation

The site does not seem to be producing significant amounts of landfill gas, which is as expected for a recently former non-putrescible site. Resultant of the methane levels reported in the 2010-2011 Annual Environmental Management Report, Council now sample the site annually as prescribed in the sites EPL.
To address a potential problem identified in the 2010-2011 Annual Environmental Management Report regarding a lack of data able to be ascertained from properties within 250m of the landfill footprint due to refused entry, Council installed four gas monitoring bores in 2011. The bores are strategically positioned as directed by GHD's landfill gas team and will provide evidence of the migration of landfill gas offsite towards residences. Testing completed indicates that gas migration is not evident.

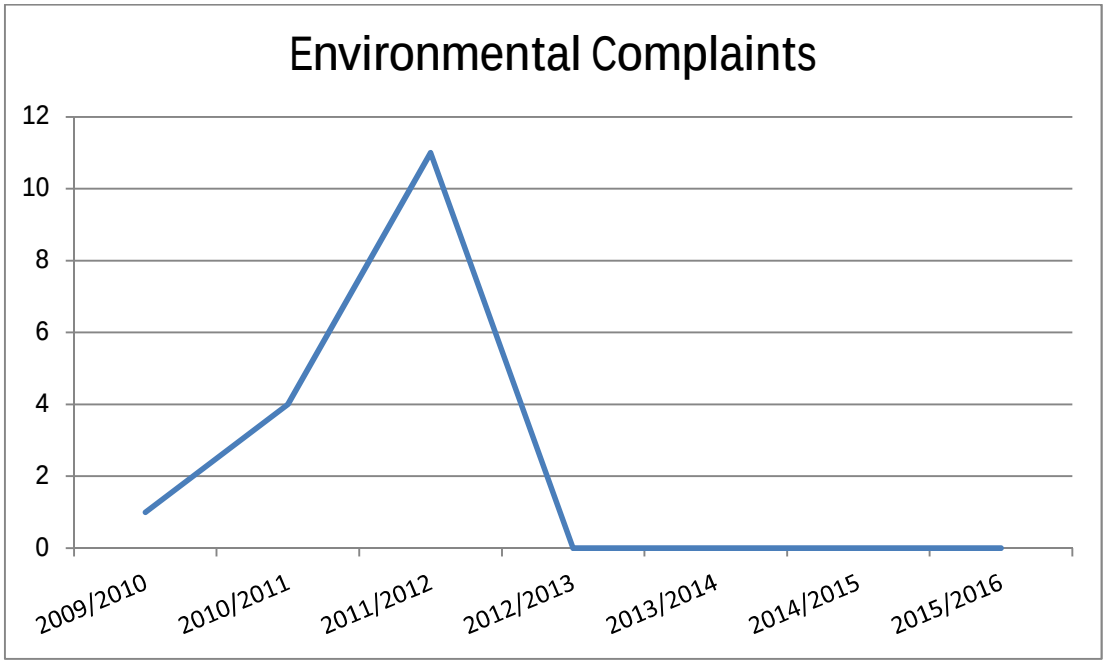
3.6 ENVIRONMENTAL COMPLAINTS

3.6.1 Tabulated Results

Table 3.6.1 Tabulated complaints for the reporting period and historically

Year	Environmental Complaints
2009/2010	1
2010/2011	4
2011/2012	11
2012/2013	0
2013/2014	0
2014/2015	0
2015/2016	0

3.6.2 Environmental Complaints Results Interpretation



There were no environment related complaints that were attributed to the site in the previous three reporting period. This is as expected due to the site being closed.

4 SITE SUMMATION

4.1 DEFICIENCY IDENTIFICATION & REMEDIATION

No deficiencies were identified in the presented Annual Environmental Management Report. However, some further observations are recommended.

4.1.1 Boreholes Indicating Potentially Imperfect Trend Stability

As discussed in Section 3.1.4, monitoring well 6 has provided individual and incidental analytical results that require further monitoring to ensure negative trends are not establishing. Whilst it is common for individual analytical results to vary from time to time, the prudent course of action is to provide an

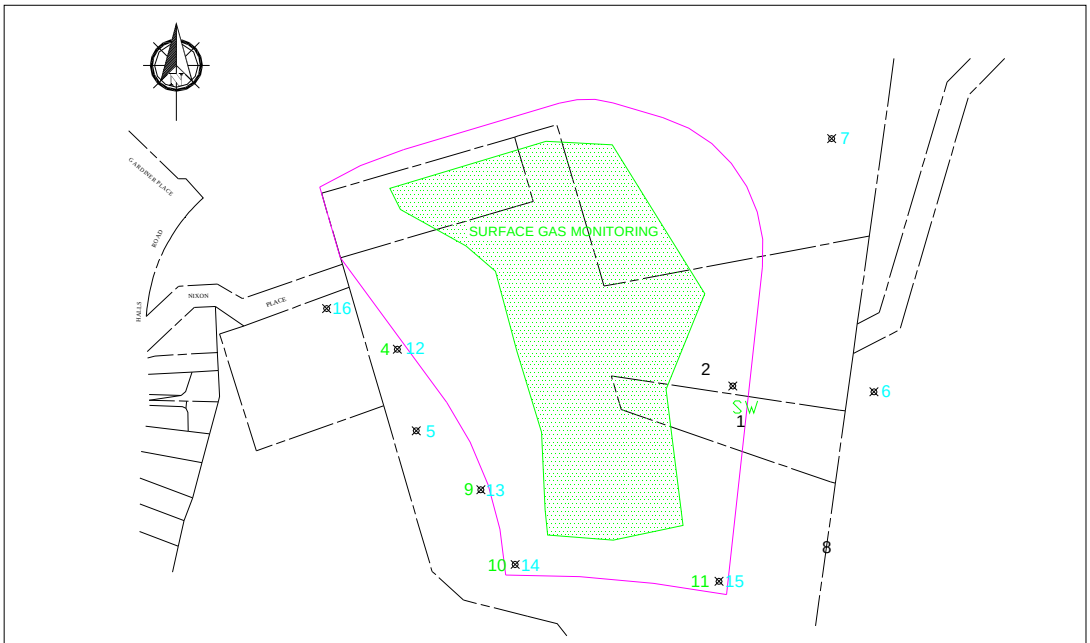
increased level of vigilance for these analyte and borehole combinations until such time the results return to historic levels or further action is required.

4.2 CONCLUSION

The site is performing adequately within the individual criteria and limits assigned to it in regard to environmental performance. The lack of deficiencies and nil non-compliance's in conjunction with low levels of environmentally disruptive pollutants shows that Council has maintained good environmental performance considering the fact that the landfill is unlined. Council will continue to monitor the site in accordance with the sites EPL despite the fact that the site is now closed.

Annexure A

Environmental Monitoring Locations



Helensburgh Waste Disposal Depot
Environmental Monitoring Locations

Annexure B

Annual Return

ANNUAL RETURN

LICENCE NO	**5861**
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	5861
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)	HELENSBURGH WASTE DISPOSAL DEPOT
Premises	NIXON PLACE HELENSBURGH NSW 2508

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.**	NIL

Pollution Complaint Category	Number of Complaints
Air	0
Water	0
Noise	0
Waste	0
Other	0

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

Overflow drain, DP1 - Overflow from stormwater pond as specified in Drawing No 500 of City of W'gong, Helensburgh Waste Depot Ext, Leachate Disposal Syst, Site Plan, 10.11.95

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
pH	pH	1	1	7	7	7

Total suspended solids	milligrams per litre	1	1	11	11	11

Monitoring Point 2

Leachate Dam, Leachate Dam

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	1	1	566	566	566
Aluminium	milligrams per litre	1	1	<0.01	<0.01	<0.01
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.0102	0.0102	0.0102
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	1	1	90	90	90
Chloride	milligrams per litre	1	1	55	55	55
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	801	1187.75	1470

Copper	milligrams per litre			0.008	0.008	0.008
Ethyl benzene	milligrams per litre			<0.002	<0.002	<0.002
Fluoride	milligrams per litre			<0.1	<0.1	<0.1
Lead	milligrams per litre			<0.001	<0.001	<0.001
Magnesium	milligrams per litre			41	41	41
Manganese	milligrams per litre			0.185	0.185	0.185
Mercury	milligrams per litre			<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre			0.29	0.29	0.29
Nitrite	milligrams per litre			0.02	0.02	0.02
Nitrogen (ammonia)	milligrams per litre			21.5	21.5	21.5
Organochlorine pesticides	milligrams per litre			<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre			<0.0005	<0.0005	<0.0005
pH	pH			6.7	6.7	6.7
Phosphorus (total)	milligrams per litre			0.05	0.05	0.05
Polycyclic aromatic hydrocarbons	milligrams per litre			0.001	0.001	0.001
Potassium	milligrams per litre			41	41	41

Sodium	milligrams per litre	1	1	94	94	94
Sulfate	milligrams per litre	1	1	42	42	42
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	1	1	647	647	647
Total organic carbon	milligrams per litre	1	1	23	23	23
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
Total suspended solids	milligrams per litre	1	1	14	14	14
Xylene	milligrams per litre	1	1	<2	<2	<2
Zinc	milligrams per litre	1	1	0.007	0.007	0.007

Monitoring Point 3

Landfill 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	1	1	0.00007	0.000179	0.00055

Monitoring Point 4

Landfill gas monitoring, LFGMB1 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	1	1	1·2	1·2	1·2

Monitoring Point 5

Ground water monitoring, BH1 - bore hole as shown on Plan 20298/SK 02 Site Plan

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	1	1·75	4
Aluminium	milligrams per litre	1	1	1·98	1·98	1·98
Arsenic	milligrams per litre	1	1	0·002	0·002	0·002
Barium	milligrams per litre	1	1	0·034	0·034	0·034
Benzene	milligrams per litre	1	1	<0·001	<0·001	<0·001
Cadmium	milligrams per litre	1	1	0·0007	0·0007	0·0007
Calcium	milligrams per litre	4	4	23	28·25	36
Chloride	milligrams per litre	4	4	51	87	127
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	0·008	0·008	0·008

Copper	milligrams per litre	1	1	0.012	0.012	0.012
Ethyl benzene	milligrams 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	0.034	0.034	0.034
Magnesium	milligrams per litre	4	4	12	20	30
Manganese	milligrams per litre	4	4	0.133	0.133	0.133
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	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.03	0.07	0.13
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	4.5	5	7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	2.25	6
Sodium	milligrams per litre	4	4	33	43.25	64

Standing Water Level	metres	4	4	2·68	3·12	3·4
Sulfate	milligrams per litre	4	4	103	124·75	143
Toluene	milligrams per litre	1	1	<0·002	<0·002	<0·002
Total dissolved solids	milligrams per litre	4	4	323	362·25	459
Total organic carbon	milligrams per litre	4	4	3	5	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 litre	1	1	2·86	2·86	2·86

Monitoring Point 6

Groundwater monitoring, GWMB6 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	86	147·50	203
Aluminium	milligrams per litre	1	1	0·014	0·014	0·014
Arsenic	milligrams per litre	1	1	0·005	0·005	0·005
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	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	26	37.75	52
Chloride	milligrams per litre	4	4	12	16.75	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	0.008	0.008	0.008
Copper	milligrams per litre	1	1	0.003	0.003	0.003
Ethyl benzene	milligrams 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	0.001	0.001	0.001
Magnesium	milligrams per litre	4	4	13	19	26
Manganese	milligrams per litre	1	1	0.751	0.751	0.751
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	0.03	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	4.4	5.98	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	5
Sodium	milligrams per litre	4	4	18	19	20
Standing Water Level	metres	4	4	2.4	2.87	3.16
Sulfate	milligrams per litre	4	4	5	13.5	22
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	209	263.50	354
Total organic carbon	milligrams per litre	4	4	7	9.5	11
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 litre	1	1	0.012	0.012	0.012

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

Monitoring Point 7

Ground water monitoring, BH4 - bore hole as shown on Plan 20298/SK 02 Site Plan

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	1	1	1
Aluminium	milligrams per litre	1	1	2·21	2·21	2·21
Arsenic	milligrams per litre	1	1	<0·001	<0·001	<0·001
Barium	milligrams per litre	1	1	<0·018	<0·018	<0·018
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	1	1	1
Chloride	milligrams per litre	4	4	73	91·75	113
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
Copper	milligrams per litre	1	1	0·007	0·007	0·007
Ethyl benzene	milligrams 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	0.003	0.003	0.003
Magnesium	milligrams per litre	4	4	4	5.25	6
Manganese	milligrams per litre	1	1	0.048	0.048	0.048
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.58	0.58	0.58
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.03	0.15	0.42
Organochlorine pesticides	milligrams per litre	1	1	<0.0005	<0.0005	<0.0005
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	4.2	4.98	7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	88	100	115
Standing Water Level	metres	4	4	2.23	3.19	4.56
Sulfate	milligrams per litre	4	4	89	93.5	96
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002

Total dissolved solids	milligrams per litre	4	4	324	339.75	359
Total organic carbon	milligrams per litre	4	4	1	2.75	4
Total petroleum hydrocarbons	milligrams per litre	1	1	50	50	50
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 litre	1	1	0.039	0.039	0.039

Monitoring Point 8

Surface water monitoring, WCC ref - Pony Club as shown on Plan 20298/SK 02 Site Plan

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
Conductivity	microsiemens per centimetre	4	4	386	492.50	708
Dissolved Oxygen	milligrams per litre	4	4	8.25	8.97	10.5
Faecal Coliforms	colony forming units per 100 millilitres	4	4	~470	~199	~2
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	.2.99	9.7
pH	pH	4	4	6.8	7.25	7.6
Potassium	milligrams per litre	4	4	5	10.75	22
Redox potential	millivolts	4	4	10	35.5	67

Total dissolved solids	milligrams per litre	4	4	202	278.75	416
Total organic carbon	milligrams per litre	4	4	6	10	21

Monitoring Point 9

Landfill gas monitoring, LFGMB2 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	1	1	0.00001	0.00001	0.00001

Monitoring Point 10

Landfill gas monitoring, LFGMB3 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	1	1	0.00017	0.00017	0.00017

Monitoring Point 11

Landfill gas monitoring, LFGMB4 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	1	1	0.00023	0.00023	0.00023

Monitoring Point 12

Groundwater monitoring, LFGMB1 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

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	10	69.75	212
Aluminium	milligrams per litre	1	1	13.2	13.2	13.2
Arsenic	milligrams per litre	1	1	0.005	0.005	0.005
Barium	milligrams per litre	1	1	0.006	0.006	0.006
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	8	28.25	74
Chloride	milligrams per litre	4	4	12	15.25	18
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
Copper	milligrams per litre	1	1	0.008	0.008	0.008
Ethyl benzene	milligrams 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	0.004	0.004	0.004
Magnesium	milligrams per litre	4	4	6	12.5	23

Manganese	milligrams per litre	1	1	0.005	0.005	0.005
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.1	0.1	0.1
Nitrite	milligrams per litre	1	1	0.1	0.1	0.1
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.04	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
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	1	2	3
Sodium	milligrams per litre	4	4	23	25	28
Standing Water Level	metres	4	4	2.05	2.59	2.9
Sulfate	milligrams per litre	4	4	40	64.5	80
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	147	220	358
Total organic carbon	milligrams per litre	4	4	1	4.25	7
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50

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 litre	1	1	0.0009	0.0009	0.0009

Monitoring Point 13

Groundwater monitoring, LFGMB2 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	4	24	44
Aluminium	milligrams per litre	1	1	1.6	1.6	1.6
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.008	0.008	0.008
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	10	13.75	21
Chloride	milligrams per litre	4	4	12	19.25	27
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

Copper	milligrams per litre	1	1	0.005	0.005	0.005
Ethyl benzene	milligrams 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	0.008	0.008	0.008
Magnesium	milligrams per litre	4	4	3	5.25	8
Manganese	milligrams per litre	1	1	0.013	0.013	0.013
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	0.01	0.01	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
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	2	3.25	4
Sodium	milligrams per litre	4	4	11	16.75	29
Standing Water Level	metres	4	4	2.59	2.89	3.32

Sulfate	milligrams per litre	4	4	16	23.75	34
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	125	139.75	157
Total organic carbon	milligrams per litre	4	4	2	3	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 litre	1	1	0.029	0.029	0.029

Monitoring Point 14

Groundwater monitoring, LFGMB3 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	10	14	20
Aluminium	milligrams per litre	1	1	0.09	0.09	0.09
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.002	0.002	0.002
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	6	6.75	8
Chloride	milligrams per litre	4	4	12	15.25	19
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
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams 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	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	3	3.75	5
Manganese	milligrams per litre	1	1	0.016	0.016	0.016
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	0.13	0.13	0.13
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.08	0.22
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
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	2	2.75	4
Sodium	milligrams per litre	4	4	9	9.5	10
Standing Water Level	metres	4	4	2.24	2.68	3.3
Sulfate	milligrams per litre	4	4	14	15.25	19
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	73	80.5	88
Total organic carbon	milligrams per litre	4	4	1	2.25	4
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
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 litre	1	1	0.018	0.018	0.018

Monitoring Point 15

Groundwater monitoring, LFGMB4 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	3	5.5	10
Aluminium	milligrams per litre	1	1	0.04	0.04	0.04
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.004	0.004	0.004
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	6	7.5	10
Chloride	milligrams per litre	4	4	12	14	15
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
Copper	milligrams per litre	1	1	0.002	0.002	0.002
Ethyl benzene	milligrams 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	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	3	3.5	5
Manganese	milligrams per litre	1	1	0.046	0.046	0.046

Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	2.15	2.15	2.15
Nitrite	milligrams per litre	1	1	2.15	2.15	2.15
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.02	0.04
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
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<0.001	<0.001	<0.001
Potassium	milligrams per litre	4	4	19	22.25	28
Sodium	milligrams per litre	4	4	8	9.75	12
Standing Water Level	metres	4	4	2.5	2.85	3.4
Sulfate	milligrams per litre	4	4	34	39.75	50
Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	113	134.25	156
Total organic carbon	milligrams per litre	4	4	1	3.75	6
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
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 litre	1	1	0.017	0.017	0.017

Monitoring Point 16

Groundwater monitoring, GWMB5 - "Well Locations - Installation of Groundwater and Gas Monitoring Wells - Helensburgh Waste Facility, Nixon Place, Helensburgh", Douglas Partners, December 2011

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	1	1	1
Aluminium	milligrams per litre	1	1	0.59	0.59	0.59
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	0.0001	0.0001	0.0001
Calcium	milligrams per litre	4	4	3	3.75	4
Chloride	milligrams per litre	4	4	33	36	38
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
Copper	milligrams per litre	1	1	0.006	0.006	0.006

Ethyl benzene	milligrams 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	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	4	4.75	5
Manganese	milligrams per litre	1	1	0.037	0.037	0.037
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.5	0.5	0.5
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.02	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
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	22	25.5	31
Standing Water Level	metres	4	4	3.87	4.71	5.48
Sulfate	milligrams per litre	4	4	23	23.5	24

Toluene	milligrams per litre	1	1	<0.002	<0.002	<0.002
Total dissolved solids	milligrams per litre	4	4	107	121-25	128
Total organic carbon	milligrams per litre	4	4	1	1	1
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
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 litre	1	1	0.021	0.021	0.021

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).

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 Retum

NIL

C2 Details of Non-Compliance with Licence

Licence condition number not complied with
Summary of particulars of the non-compliance **(NO MORE THAN 50 WORDS)**
If required, further details on particulars of non-compliance
Date(s) when the non-compliance occurred, if applicable
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
Cause of non-compliance
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Action taken or that will be taken to prevent a recurrence of the non-compliance

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

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/wastestereadyforcollectiondate.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 __/__/____

Site has not been operating as a waste disposal depot since 30 June 2012.

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 29/06/2015

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/wastesitesanalyticalmonitoringdata.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? in accordance with our Inspection and Testing Matrix - intervals vary.

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

stopping to commence - total site rehabilitation

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: _____

NAME: (printed) DAVID FARMER

POSITION: GENERAL MANAGER

DATE: 21 / 7 / 2016

SIGNATURE: _____

NAME: (printed) _____

POSITION: _____

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