EPA SUBMISSION

Wollongong City Council

Whytes Gully Waste Disposal Facility
Annual Report

Period 01 June 2013 – 31 May 2014

Reference Z14/248285

wollongong
city of innovation

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ANNEXURES

ABBREVIATIONS

Al	Aluminium
ANZECC	Australian and New Zealand Environment Conservation Council
Ar	Arsenic
Ba	Barium
Ca	Calcium
$CaCO_3$	Calcium Carbonate
Cd	Cadmium
CH_4	Methane
Cl	Chloride
Co	Cobalt
Cr	Chromium
Cu	Copper
DC	Development Consent
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
F	Fluoride
K	Potassium
LEMP	Landfill Environmental Management Plan
Mg	Magnesium
Mn	Manganese
Na	Sodium
NH_3	Ammonia
NO_3	Nitrate
NO_2	Nitrite

ppm	Parts per Million
SO_4	Sulfate
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WWARRP	Wollongong Waste and Resource Recovery Park
Zn	Zinc

1 INTRODUCTION

1.1 BACKGROUND

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

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

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

1.2 OBJECTIVES OF THE ANNUAL REPORT

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

1.3 SITE HISTORY

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

The 'eastern gully' section development received consent in 1992/93, following extensive public consultation. The eastern gully section is lined with a single layer of HDPE smooth liner, over a subsoil drainage layer of 5mm

gravel and a corrugated groundwater drainage system. The eastern gully was excavated to rock and was developed in two stages, beginning with the first stage 80 to 100m above the slope from the current toe of the landfill embankment. The leachate is drained from the first stage of the eastern gully via a 300mm corrugated drainage pipe at the base and a 300mm thick sand layer above the liner.

The second stage of the eastern gully operates in front and above the first stage, with extended leachate drains and HDPE liner. The eastern gully has intermediate cover of varying quality on the embankments.

The new third stage of the eastern gully commenced construction in August 2013 and is set to be completed in mid to late 2014. No waste was placed into the third stage of the landfill during the review period, or to date.

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

1.4 *RELEVANT DOCUMENTS*

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

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

2 KEY LICENCE ISSUES

2.1 ENVIRONMENTAL PROTECTION LICENCE ANNUAL RETURNS

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

a) Statement of compliance; and

b) Monitoring and complaints summary.

c) Tabulated results of all monitoring data required by the licence from at least the last three years (if available).

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

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

f) An analysis and interpretation of all monitoring data.

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

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

i) Recommendations on improving the sites environmental performance.

The EPL Annual Returns for 2008 to 2013 reporting periods were reviewed to provide a background to this report. These Annual Returns can be summarised as follows:

01 June 2008 to 31 May 2009
B1. Pollution complaints - Nine
B2. Concentration monitoring summary – Complete
B3. Volume or mass monitoring summary - None required
C1. Compliance with licence condition – Ten non compliances.
C2. Details of non-compliance

1. *Stormwater pH measurement > 8.5*
2. *Four missed stormwater conductivity measurements*
3. *Stormwater suspended solids > 50mg/L twice*
4. *Four missed potassium groundwater measurements*
5. *One missed groundwater redox, coliforms and dissolved oxygen measurements*
6. *Three missed groundwater alkalinity measurements*

7. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium tests*
8. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*
9. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*
10. *One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*

01 June 2009 to 31 May 2010
B1. Pollution complaints - Twelve
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Five non compliances.
C2. Details of non-compliance

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

01 June 2010 to 31 May 2011
B1. Pollution complaints – Twelve
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Zero non-compliance.
C2. Details of non-compliance – N/A

01 June 2011 to 31 May 2012
B1. Pollution complaints – Forty Eight
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Zero non-compliance.
C2. Details of non-compliance – N/A

01 June 2012 to 31 May 2013
B1. Pollution complaints - Fifty nine
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Zero non-compliance.
C2. Details of non-compliance – N/A

In summary, compliance issues have generally been restricted to minor exceedances of pH and suspended solids in the sediment pond, and these issues are covered by ongoing monitoring provisions.

A potential problem existed prior to June 2010 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:

- Site boundaries updated to excise the previous Solid Waste to Energy Recovery Facility from the landfill licence to allow Visy to gain their own licence for the retrofit of the building as a Materials Recovery Facility. Also addition of a Potential Offensive Odour clause and analytical unit measures amended on 08 July 2014

- Wording amendments and consolidation of various clauses as well as monitoring point updates in 23 August 2013

- Tidy up of various incremental site changes including lot and boundary amendments, sampling point review and update including location detail, removal of redundant trial and reporting details and various other updates in line with EPA reformatting and internal software and consistency changes 16 April 2012.

- Addition of pollution studies and reduction programs added on 28 November 2008.

- Scheduled Activity and Waste Classification structure changed on 17 October 2008.

- Reformatted licence including specification for cover material, litter control and other operational processes 20 November 2007.

- Clarification of water pollution prevention requirements on 11 October 2005.

- Overhauled and reformatted licence resulting from Council's request to modernise environmental testing requirements and to formally recognise the increased environmental sampling points and standards adopted by Council for the site. The request formed Annexure B of the 2010/2011 Annual Environmental Management Report and was formally approved and adopted by the EPA on 16 April 2012.

- Inclusion of further enhanced and upgraded environment sampling points on 23 August 2013 for the Stage 3 (new landfill cell development).

3 REVIEW OF LANDFILL MONITORING DATA

3.1 GROUNDWATER MONITORING

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

3.1.1 *Tabulated Results*

Analyte		13 August 2013																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	955	673	322	408	243	382	238	51	DRY	340	459	873	554	435	223	711
Calcium	mg/l	*	302	354	113	89	50	216	45	9		25	131	309	192	91	83	122
Chloride	mg/L	*	1080	1180	659	630	29	486	54	34		200	627	163	797	494	370	992
Conductivity	µS/cm	*	5450	5530	3200	3120	621	2490	513	253		1480	3330	2310	4030	2640	1700	5170
Magnesium	mg/L	*	197	213	73	81	22	77	26	5		20	92	65	151	75	45	129
Nitrogen	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.03		<0.01	<0.01	7.76	<0.01	<0.01	<0.01	07
Potassium	mg/L	*	3	2	1	1	2	1	1	2		2	<1	16	2	2	2	<1
Sodium	mg/L	*	645	546	460	494	58	191	106	35		258	459	175	476	383	189	852
Water Level	m	*	4.72	36	1.66	2.18	9.55	7.71	6.88	10.54		2.64	2.14	3.32	4.02	6.25	2.96	1.46
Sulfate	mg/L	*	169	194	194	214	31	131	36	12		55	185	183	279	106	24	283
TDS	mg/L	*	3230	3390	1720	1800	350	1440	362	167		728	1700	1460	2390	1360	933	2920
TOC	mg/L	*	8	5	2	2	5	2	4	4		11	3	50	3	3	1	3
pH	pH	*	6.6	6.7	6.7	7.1	7.3	6.8	6.6	5.3		6.8	6.8	7.1	6.6	7	7.3	6.9

Table 3.1.1(a) Quarterly analyte testing results for August 2013, * Note Bore destroyed

Analyte		06 November 2013																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	974	658	318	399	DRY	265	404	48	DRY	319	446	822	547	437	222	719
Calcium	mg/L	*	299	342	127	97		196	49	4		16	124	189	178	73	44	122
Chloride	mg/L	*	1160	1280	700	658		524	91	41		204	653	165	848	112	382	1120
Conductivity	µS/cm	*	5330	5310	3090	3110		2460	1220	258		1620	3170	2110	3950	2510	1650	5040
Magnesium	mg/L	*	194	208	83	94		72	32	2		16	92	56	151	73	44	136
Nitrogen	mg/L	*	0.03	02	0.02	0.02		0.02	0.02	0.02		0.03	0.02	7.1	0.01	0.01	0.02	0.07
Potassium	mg/L	*	3	2	1	1		1	1	1		1	1	11	2	1	2	1
Sodium	mg/L	*	661	554	453	486		192	164	34		280	474	183	500	397	201	882
Water Level	m	*	5.02	0.72	2.02	2.5		7.57	7.34	10.83		2.84	2.23	3.62	4.23	6.43	3.23	1.64
Sulfate	mg/L	*	160	194	203	215		138	56	13		55	193	93	280	112	25	283
TDS	mg/L	*	3550	3890	1900	1800		1710	674	197		753	1830	1330	2590	1380	1060	2930
TOC	mg/L	*	44	35	18	17		21	20	11		15	23	80	28	19	9	17
pH	pH	*	66	6.6	6.7	7		6.9	7.3	5.7		6.9	6.8	7	6.7	6.9	75	6.8

Table 3.1.1(b) Quarterly analyte testing results for November 2013

Analyte		27 February 2014																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	984	673	324	404	DRY	347	410	46	DRY	345	455	412	564	441	224	718
Calcium	mg/L	*	346	380	125	97		203	60	6		19	141	133	214	104	90	134
Chloride	mg/L	*	1060	1160	631	611		491	90	32		123	613	225	787	473	363	718
Conductivity	µS/cm	*	5060	4920	3050	3080		2390	1240	258		1030	3140	1590	38.7	2410	1600	4720
Magnesium	mg/L	*	209	219	76	87		70	34	3		13	98	42	160	79	47	137
Nitrogen	mg/L	*	0.02	0.04	0.01	0.02		0.02	0.05	0.01		0.04	0.01	3.27	0.03	0.04	0.02	0.08
Potassium	mg/L	*	3	2	1	1		1	1	1		2	1	7	2	1	2	1
Sodium	mg/L	*	601	483	440	480		159	1370	41		198	433	165	442	340	185	783
Water Level	m	*	6	0.6	1.92	2.4		7.78	7.54	1		9	2.21	3.47	4.16	6.37	3.1	1.47
Sulfate	mg/L	*	166	198	201	217		138	56	13		40	196	82	288	113	25	288
TDS	mg/L	*	3100	3430	1600	1750		1580	659	186		650	1730	880	2390	1320	959	2650
TOC	mg/L	*	6	4	1	1		1	2	1		9	2	14	2	1	1	2
pH	pH	*	6.6	6.5	6.8	7		6.8	7.2	6		6.9	6.8	6.4	6.7	7	7.2	6.7

Table 3.1.1(c) Quarterly analyte testing results for February 2014

Analyte		12 May 2014																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	1090	738	364	396	271	436	320	44	DRY	494	509	980	623	483	249	816
Calcium	mg/L	*	310	347	111	78	56	204	44	4		84	128	274	191	90	85	120
Chloride	mg/L	*	1150	1240	660	579	24	486	58	38		424	659	180	841	504	368	816
Conductivity	µS/cm	*	5350	5470	2690	2810	594	2380	915	250		3460	3300	2400	4060	2570	1680	4960
Magnesium	mg/L	*	199	210	70	72	17	73	24	2		64	91	60	155	73	45	130
Nitrogen	mg/L	*	0.02	0.07	0.01	0.06	0.02	0.27	0.17	0.01		0.06	0.15	5.98	0.05	0.03	0.14	0.12
Potassium	mg/L	*	3	2	1	1	1	1	1	1		1	1	13	2	1	2	1
Sodium	mg/L	*	566	464	402	392	47	168	99	42		295	392	161	435	326	174	760
Water Level	m	*	4.79	0.38	1.64	2.24	10.57	7.65	7.14	4		7	2.15	3.32	4.06	6.1	2.86	1.47
Sulfate	mg/L	*	187	224	209	204	22	149	41	14		127	215	190	319	123	28	302
TDS	mg/L	*	2800	2910	1660	1420	411	1320	357	125		1150	1560	1290	2130	1270	769	1500
TOC	mg/L	*	5	4	1	2	4	2	4	4		7	1	38	2	1	1	2
pH	pH	*	66	6.6	7.2	7.2	7.3	6.9	7.2	5.7		6.8	6.9	7	6.9	7.2	7.4	6.8

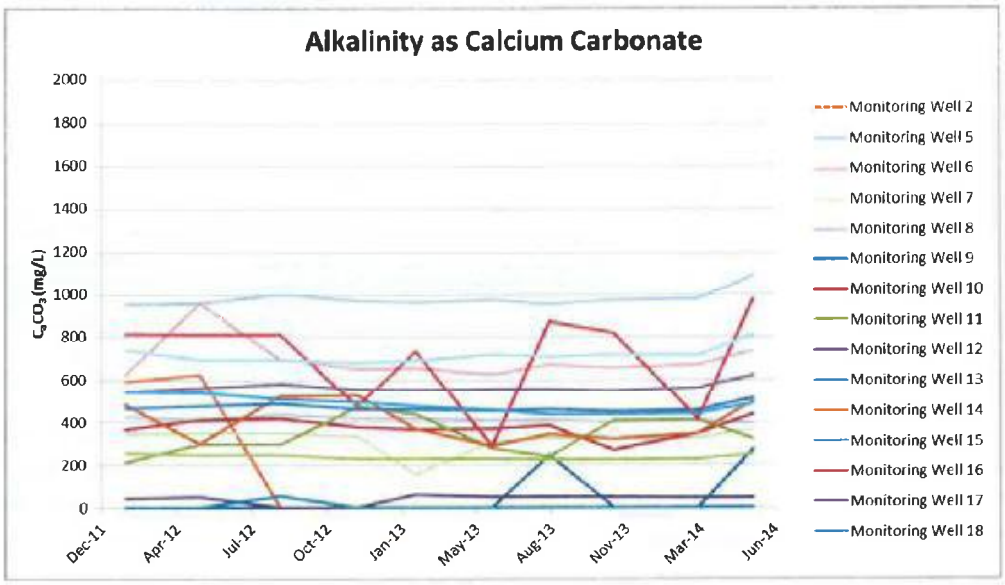
Table 3.1.1(d) Quarterly analyte testing results for May 2014

		13 August 2013																
Analyte	**Units**	**2**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Aluminium	mg/L	*	02	<0.01	0.04	0.08	7.77	0.1	0.1	10.3	DRY	4.63	0.08	0.67	0.55	0.69	0.08	0.05
Arsenic	mg/L	*	<0.001	<0.001	<0.001	<.001	<0.001	<0.001	<0.001	<0.001		0.002	<0.001	0.005	<0.001	0.69	<0.001	0.003
Barium	mg/L	*	.002	0.016	0.008	0.117	055	0.023	0.014	0.056		0.117	0.016	0.46	<.006	<0.001	0.126	0.055
Benzene	µg/	*	<1	<1	<1	<1	<1	<1	<1	<1		1	1	1	<1	0.033	<1	<1
Cadmium	mg/L	*	<0.001	<.0001	<0.000 1	<0.000 1	.0004	<0.000 1	<0.000 1	<0.000 1		<0.000 1	<0.000 1	0.0002	<0.000 1	<1	0.0001	<0.000 1
Chromium (hex.)	mg/L	*	<0.01	<0.01	<0.01	<0.01	<.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	0.0002	<0.01	<0.01
Chromium (total)	mg/L	*	<0.001	<0.001	<0.001	<0.001	003	0.012	0.001	0.008		0.004	<0.001	0.002	<0.001	<0.01	<0.001	<0.001
Cobalt	mg/L	*	<0.001	0.002	0.001	0.001	004	<0.004	<0.002	0.004		0.009	<0.001	0.004	<0.001	<0.001	<0.001	<0.01
Copper	mg/L	*	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
Ethyl Benzene	µg/L	*	<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Fluoride	mg/L	*	0.6	0.6	0.6	1.2	0.7	0.6	0.8	0.2		0.6	0.8	0.4	0.5	<2	0.4	1.1
Lead	mg/L	*	<0.001	<0.001	<0.001	<0.001	005	<0.001	<0.002	0.007		0.004	0.001	0.002	<0.001	0.6	<0.001	<0.005
Manganese	mg/L	*	0.046	0.308	0.004	0.059	0.227	0.107	0.189	0.206		0.354	0.008	3.46	0.044	0.003	0.035	1.77
Mercury	mg/L	*	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1		<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1	<0.000 1
Nitrate	mg/L	*	0.01	0.01	<.01	<0.01	0.26	0.01	0.01	0.01		0.04	<0.01	0.01	<0.05	<0.000 1	0.16	<0.01
Nitrite	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01
OCP	µg/	*	<.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.05	<0.5	<0.01	<0.5	<0.5
OPP	µg/	*	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5
PAH	µg/	*	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<0.5	<1	<1
Toluene	µg/	*	<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	<1	<2	<2
TPH	µg/	*	<50	<50	<50	<12	50	<50	<50	<50		<50	<50	350	50	<2	<50	<50
Total Phenolics	mg/L	*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<50	<0.05	<0.05
Xylene	µg/	*	<2	<2	<2	<2	<2	<2	<2	<2		<1	<2	<2	<2	<0.05	<1	<2
Zinc	mg/L	*	0	0	0	0	0	0	0	0	0	0	0	0	0	<2	0	0

Table 3.1.1(e) Annual analyte testing August 2013 results

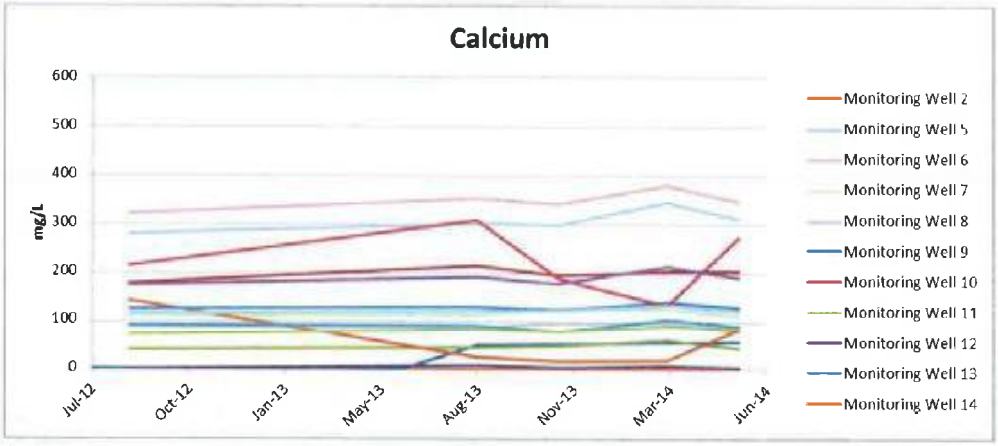
3.1.2 *Data Presentation – Quarterly Monitoring*

Alkalinity results presentation.



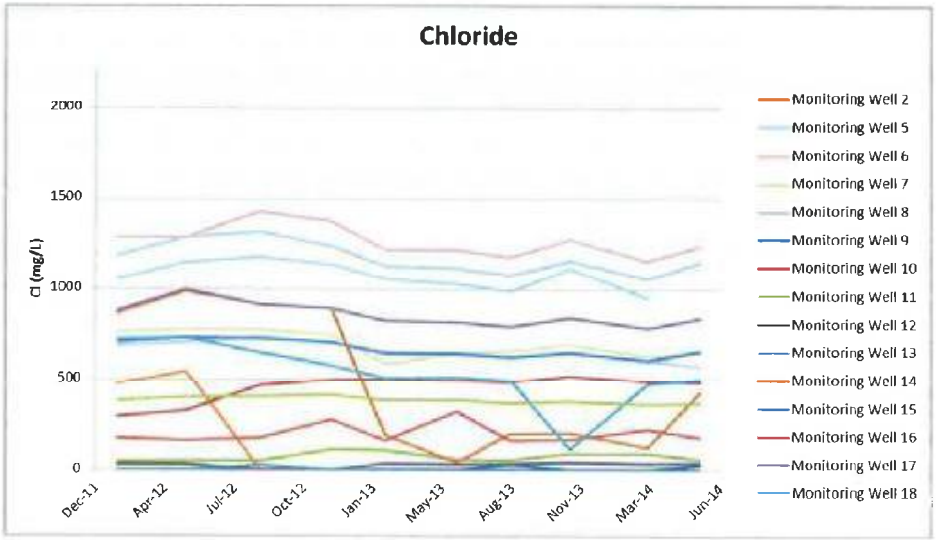
Increased alkalinity levels can be caused by many chemical processes including the denitrification process common in landfill leachate. Denitrification is the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form. Under anoxic conditions microorganisms consume the oxygen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

Calcium results presentation.



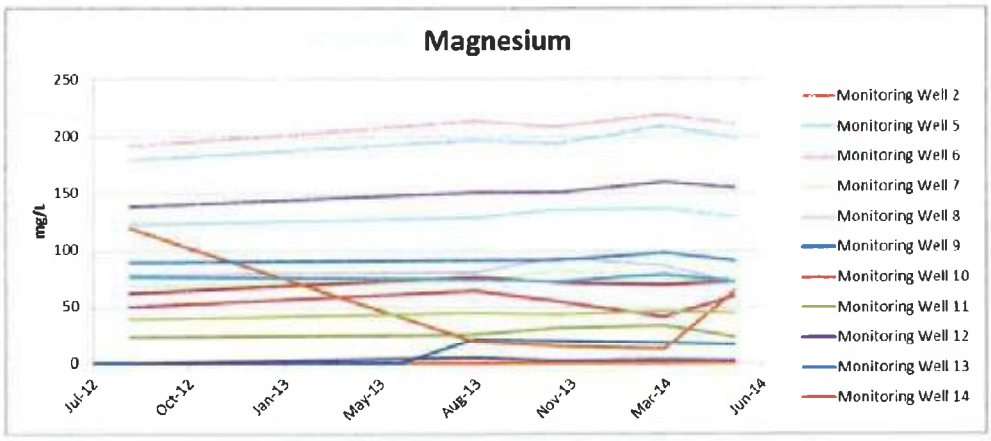
The groundwater monitoring wells show a consistent stable trend for calcium levels. The calcium levels sampled would be considered "hard" water in the region of 120-180mg/L. This is consistent with the presented results for alkalinity.

Chloride results presentation.



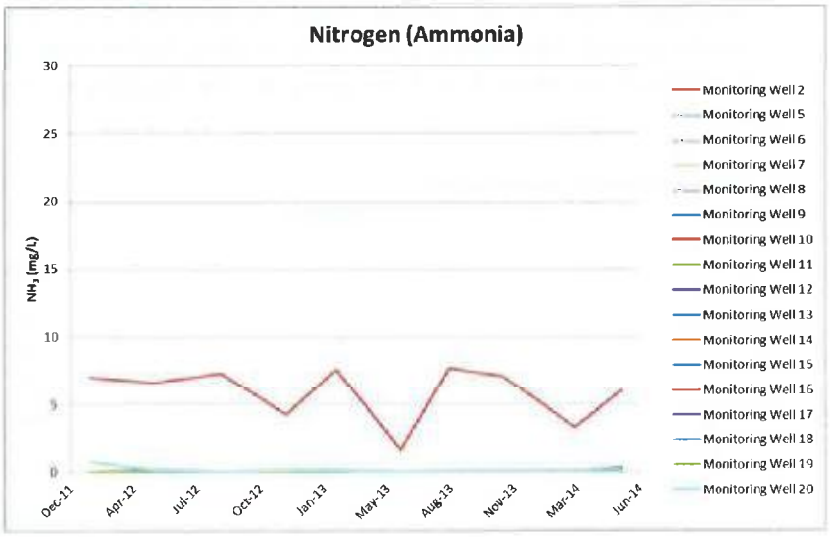
The trends realised through chloride monitoring have been in line with the historical levels over the data range available. Large quantities of inorganic ions such as chloride can be an indicator of leachate contamination of groundwater. A sudden increase in these ions can act as early warning system.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

Magnesium results presentation.



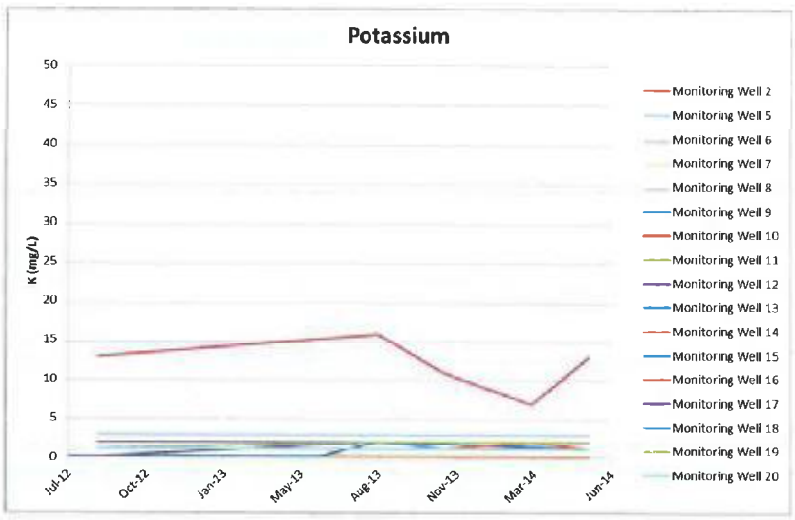
Groundwater monitoring well results are in line with historical levels and have maintained consistent levels. The magnesium levels sampled would be considered quite "hard" and consistent with other typical water hardness measures such as alkalinity and calcium.

Nitrogen as ammonia results presentation.



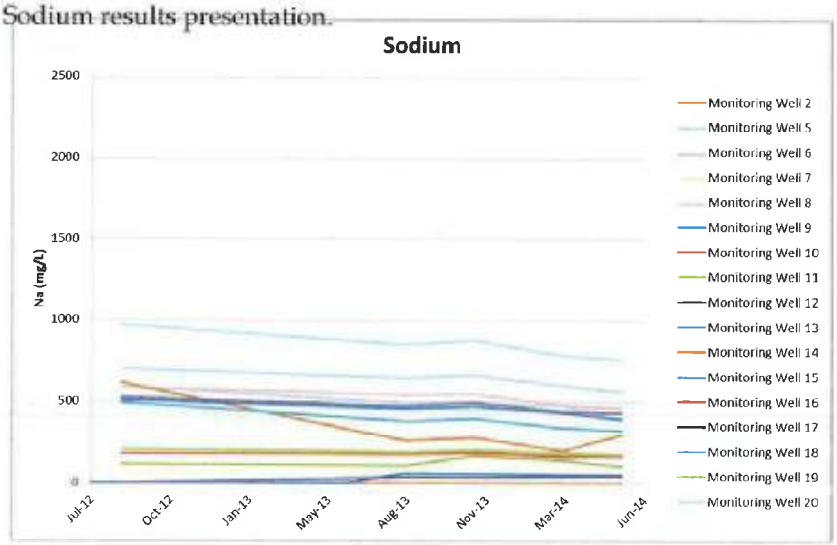
The groundwater monitoring wells indicate that ammonia levels in the groundwater are extremely low and often beneath the testing limits. However, monitoring point 16 has indicated a relatively higher result level. Considering that monitoring points 16 and 19 are arguably the most relevant with regard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

Potassium results presentation.



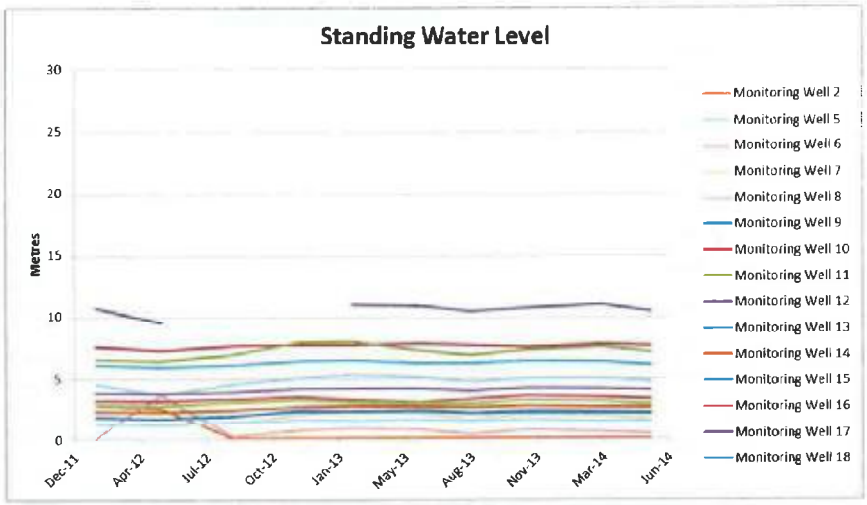
Potassium is present in groundwater systems outside coastal areas generally through weathering of clays and as a result of agriculture (leaching of fertiliser). Potassium may also be present in the breakdown of glass and especially cathode ray tubes. Groundwater monitoring wells indicate that potassium levels in the ground water are generally low over the available results period. Monitoring point 16 is reading higher than all other bores. Additional attention should be given to this location in future sampling events.

Sodium results presentation.



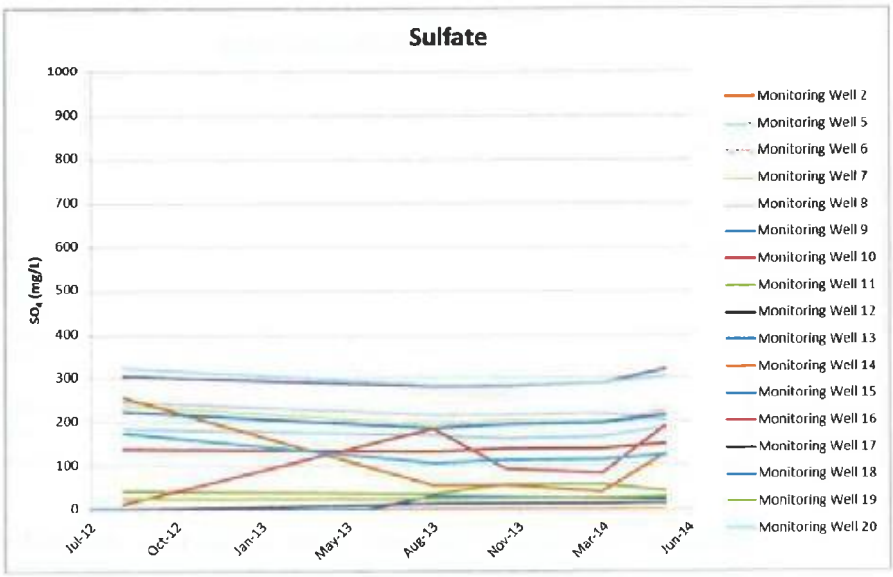
High sodium levels are indicative of leachate contamination infiltrating the groundwater. As presented, results for sodium have been stable over the history of data available. Notable monitoring well 16 is displaying low levels.

Standing water level presentation.



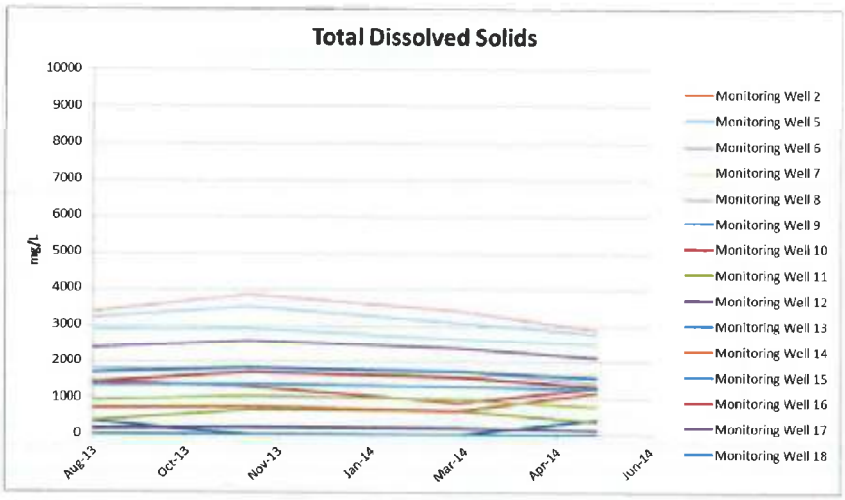
Groundwater level trends have been fairly stable, with the fluctuation over the 4 year testing period. It should be noted that some bores have run dry at periods.

Sulfate results presentation.



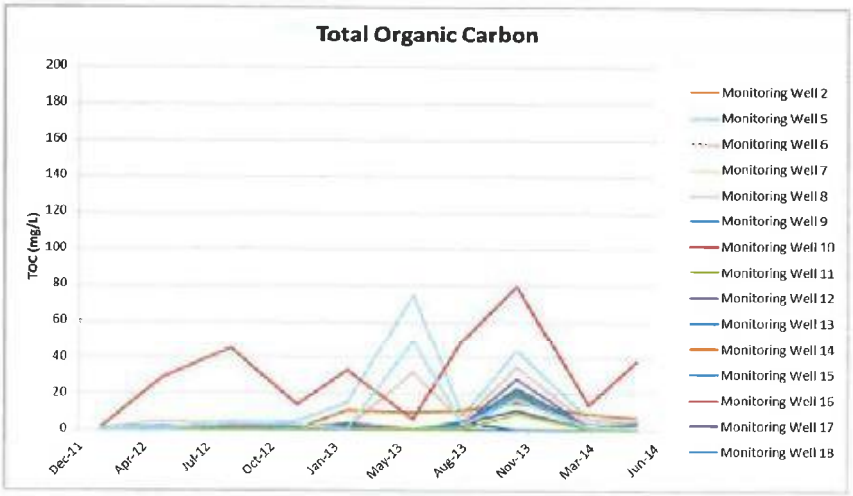
The *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500mg/L. The sulfate levels in the groundwater monitoring wells are in line with the historical levels and are generally below the drinkable water standard. Inorganic ions such as sulfate provide a good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

Total dissolved solids results presentation.



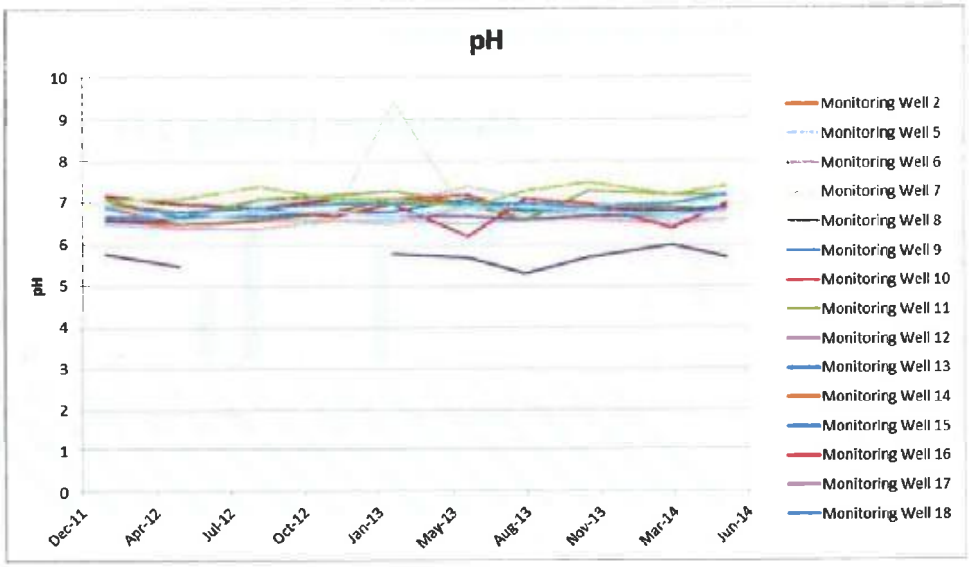
The trend for the quantity of dissolved solids has been fairly stable for the ground water monitoring wells over the reporting period, in line with historical trends. High levels of dissolved solids can be sourced from salts derived from leachate infiltration

Total organic carbon results presentation.



Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of groundwater contamination by organic compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained relatively stable over the three year results period. However, monitoring point 16 requires closer attention for the next sampling periods.

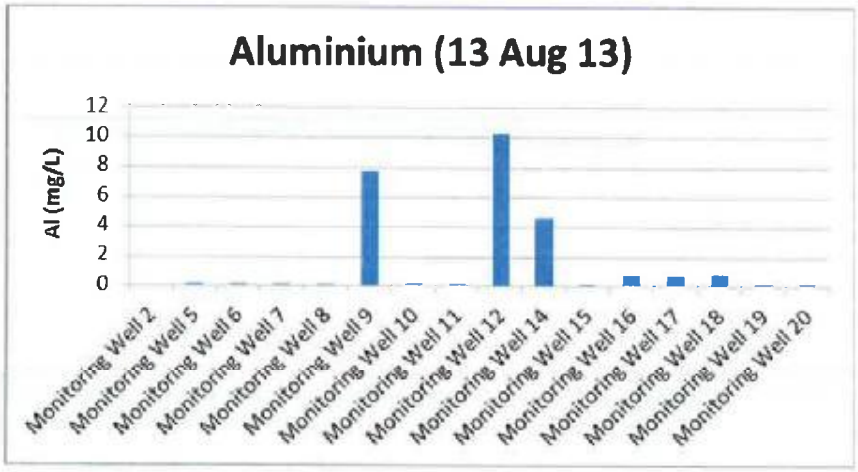
pH results presentation.



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

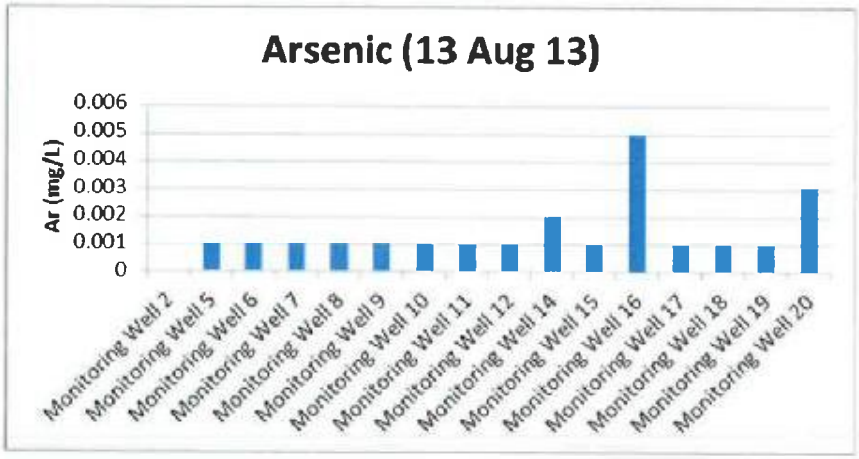
3.1.3 *Data Presentation - Annual Monitoring*

Aluminium results presentation



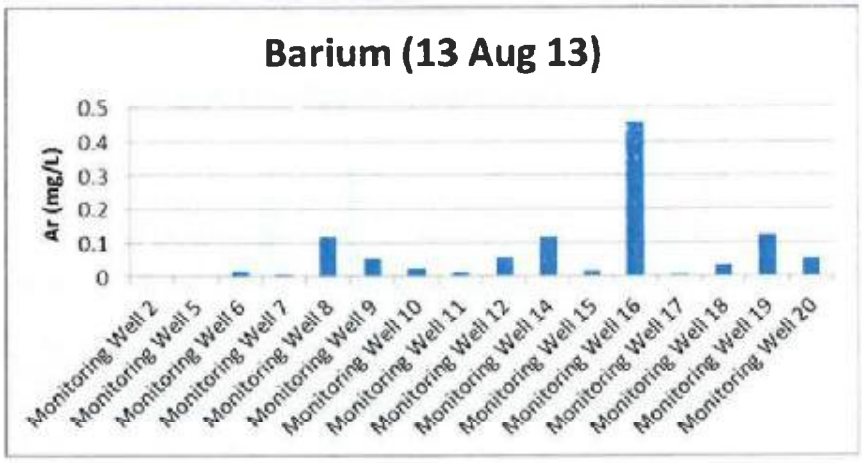
Aluminium levels in the sampled groundwater monitoring points 9, 12 and 14 are relatively higher than the other point's onsite. Anthropogenic sources of aluminium in groundwater are generally related to low pH runoff and colliery based leachate. No trends have developed in the one round of sampling conducted to date.

Arsenic results presentation



The US EPA sets the maximum contaminant level of arsenic in groundwater at 0.05mg/L. Therefore amount of arsenic found in the groundwater monitoring bores over the reporting period is extremely low. In fact arsenic levels are below detectable limits in almost all of the test results.

Barium results presentation

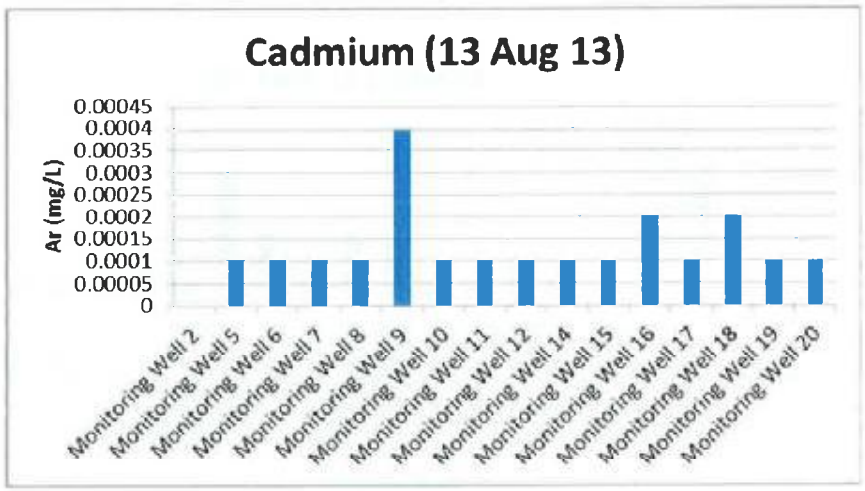


The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 2 mg/L of barium is safe for consumption. Anthropogenic sources of barium in groundwater include bleaches, dyes and drillers mud. Barium levels are therefore extremely low and stable in the sites groundwater.

Benzene results presentation

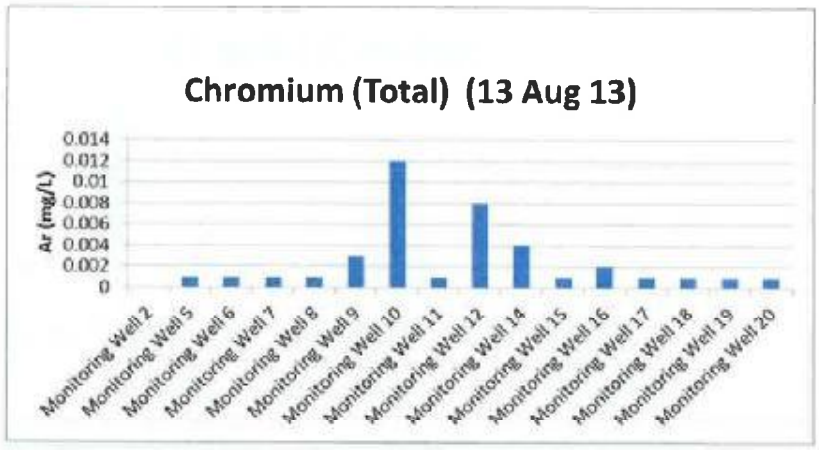
Benzene has not been modelled as every instance of sampling has not provided a result due to the concentration of benzene being below laboratory testing thresholds.

Cadmium results presentation



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

Chromium results presentation

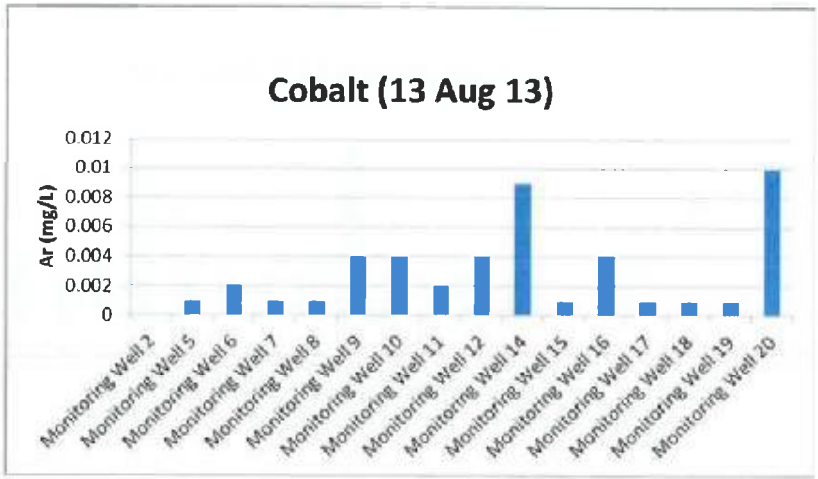


The US EPA sets the maximum contaminant level of chromium in groundwater at 0.05mg/L The levels of chromium detected in the ground water monitoring wells over the reporting period have been extremely low. Chromium levels are below detectable limits in the majority of the samples.

Chromium (hexavalent) results presentation

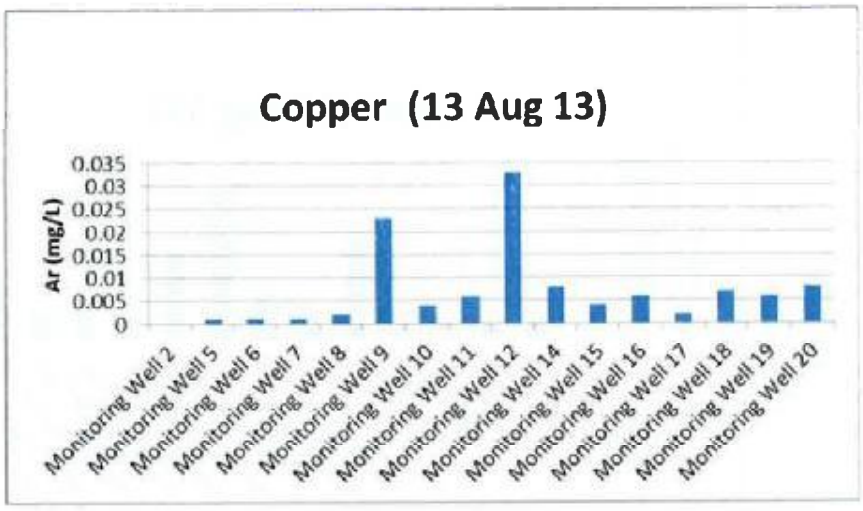
Hexavalent chromium has not been modelled as every instance of sampling has not provided a result due to the concentration of hexavalent chromium being below laboratory testing thresholds.

Cobalt results presentation



Anthropogenic sources of cobalt in the environment include agricultural runoff and sewage effluent.

Copper results presentation

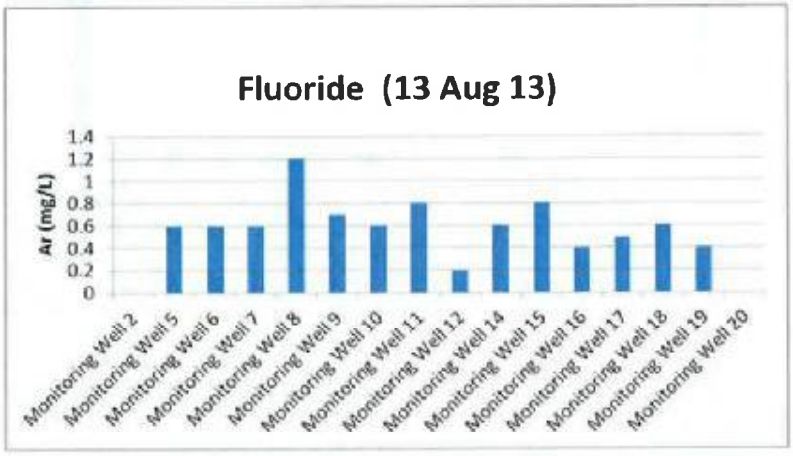


Tested results from the ground water monitoring wells show an extremely small amount of copper. The *2011 Australian Drinking Water Guidelines 6* prescribes an aesthetic limit of 1 mg/L of copper in drinking water. Clearly, the results therefore indicate that copper contamination is not evident.

Ethyl Benzene results presentation

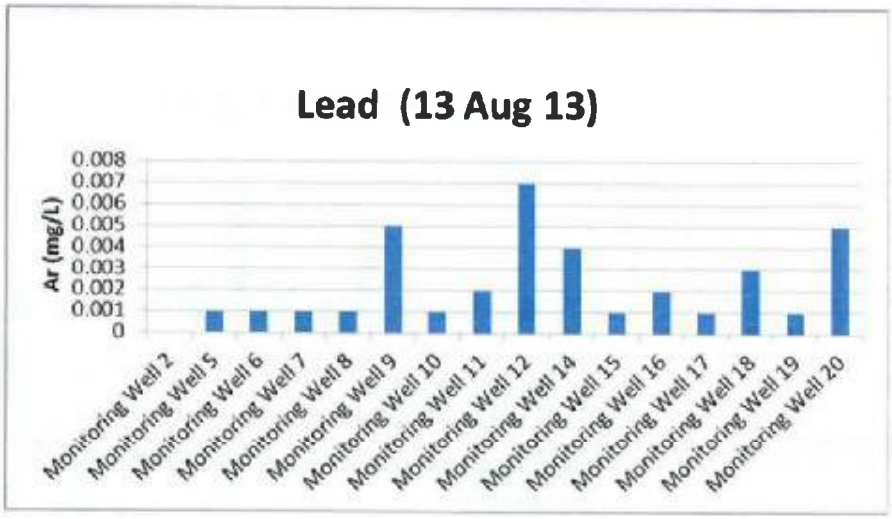
Ethyl benzene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Fluoride results presentation



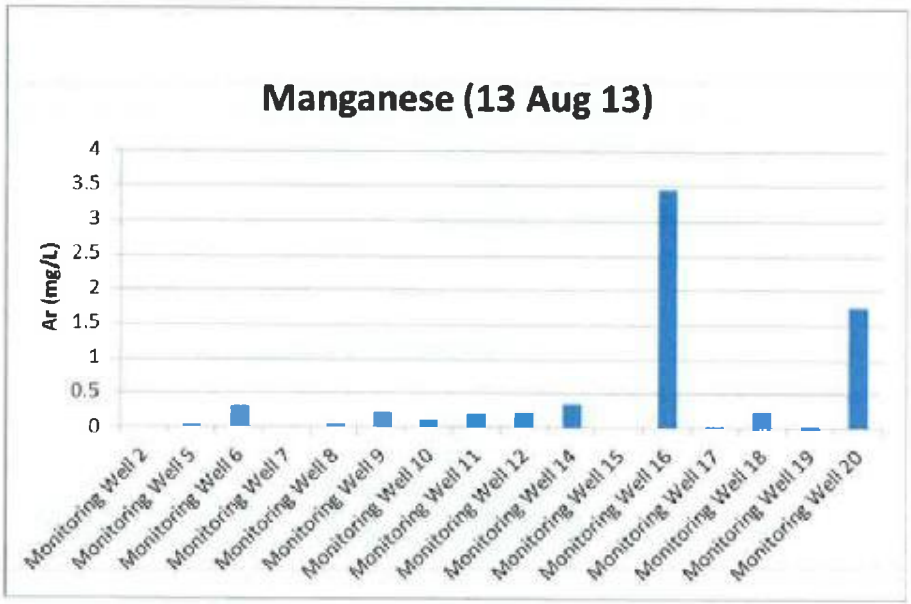
Industrial emissions are understood to be the primary anthropogenic pathway for fluoride to enter the environment. The US EPA sets the maximum contaminant level of fluoride in groundwater at 4 mg/L. Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L.

Lead results presentation



Heavy metal contamination in the groundwater in the form of lead is at very low levels.

Manganese results presentation

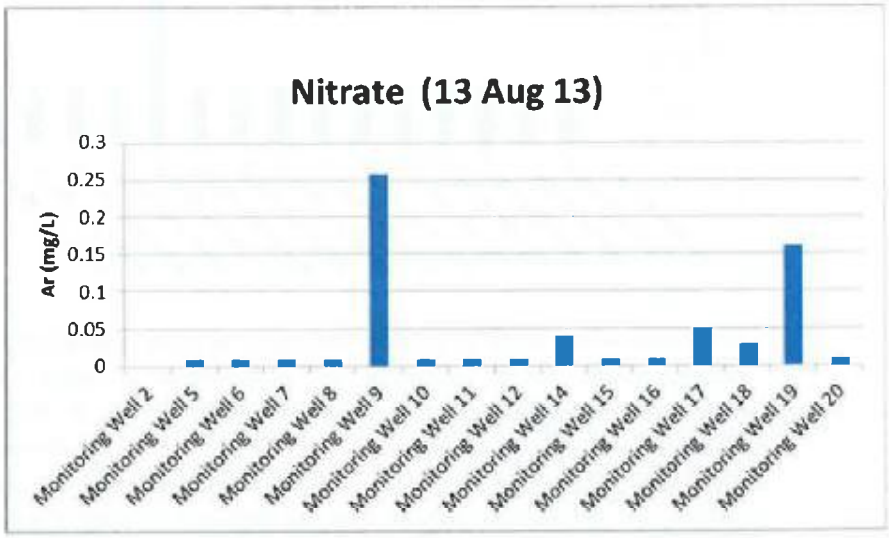


The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 0.5 mg/L of manganese is safe for consumption. Manganese can be a strong indicator of landfill leachate in groundwater leached from hazardous waste sites and often derived from battery disposal. Monitoring points 16 and 20 should be closely monitored in future sampling events.

Mercury results presentation

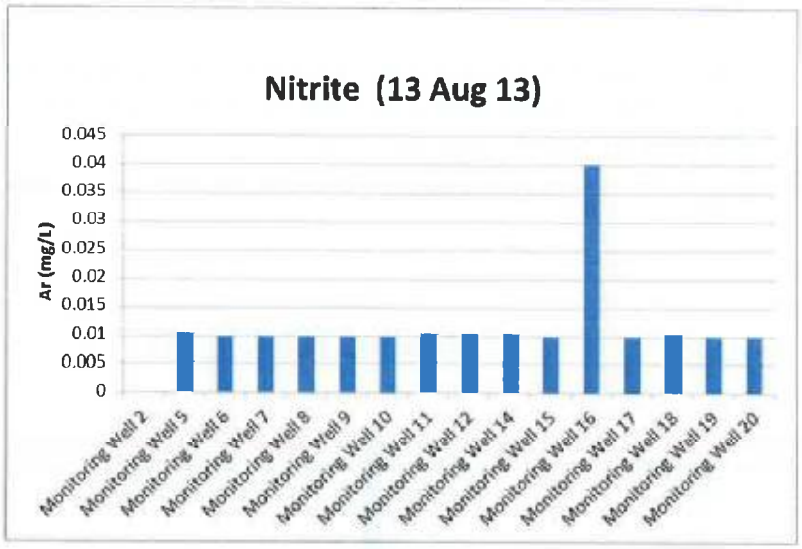
Mercury was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

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 where the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form occurs. Under anoxic conditions microorganisms consume the oxygen in the nitrate and liberate the nitrogen. The relatively low levels of nitrate sampled, indicate that the denitrification process is not evident and landfill leachate is not present in the groundwater.

Nitrite results presentation



Nitrification is a twostep aerobic biological process where bacteria known as nitrosomonas convert ammonia and ammonium to nitrite. Next, bacteria called nitrobacter finish the conversion of nitrite to nitrate. The conversion of nitrite to nitrate is generally very fast and nitrite levels are therefore invariably quite low. More toxic than nitrate, nitrite is an indicator of ammonia (major constituent of landfill leachate) that has not been biologically processed (into nitrate). Nitrite levels above 3 mg/L are considered potentially harmful by the *2011 Australian Drinking Water Guidelines 6*. As demonstrated by the above data presentation, nitrite levels found in the ground water monitoring wells are extremely small and below detectable limits in almost all of the samples taken. However, monitoring point 16 should be given additional attention in future sampling events.

Organochlorine Pesticides results presentation

Organochlorine pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Organophosphate Pesticides results presentation

Organophosphate pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

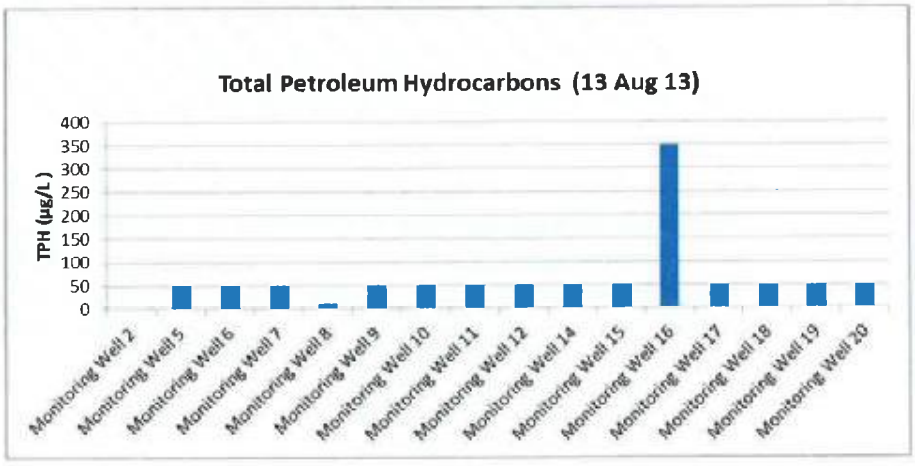
Polycyclic Aromatic Hydrocarbons results presentation

Polycyclic aromatic hydrocarbons were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Toluene results presentation

Toluene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Total Petroleum Hydrocarbons results presentation



Total petroleum hydrocarbons were not detected at any level in the ground water monitoring points during the reporting with the exception of point 16. Point 16 to be further monitored.

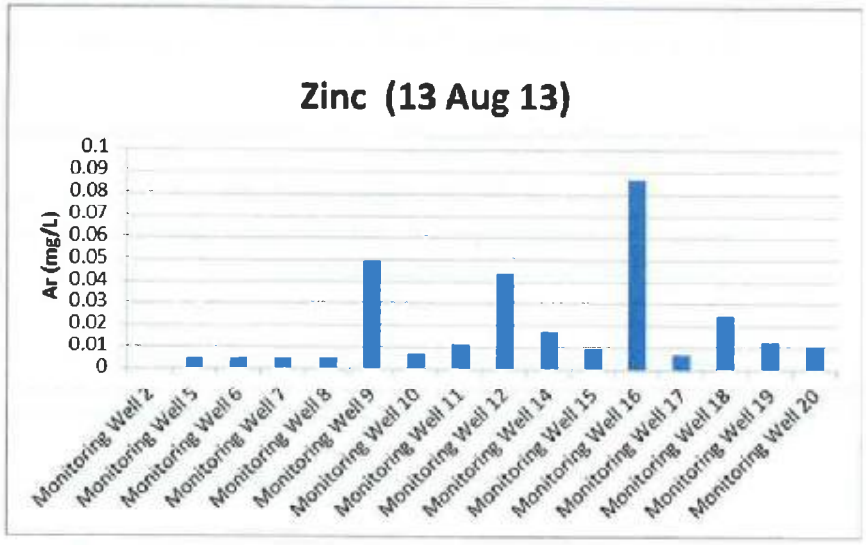
Total Phenolics results presentation

Total phenolics were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Xylene results presentation

Xylene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Zinc results presentation



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

3.1.4 *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. 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
Nitrogen (Ammonia)	16	Quarterly	August 2014
Potassium	16	Quarterly	August 2014
Total Organic Carbon	16	Quarterly	August 2014
Manganese	16, 20	Annual	August 2014
Nitrite	16	Annual	August 2014
TPH	16	Annual	August 2014
Zinc	16	Annual	August 2014

On reflection, key indicators of landfill leachate's 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. However, the potentially anomalous results presenting in monitoring point 16 warrant further scrutiny. Pending the results of August 2014 sampling events (quarterly and annual), the monitoring point 16 will be subject of a independent consultants review.

3.2 SURFACE WATER MONITORING

3.2.1 *Tabulated Results*

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

Analyte	Aug 2013	EPA Monitoring Location		
	Units	1	33	34
Alkalinity	mg/L	501	142	163
Ammonia	mg/L	30.8	0.15	0.01
Calcium	mg/L	54	34	46
Chloride	mg/L	210	66	61
Conductivity	µS/cm	1640	535	594
Dissolved O_2	mg/L	4.66	5.87	8.7
Iron	mg/L	0.67		
Fluoride	mg/L	0.6	0.2	0.3
Magnesium	mg/L	37	17	21
Nitrate	mg/L	0.26	0.6	0.01
Potassium	mg/L	39	<5	3
Sodium	mg/L	177	44	37
Sulfate	mg/L	24	19	34
Temperature	°C	12.4	13.2	12.1
TOC	mg/L	45	5	3
TP	mg/L	<0.05	<0.05	<0.05
TSS	mg/L	154	<5	<5
pH	pH	7.8	7.1	7.6

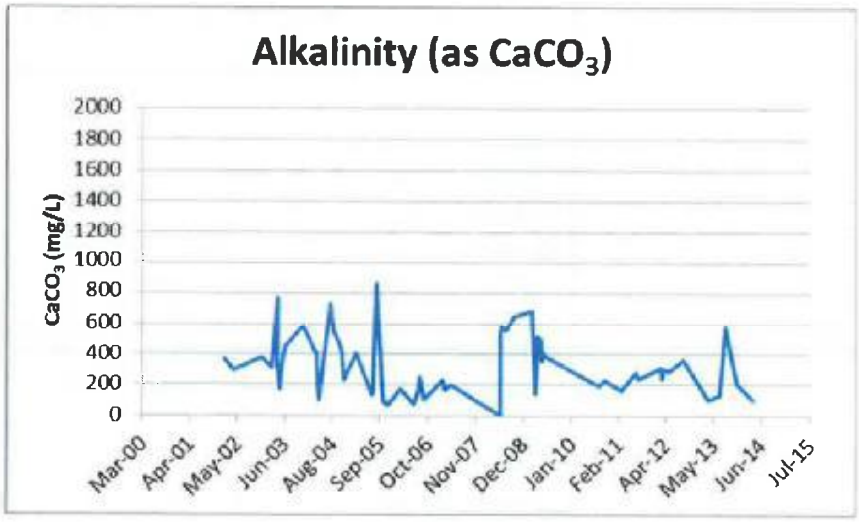
Table 3.2.1 Stormwater overflow monitoring results for the reporting period

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

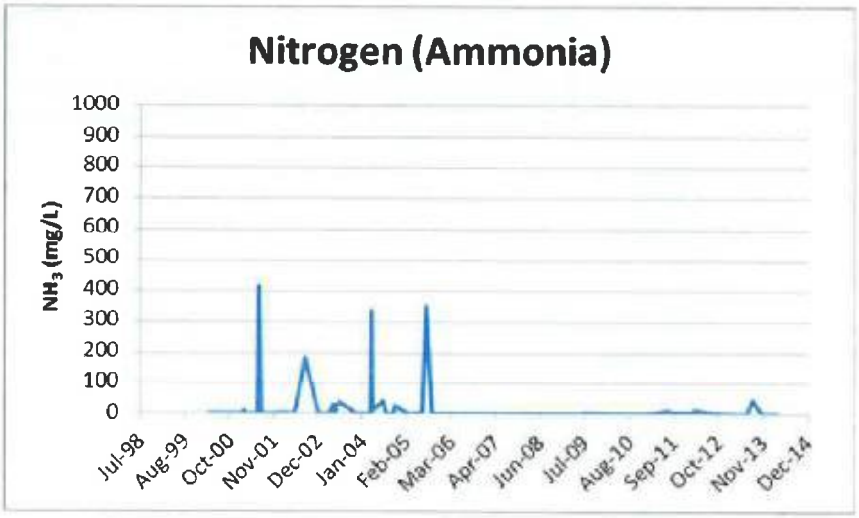
Analyte	Units	EPA Monitoring Point 1		
		28 June 13	18 Nov 13	25 Mar 14
Alkalinity	mg/L	129	207	106
Ammonia	mg/L	1.08	1.23	1.1
Calcium	mg/L	31	29	26
Chloride	mg/L	33	133	47
Conductivity	µS/cm	417	934	391
Dissolved O_2	mg/L	9.08	8.28	686
Iron	mg/L		0.45	0.37
Fluoride	mg/L	0.3	0.4	0.3
Magnesium	mg/L	10	21	18
Nitrate	mg/L	0.08	3.16	1.63
Potassium	mg/L	6	34	13
Sodium	mg/L	34	119	47
Sulfate	mg/L	30	25	31
Temperature	°C	15.4	18.6	22.4
TOC	mg/L	12	28	12
TP	mg/L	0.05	0.05	0.05
TSS	mg/L	26	98	526
pH	pH	7.6	8.2	6.8

3.2.2 *Data Presentation*

Alkalinity results presentation.

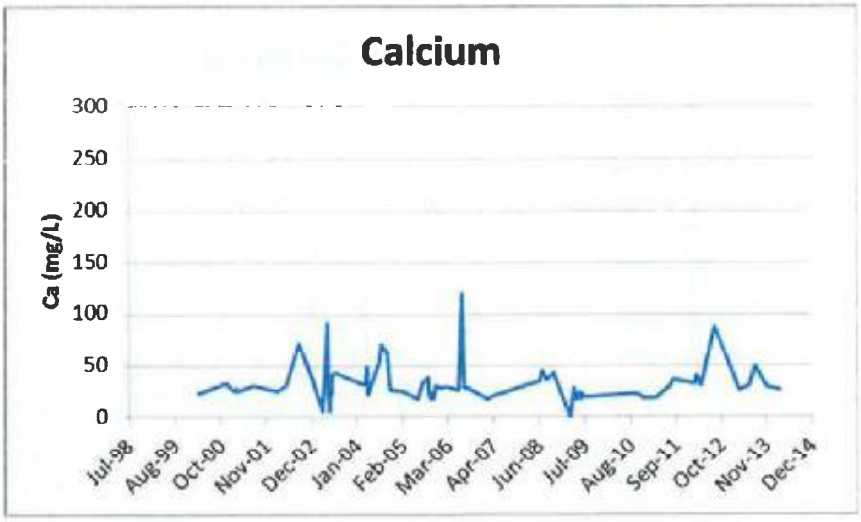


Ammonia results presentation

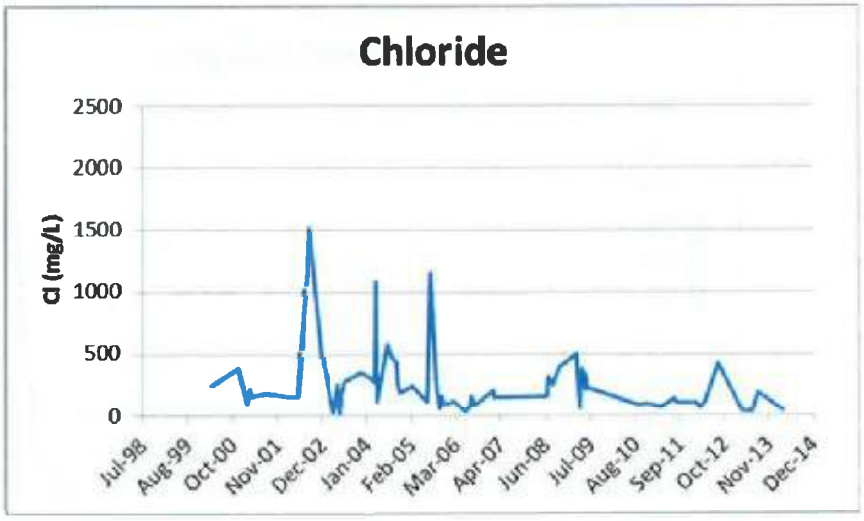


Increased alkalinity and ammonia levels can be caused by biological reactions in landfill leachate. The stability of results, particularly in regard to the reporting period indicates that leachate does not appear to be affecting the stormwater pond. The relatively high alkalinity levels coincide with natural groundwater levels in the area.

Calcium results presentation

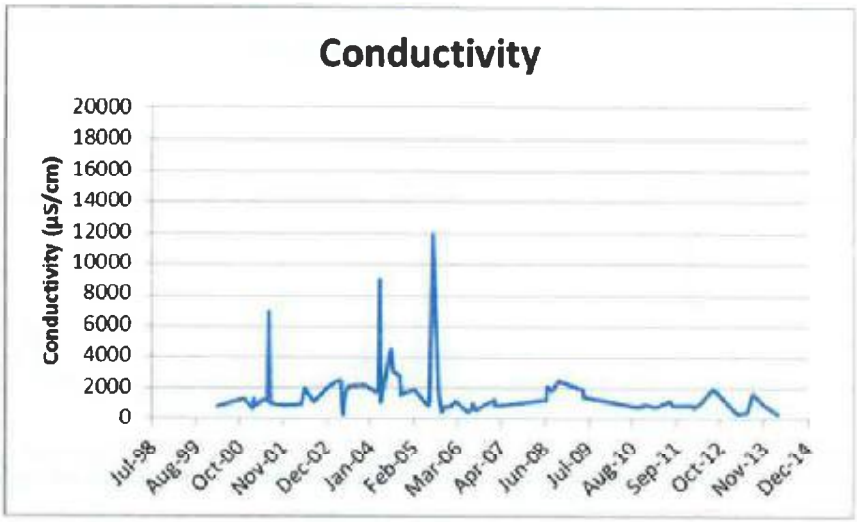


Chloride results presentation

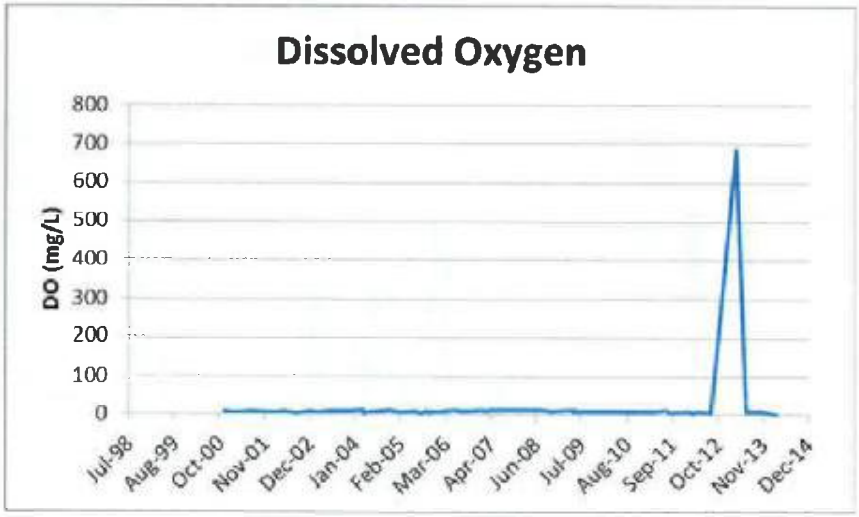


The calcium and chloride levels in the stormwater pond are invariably better than historical results. The levels sampled are also in line with the results sampled throughout the surrounding groundwater system.

Conductivity results presentation

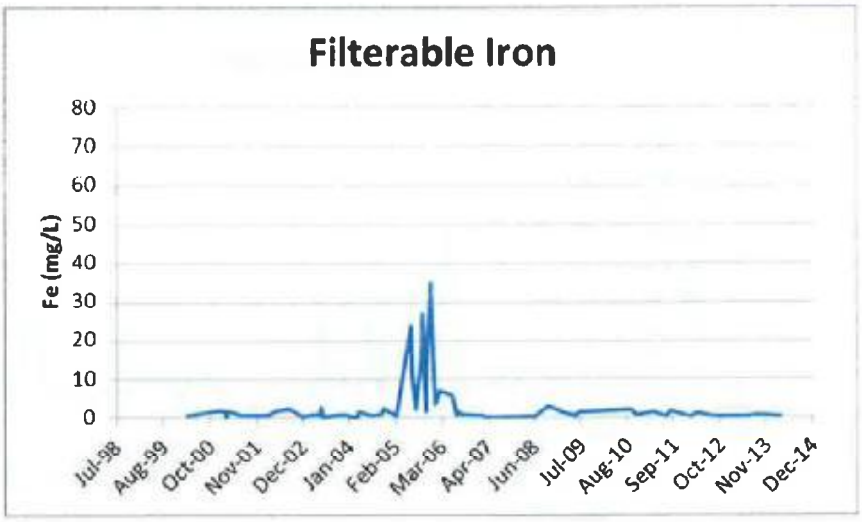


Dissolved oxygen results presentation

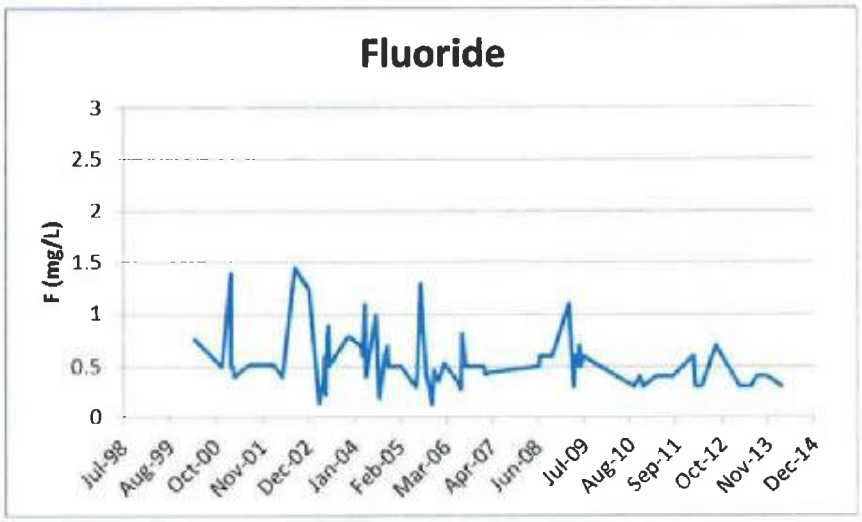


Conductivity is a measure of the waters ability to pass electrical current, usually though positively or negatively charged inorganic dissolved solids (e.g. sodium, magnesium, calcium, iron). The conductivity results for the stormwater detention pond have been stable and trending downwards. Dissolved oxygen levels can be depleted by biological activity associated with the nitrification process. The dissolved oxygen levels have been stable over the history of available results with the exception of a very high result in 2013, that has since returned to historic levels.

Filterable iron results presentation



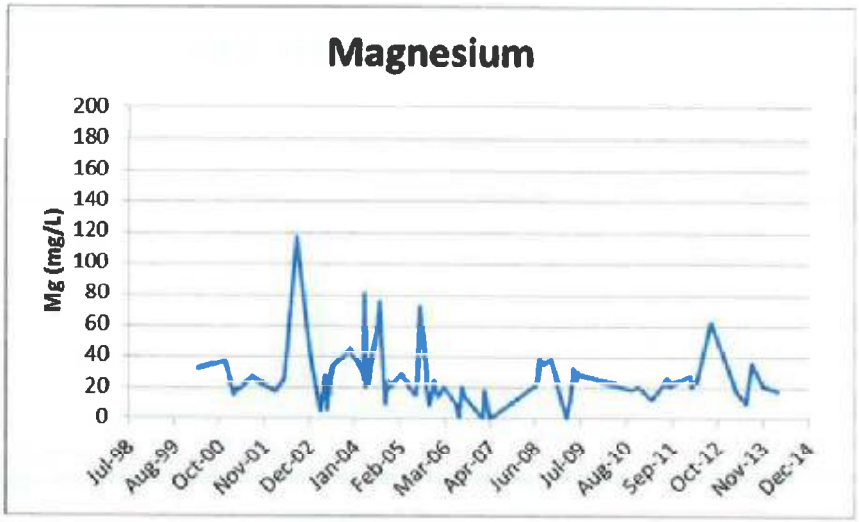
Fluoride results presentation



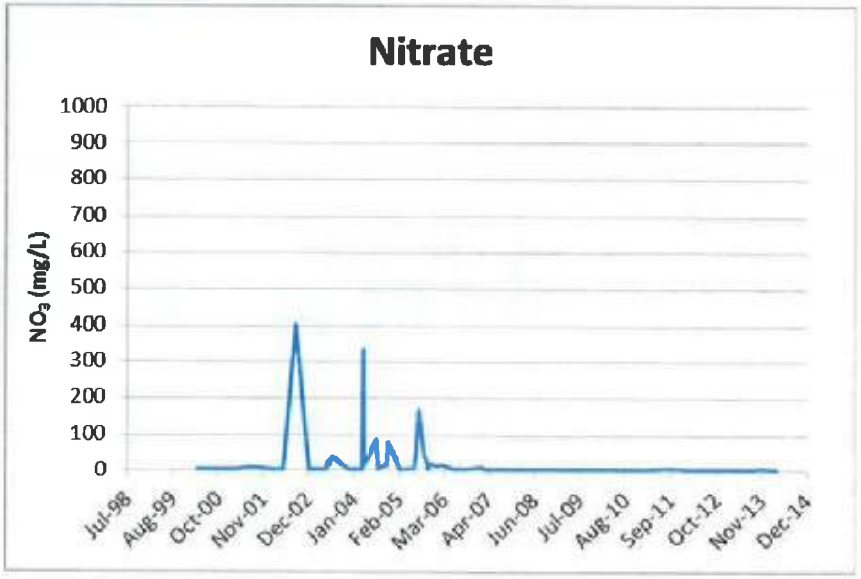
Filterable iron and fluoride have continued to trend at very low levels, especially with regard to the reporting period.

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

Magnesium results presentation

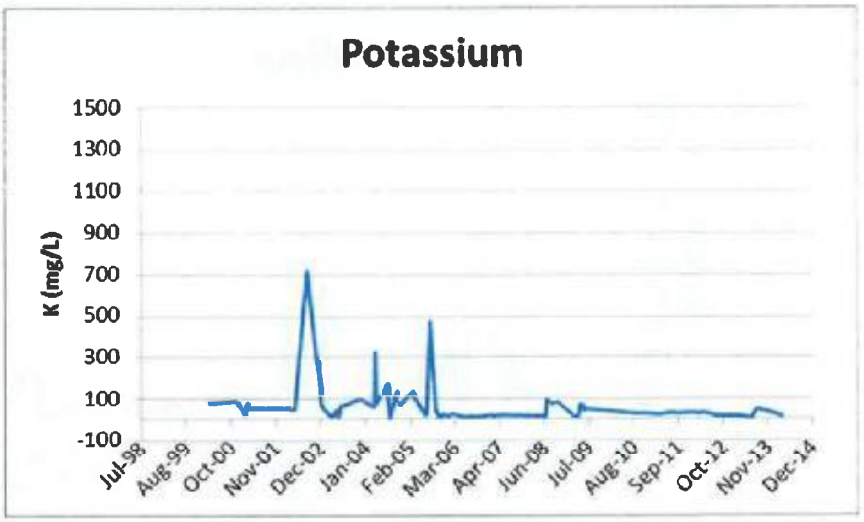


Nitrate results presentation

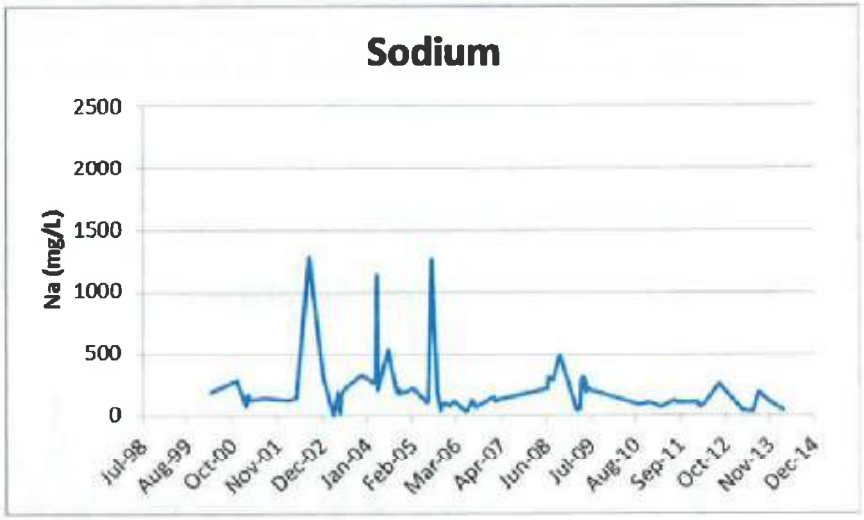


The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 50 mg/L of nitrate is safe for consumption, whilst magnesium is considered as "soft" in the range of 0-60 mg/L. The relatively low levels of nitrate and magnesium sampled indicate that landfill leachate is probably not present in the stormwater detention pond.

Potassium results presentation

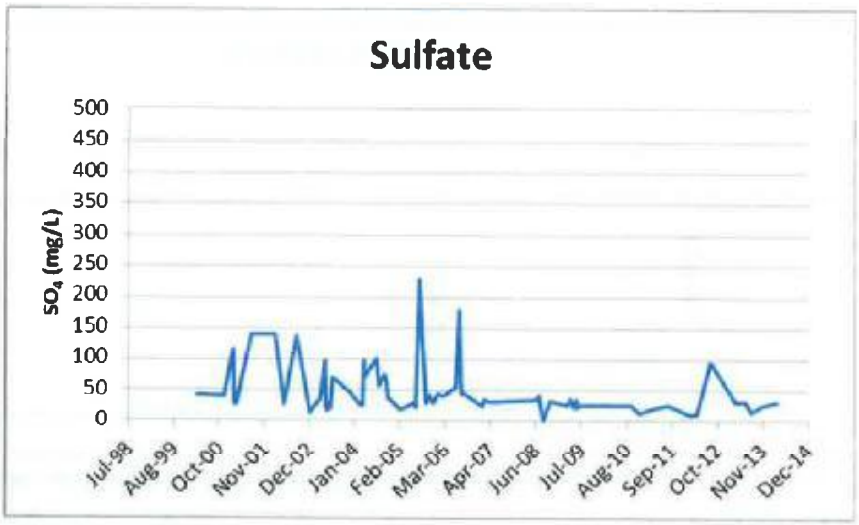


Sodium results presentation



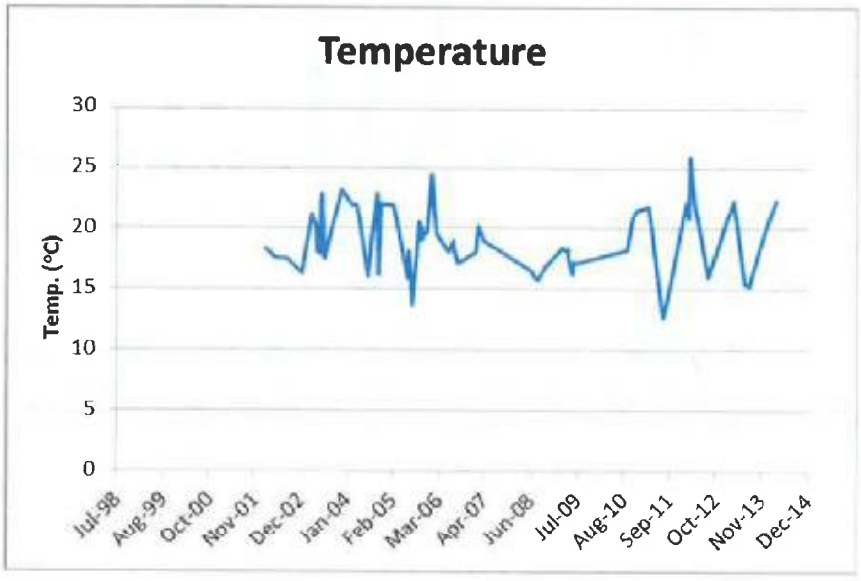
Potassium and sodium concentrations have been in line with recent trends and with the naturally occurring groundwater levels of these analytes around the site. Both analytes have trended downwards in recent years.

Sulfate results presentation



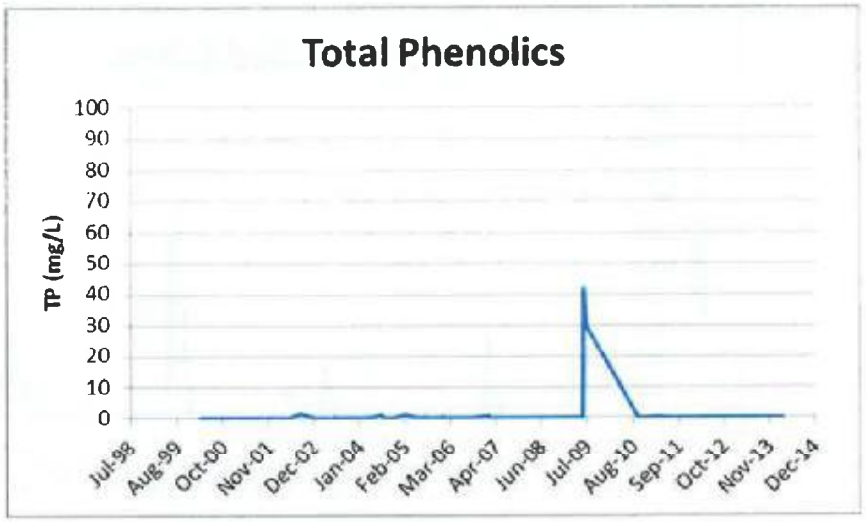
The *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the stormwater detention pond are in line with the historical levels and are better than the drinkable water standard. Inorganic ions such as sulfate provide a potential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

Temperature results presentation



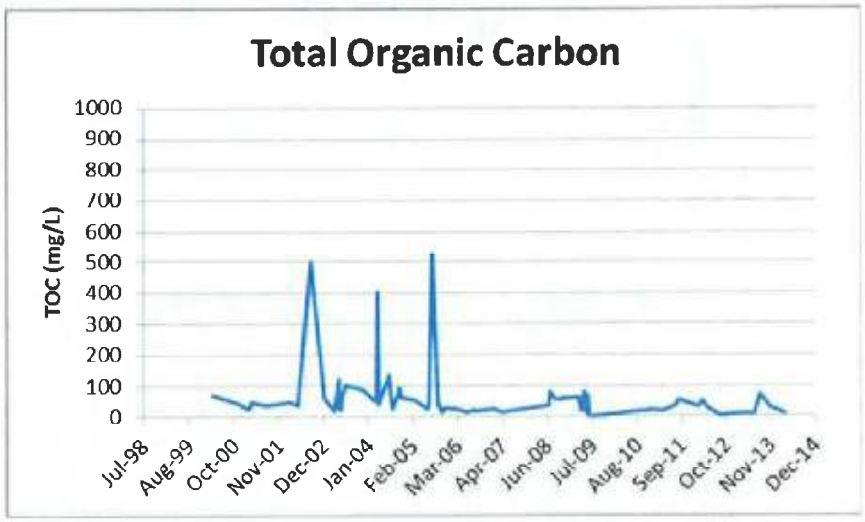
Temperature, as expected has generally been indicative of the season in which the stormwater detention pond has been sampled.

Total phenolics results presentation



Total phenols are widely used in the manufacture of resins, plastics, insecticides, explosives, dyes, and detergents. It is also used as a raw material for the production of medicinal drugs such as aspirin. Historical results for total phenols have been extremely low and more often than not, below detectable limits in the stormwater detention pond. In fact, all samples taken during the reporting period were below detectable limits.

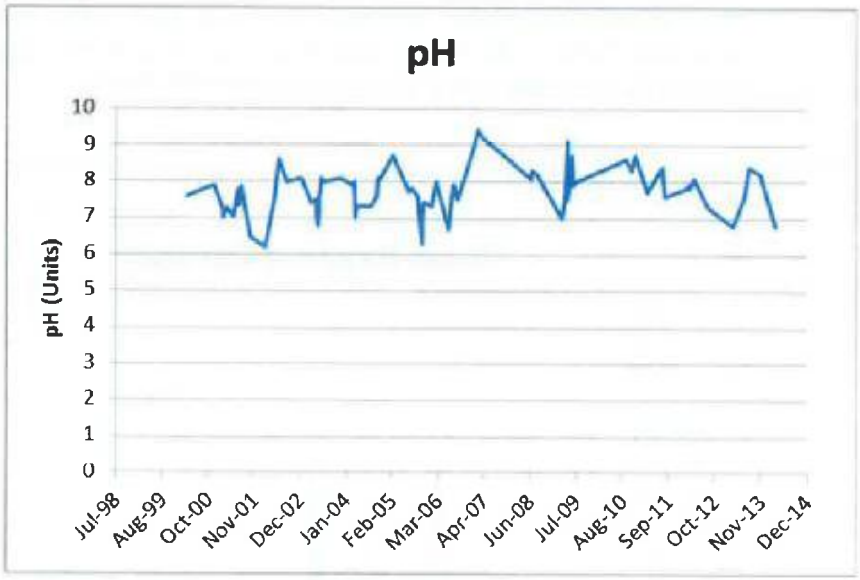
Total organic carbon results presentation



Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of water contamination by natural compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained consistently stable over the last nine years.

Total suspended solids results presentation

pH results presentation



The detention pond analytes measured at the site show relatively low levels of suspended solids and consistent pH levels in the surface water. The suspended solids levels were somewhat inconsistent in the 2008-2009 period, with the amount of solids suspended in the stormwater fluctuating. More modern results indicate that the stormwater pond is functioning effectively with the exception of a peak in March 2013.

3.2.3 *Surface Water Results Interpretation*

From the analytical results it can be demonstrated that the sites sediment and stormwater pond infrastructure are performing adequately and as desired.

3.3 AIR EMISSIONS MONITORING

3.3.1 Tabulated Results

Date	Results Above Recommended Threshold 500ppm	Accumulation Above Recommended Threshold 1250ppm
Jun-13	0	0
Jul-13	0	0
Aug-13	0	0
Sep-13	1	0
Oct-13	0	0
Nov-13	0	0
Dec-13	0	0
Jan-14	0	0
Feb-14	0	0
Mar-14	0	0
Apr-14	0	0
May-14	0	0

Table 3.3.1 Methane monitoring results for the reporting period

Presented results are the number of individual sample results derived from monthly testing that are above the EPA Benchmark Technique recommended threshold levels for further action regarding surface emissions (500 ppm) and accumulation levels (1,250 ppm).

3.3.2 *Data Presentation*

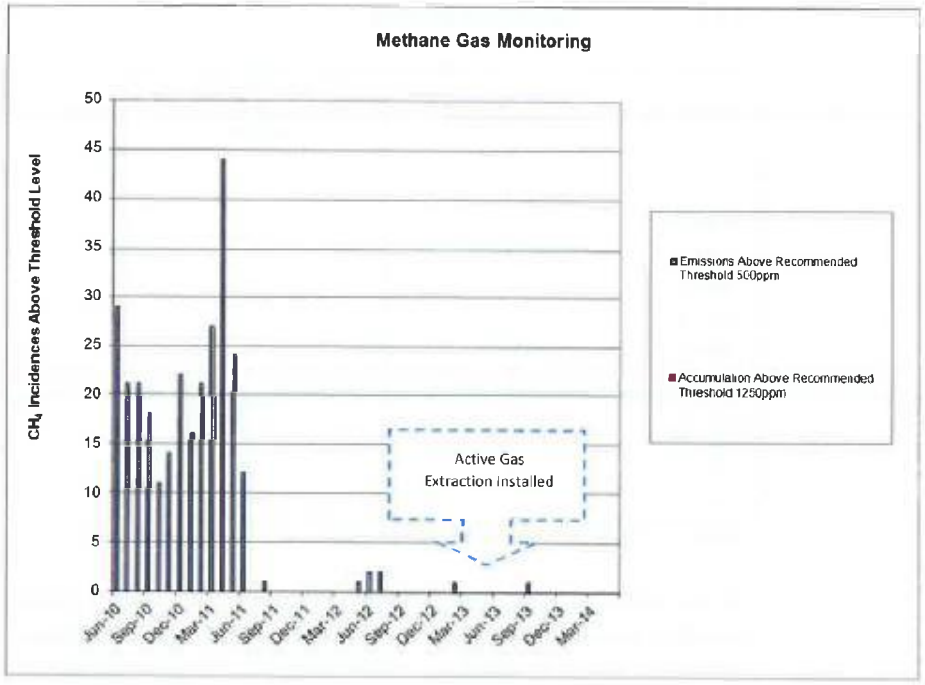


Figure 3.3.2 Air emissions test results above benchmark recommended threshold levels presentation

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

3.3.3 *Air Emissions Monitoring Results Interpretation*

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

Despite the differences in sample results, the site has the potential to generate relatively high amounts of landfill gas, namely methane that must be dealt with. Accordingly, Council commenced installation of methane gas extraction infrastructure. In fact, Phase 1 (covering the older western gully) of the landfill gas management is in place and connected to a flaring unit. Phase 2 (capturing the newer and current eastern gully) has been fully constructed. Commissioning is simply awaiting the finalisation of safety mitigation processes and infrastructure. The final Phase 3 gas collection system will

include infrastructure within the waste filling of the new landfill cell at the WWARRP. Contract procurement is currently underway.

It should be noted that Council has not attempted to rehabilitate the areas prone to surface gas emissions as it would increase the possibility of those somewhat controlled emissions finding a new path of least resistance and becoming uncontrolled.

3.4 ENVIRONMENTAL COMPLAINTS

3.4.1 *Tabulated Results*

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

Table 3.4.1 Tabulated complaints for the reporting period and historically

3.4.2 *Data Presentation*

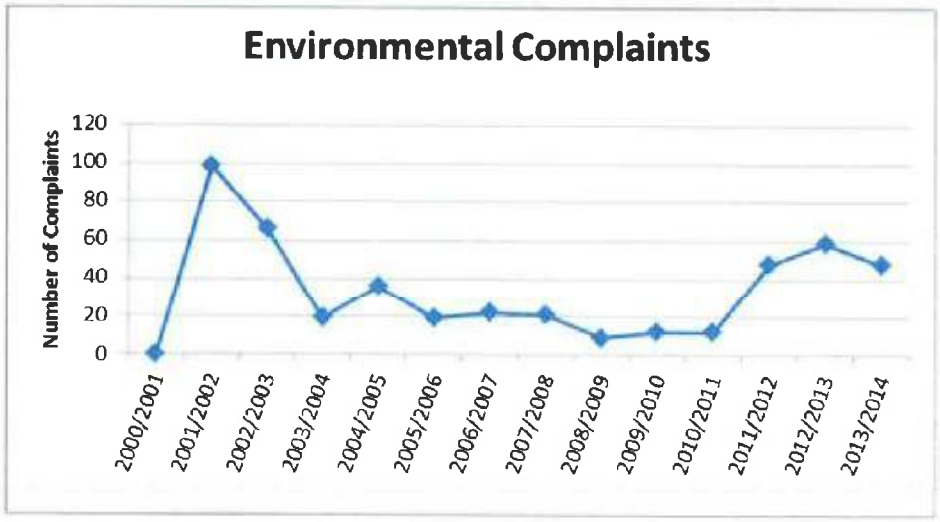


Figure 3.4.2 Environmental complaints results

Environmental complaints have generally trended downwards until the previous three reporting periods where a spike has occurred.

3.4.3 *Environmental Complaints Results Interpretation*

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

For additional clarity of the potential causes in the spike of complaints over the previous reporting periods, Figure 3.4.3 is provided.

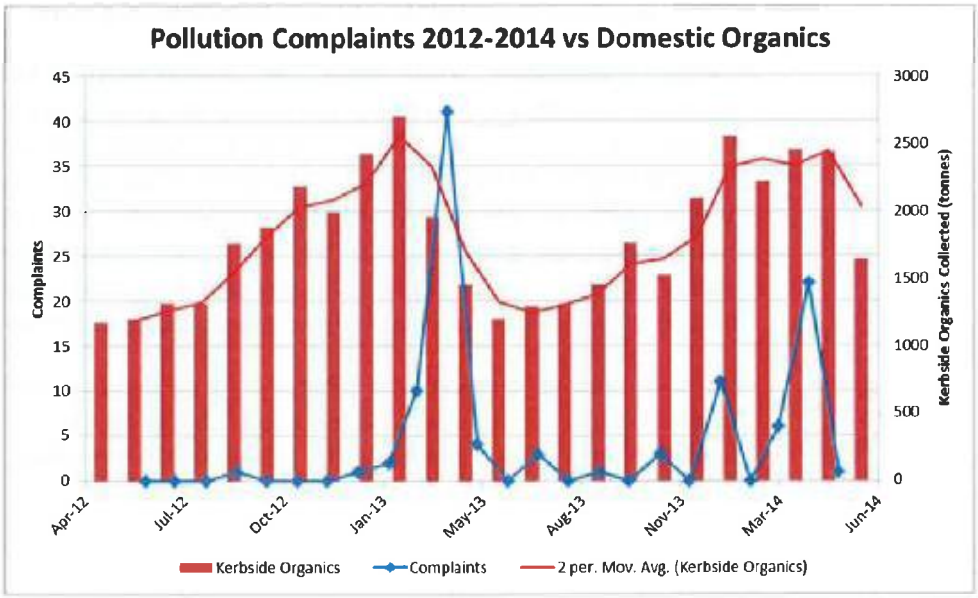


Figure 3.4.3, Pollution Complaints (Odour) vs Domestic Organic Waste Production

As detailed by a blue line in the Figure 3.4.3 (over a two year period), the majority of complaints have been received during late summer and into the autumn season.

The chart also demonstrates in red columns the tonnage of organic waste collected by Wollongong City Council in the kerbside collections. The red line above the columns indicates a non-linear fitted trend curve.

It can be noted from Figure 3.4.3 that complaints align almost perfectly with the increase trend for kerbside organic waste collected. It is also worthy of noting that the green waste is not received at the WWARRP and is instead received at a nearby site also located on Reddalls Road at Kembla Grange.

Complaints received during autumn 2013 were directed to Council and only upon follow up with each individual resident was Council able to conclude that the vast majority did not know about other processing facilities on

Reddalls Road at Kembla Grange. Despite this, the majority of residents opined that as a whole Council is still responsible for ensuring odour in its governance area is minimised.

More recently, in May 2014 Council received two EPL breach notices with fines attached due to the breaches causing uncontrolled odour emissions outside of Council's site boundary. Council acknowledged its indiscretions, namely:

- Excavating waste without approval (in order to bury bulky items sourced from previous flooding within Wollongong's LGA).
- Not providing an odour mitigation strategy for excavation works approved as part of the new landfill cell development.

Council immediately acted upon the aforementioned indiscretions by retraining staff in site procedures (including the process for placing special wastes) and urgently compelling Councils new landfill cell project managers to develop and comply with odour mitigation plans for construction works. Further, Council has developed (in liaison with the EPA) a revised environment complaints procedure that will compel Council to response more quickly in the future and ensure that uncontrolled odour emissions derived from Whytes Gully are investigated and acted upon as a priority.

Whilst Council is confident that there will be no repeat of the incidents that resulted in breach notices, the evidence provided in Figure 3.4.3 suggests that Council's actions may not be 100% effective in eliminating future odour complaints during the late summer and autumn period.

4 SITE SUMMATION

4.1 DEFICIENCY IDENTIFICATION & REMEDIATION

4.1.1 *Surface Methane Emissions above Recommended Benchmark Threshold Levels*

As discussed in Section 3.3.3, the site has historically possessed some previously landfilled areas that emit methane gas above the EPA's recommended benchmark level for further investigation into surface gas emissions. Council has not attempted to cap these areas so that the peak emissions locations are identified and so that the possibility of offsite migration is nullified. Council has trialled a biofiltration type system to attempt to reduce the methane emissions from identified peak areas. However, in February 2013 Council commenced installation of a gas extraction system. The gas management system and its future developments are expected to address the gas emission issues that have historically arisen from time to time at the WWARRP. In conjunction with the gas extraction system, additional subsurface sampling points have been recently installed. These points are now included in sampling regimes.

4.1.2 *Boreholes Indicating Potentially Imperfect Trend Stability*

As discussed in Section 3.1.4, borehole 16 has provided individual and incidental analytical results that require an increased level of scrutiny upon future measurements 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.

4.1.3 *Dry and Destroyed Boreholes*

During the current sampling period, monitoring points 9 and 13 had a propensity to become "dry" and monitoring point 2 was accidently destroyed by a contractor. To rectify this, Council in association with Golder Associates and the EPA have developed a new groundwater monitoring regime with many a revised structure and analyte sampling regime that collectively replaces the regime detailed in this report. It is anticipated that Council will submit this report for the EPA's consideration in the near future. It is anticipated that the revised program will provide far more relevant results for site investigations and future actions.

4.2 CONCLUSION

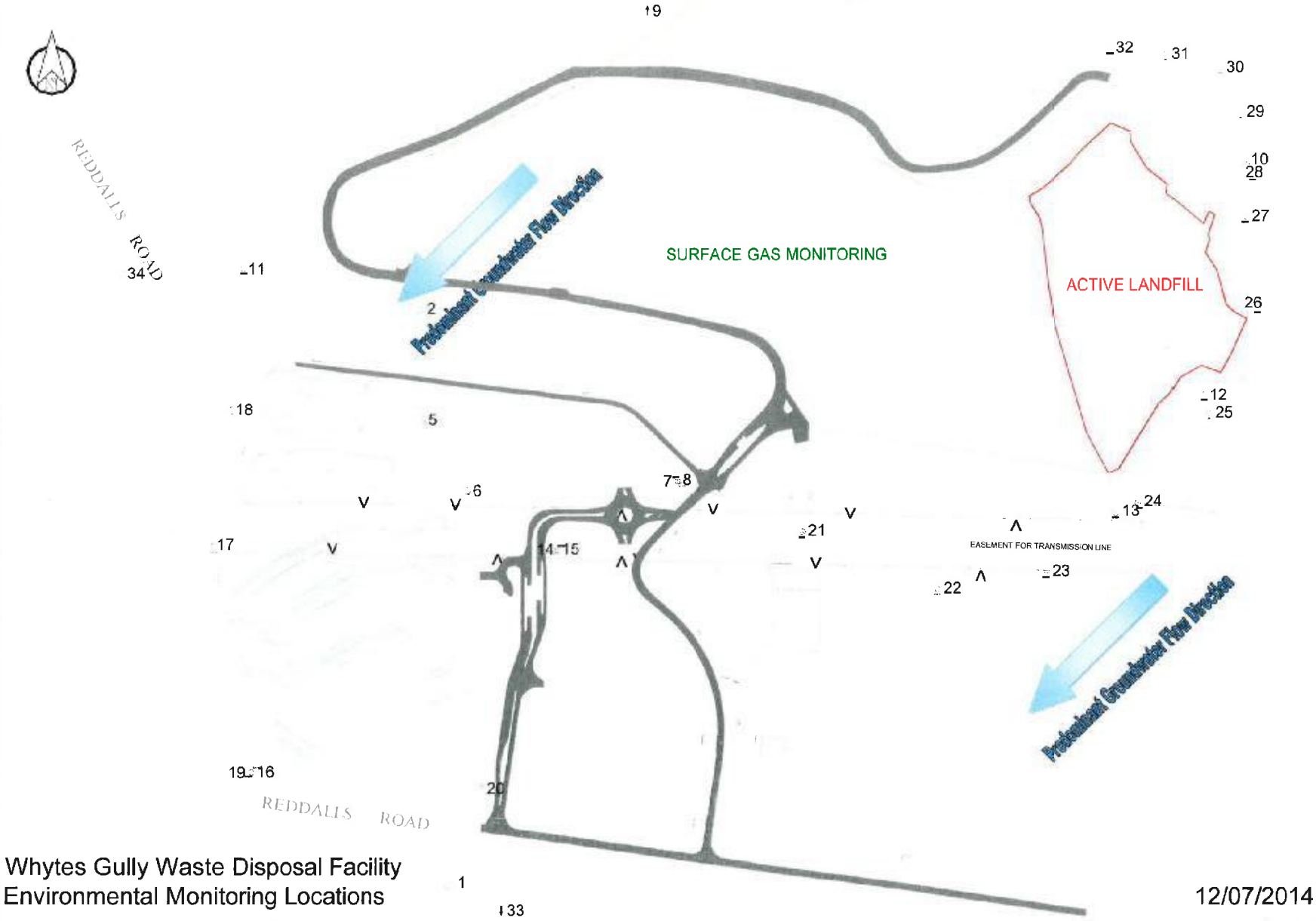
The site is performing well within the individual criteria and limits assigned to it in regard to environmental performance. The low number of deficiencies and nil non compliances (with the exception of the two breach notices issued during the reporting period) shows that Council has maintained satisfactory environmental performance. Actions have already commenced to improve the sites performance in regard to the identified deficiency in Section 4.1.1, which will ensure Council's goal of continuous environmental improvement at Whytes Gully is achieved.

Further, modernised test regimes already implemented and to be further refined in the next reporting period alongside the almost complete new cell development will provide a far better reflection of the state of the environment affected by the site. Consequently, environmental performance trend analysis and analytical results with be more pertinent as the new cell develops.

Annexure A

A Environmental Monitoring Locations

Environmental Monitoring Locations



Whytes Gully Waste Disposal Facility
Environmental Monitoring Locations

12/07/2014

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

ANNUAL RETURN

LICENCE NO	**5862**
LICENCE HOLDER	WOLLONGONG CITY COUNCIL
REPORTING PERIOD	29-May-2013 to 28-May-2014

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 ON OR BEFORE 27-Jul-2014

Your Annual Return must be completed, including certification in Section E, and supplied 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 $750 (individuals) or $1500 (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*

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

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:	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	

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

'Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

A Statement of Compliance - Licence Details

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

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

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

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

A1 Licence Holder

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

A2 Premises to which Licence Applies (if applicable)

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

A3 Activities to which Licence Applies

Waste Disposal (application to land)

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

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

Fee-based activity	Activity scale	Unit of measure
Waste disposal by application to land		annual 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.**	

Pollution Complaint Category	Number of Complaints
Air	
Water	
Noise	
Waste	
Other	

B2 Concentration Monitoring Summary

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

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

Discharge & Monitoring Point 1

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	1	4	106	253	570

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

Ammonia	milligrams per litre	1	4	1-08	11-28	41-7
Calcium	milligrams per litre	1	4	26	33-75	49
Chloride	milligrams per litre	1	4	33	100-5	189
Conductivity	milligrams per litre	1	4	391	853	1670
Dissolved Oxygen	milligrams per litre	1	4	8-28	8-73	9-08
Filterable iron	milligrams per litre	1	4	0-22	0-43	0-67
Fluoride	milligrams per litre	1	4	0-3	0-35	0-4
Magnesium	milligrams per litre	1	4	10	21-25	36
Nitrate	milligrams per litre	1	4	0-08	1-27	3-16
pH	pH	1	4	6-8	7-75	8-4
Potassium	milligrams per litre	1	4	6	25-75	50
Sodium	milligrams per litre	1	4	34	96-75	187
Sulfate	milligrams per litre	1	4	14	25	31
Temperature	degrees Celsius	1	4	15-3	17-93	22-4
Total organic carbon	milligrams per litre	1	4	12	30-75	71
Total Phenolics	milligrams per litre	1	4	<0-05	<0-05	<0-05

Total suspended solids	milligrams per litre	1	4	23	49	98

Monitoring Point 2 DESTROYED

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

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

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

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

DESTROYED

Monitoring Point 3

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 4

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

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

Methane	percent by volume	1	12	0.00014	0.00022	0.00019

Monitoring Point 5

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	955	1000.75	1090
Aluminium	milligrams per litre	1	1	0.02	0.02	0.02
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	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	299	314.25	346
Chloride	milligrams per litre	4	4	1060	1112.5	1160
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
Coball	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	millisiemens per centimetre	4	4	5060	5297.5	5450

Copper	milligrams per litre	1	1	<0·001	<0·001	<·001
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0·6	0·6	0·6
Lead	milligrams per litre	1	1	<0·001	<0·001	<0·001
Magnesium	milligrams per litre	4	4	194	199-75	209
Manganese	micrograms 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	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	0·02	0·03
Organochlorine pesticides	milligrams per litre	1	1	-0·5	-0·5	-0·5
Organophosphate pesticides	milligrams per litre	1	1	-0·5	-0·5	-0·5
pH	pH	4	4	6·6	21-45	66
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	-1	-1	-1
Potassium	milligrams per litre	4	4	3	3	3
Sodium	milligrams per litre	4	4	566	618·25	661

Standing Water Level	metres	4	4	4.72	4.885	5.02
Sulfate	milligrams per litre	4	4	160	170.5	187
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2800	3170	3550
Total organic carbon	milligrams per litre	4	4	5	15.75	44
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	2	2	2
Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005

Monitoring Point 6

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	658	685.5	738
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	0.016	0.016	0.016

Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	342	355.75	380
Chloride	milligrams per litre	4	4	1160	1215	1280
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Conductivity	millisiemens per centimetre	4	4	4920	5307.5	5530
Copper	milligrams per litre	1	1	<0.001	<0.001	<0.001
Ethyl benzene	micrograms per litre	1	1	2	2	2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	208	212.5	219
Manganese	micrograms per litre	1	1	.308	.308	.308
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	0.035	0.07
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.5	6.6	6.7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1.0	<1.0	<1.0
Potassium	milligrams per litre	4	4	2	2	2
Sodium	milligrams per litre	4	4	464	511.75	554
Standing Water Level	metres	4	4	0.36	0.515	0.72
Sulfate	milligrams per litre	4	4	194	202.5	224
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2910	3405	3890
Total organic carbon	milligrams per litre	4	4	4	12	35
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	<2	<2	<2

Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005

Monitoring Point 7

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	318	332	364
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	0.008	0.008	0.008
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	111	119	127
Chloride	milligrams per litre	4	4	631	662.5	700
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	millisiemens per centimetre	4	4	3090	3145	3200

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Copper	milligrams per litre	1	1	<0.001	<0.001	<0.001
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	70	75.5	83
Manganese	micrograms per litre	1	1	0.004	0.004	0.004
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.0125	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.05	<0.05	<0.05
Organophosphate pesticides	milligrams per litre	1	1	<0.05	<0.05	<0.05
pH	pH	4	4	6.7	6.85	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	402	438.75	460

Standing Water Level	metres	4	4	1.64	1.86	2.02
Sulfate	milligrams per litre	4	4	194	201.75	209
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1600	1720	1900
Total organic carbon	milligrams per litre	4	4	1	5.5	18
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	<2	<2	<2
Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005

Monitoring Point 8

Groundwater quality monitoring, Monitoring point labelled GABH06S on Figure 15 titled "Current Site Investigation Locations" dated 8 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297977 N6184322

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	396	401.75	408
Aluminium	milligrams per litre	1	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.117	0.117	0.117

Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.00001	<0.0001
Calcium	milligrams per litre	4	4	78	90.25	97
Chloride	milligrams per litre	4	4	579	619.5	658
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	millisiemens per centimetre	4	4	2810	3030	3120
Copper	milligrams per litre	1	1	0.002	0.002	0.002
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	1.2	1.2	1.2
Lead	milligrams per litre	1	1	<0.001	<0.0001	<0.001
Magnesium	milligrams per litre	4	4	72	83.5	94
Manganese	micrograms per litre	1	1	0.059	0.059	0.059
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	0.0275	0.06
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	7	7.075	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	<1	<1	<1
Sodium	milligrams per litre	4	4	392	463	494
Standing Water Level	metres	4	4	2.18	2.33	2.5
Sulfate	milligrams per litre	4	4	204	212.5	217
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1420	1692.5	1800
Total organic carbon	milligrams per litre	4	4	1	5.5	17
Total petroleum hydrocarbons	milligrams per litre	1	1	<1.2	<1.2	<1.2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005

Monitoring Point 9

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	243	257	271
Aluminium	milligrams per litre	1	1	7.77	7.77	7.77
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.055	0.055	0.055
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	0.0004	0.0004	0.0004
Calcium	milligrams per litre	4	4	50	53	56
Chloride	milligrams per litre	4	4	24	26.5	29
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.003	0.003	0.003
Cobalt	milligrams per litre	1	1	0.004	0.004	0.004
Conductivity	millisiemens per centimetre	4	4	594	607.5	621

Copper	milligrams per litre	1	1	0·023	0·023	0·023
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0·7	0·7	0·7
Lead	milligrams per litre	1	1	0·005	0·005	0·005
Magnesium	milligrams per litre	4	4	17	19·5	22
Manganese	micrograms per litre	1	1	0·227	0·227	0·227
Mercury	milligrams per litre	1	1	<0·0001	<0·0001	<0·0001
Nitrate	milligrams per litre	1	1	0·26	0·26	0·26
Nitrite	milligrams per litre	1	1	<0·01	<0·01	<0·01
Nitrogen (ammonia)	milligrams per litre	4	4	0·01	0·015	0·02
Organochlorine pesticides	milligrams per litre	1	1	<0·5	<0·5	<0·5
Organophosphate pesticides	milligrams per litre	1	1	<0·5	<0·5	<0·5
pH	pH	4	4	7·3	7·3	7·3
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1·5	2·0
Sodium	milligrams per litre	4	4	47	52·5	58

Standing Water Level	metres	4	4	9.55	10.06	10.57
Sulfate	milligrams per litre	4	4	22	26.5	31
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	350	380.5	411
Total organic carbon	milligrams per litre	4	4	4	4.5	5.0
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	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.049	0.049	0.049

Monitoring Point 10

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	265	357.5	436
Aluminium	milligrams per litre	1	1	0.1	0.1	0.1
Arsenic	milligrams per litre	1	1	<.001	<0.001	<0.001
Barium	milligrams per litre	1	1	.023	.023	.023

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<.0001	<.0001	<.0001
Calcium	milligrams per litre	4	4	196	204.75	216
Chloride	milligrams per litre	4	4	486	496.75	524
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.012	0.012	0.012
Cobalt	milligrams per litre	1	1	<.004	<0.004	<0.004
Conductivity	millisiemens per centimetre	4	4	2380	2430	2490
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	<.001	<.001	<.001
Magnesium	milligrams per litre	4	4	70	73	77
Manganese	micrograms per litre	1	1	0.107	0.107	0.107
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.01	0.01	0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.08	0.27
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.8	6.85	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	159	177.5	192
Standing Water Level	metres	4	4	7.57	7.68	7.78
Sulfate	milligrams per litre	4	4	131	139	149
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1320	1512.5	1710
Total organic carbon	milligrams per litre	4	4	1	6.5	21
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	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.007	0.007	0.007

Monitoring Point 11

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	238	343	410
Aluminium	milligrams per litre	1	1	0.1	0.1	0.1
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.014	0.014	0.014
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	44	49.5	60
Chloride	milligrams per litre	4	4	54	73.25	91
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	<0.002	<0.002	<0.002
Conductivity	millisiemens per centimetre	4	4	513	972	1240

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Copper	milligrams per litre	1	1	0.006	0.006	0.006
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.8	0.8	0.8
Lead	milligrams per litre	1	1	<0.002	<0.002	<0.002
Magnesium	milligrams per litre	4	4	24	29	34
Manganese	micrograms per litre	1	1	0.189	0.189	0.189
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	.062	0.17
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.6	7.08	7.3
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	99	126.5	164

Standing Water Level	metres	4	4	6.88	7.23	7.54
Sulfate	milligrams per litre	4	4	36	47.25	56
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	357	513	674
Total organic carbon	milligrams per litre	4	4	2	7.5	20
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	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.011	0.011	0.011

Monitoring Point 12

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	44	47.25	51
Aluminium	milligrams per litre	1	1	10.3	10.3	10.3
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.056	0.056	0.056

Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	4	5.75	9
Chloride	milligrams per litre	4	4	32	36.25	41
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.008	0.008	0.008
Cobalt	milligrams per litre	1	1	0.004	0.004	0.004
Conductivity	millisiemens per centimetre	4	4	250	1682.75	5970
Copper	milligrams per litre	1	1	0.033	0.033	0.033
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.2	0.2	0.2
Lead	milligrams per litre	1	1	0.007	0.007	0.007
Magnesium	milligrams per litre	4	4	2	3	5
Manganese	micrograms per litre	1	1	0.206	0.206	0.206
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.01	0.01	0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	1	1	0.01	0.018	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	5.3	5.68	6
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	34	38	42
Standing Water Level	metres	4	4	10.54	10.74	11.06
Sulfate	milligrams per litre	4	4	12	13	14
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	125	168.75	197
Total organic carbon	milligrams per litre	4	4	1	5	11
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	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.043	0.043	0.043

Monitoring Point 13

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

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

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

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

Monitoring Point 14

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	319	374.5	494
Aluminium	milligrams per litre	1	1	4.63	4.63	4.63
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.117	0.117	0.117

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Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	16	36	84
Chloride	milligrams per litre	4	4	123	237.75	424
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.004	0.004	0.004
Cobalt	milligrams per litre	1	1	0.009	0.009	0.009
Conductivity	millisiemens per centimetre	4	4	1030	1897.5	3460
Copper	milligrams per litre	1	1	0.008	0.008	0.008
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	0.004	0.004	0.004
Magnesium	milligrams per litre	4	4	13	28.25	64
Manganese	micrograms per litre	1	1	0.354	0.354	0.354
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	0.035	0.06
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.8	6.85	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1.5	2.0
Sodium	milligrams per litre	4	4	198	257.75	295
Standing Water Level	metres	4	4	2.64	2.71	2.84
Sulfate	milligrams per litre	4	4	40	69.25	127
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	650	820.25	1150
Total organic carbon	milligrams per litre	4	4	7	10.5	15
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	<1	<1	<1

Zinc	milligrams per kilogram	1	1	0.017	0.017	0.017

Monitoring Point 15

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	446	467.25	509
Aluminium	milligrams per litre	1	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.016	0.016	0.016
Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	124	131	141
Chloride	milligrams per litre	4	4	613	638	659
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	millisiemens per centimetre	4	4	3140	3235	3330

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Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.8	0.8	0.8
Lead	milligrams per litre	1	1	0.001	0.001	0.001
Magnesium	milligrams per litre	4	4	91	93.25	98
Manganese	micrograms per litre	1	1	0.008	0.008	0.008
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	0.0475	0.15
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.8	6.83	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	<1	1	1
Sodium	milligrams per litre	4	4	392	439.5	474

Standing Water Level	metres	4	4	2.14	2.1845	2.238
Sulfate	milligrams per litre	4	4	185	197.25	215
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1560	1705	1830
Total organic carbon	milligrams per litre	4	4	1	7.25	23
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	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.009	0.009	0.009

Monitoring Point 16

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	412	771.75	980
Aluminium	milligrams per litre	1	1	0.67	0.67	0.67
Arsenic	milligrams per litre	1	1	0.005	0.005	0.005
Barium	milligrams per litre	1	1	0.46	0.46	0.46

Annual Return

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NSW EPA

Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	4	133	226.25	309
Chloride	milligrams per litre	4	4	163	183.25	225
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	0.004	0.004	0.004
Conductivity	millisiemens per centimetre	4	4	1590	2102.5	2400
Copper	milligrams per litre	1	1	0.006	0.006	0.006
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	42	55.75	65
Manganese	micrograms per litre	1	1	3.46	3.46	3.46
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.01	0.01	0.01

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Nitrite	milligrams per litre	1	1	<0.04	<0.04	<0.04
Nitrogen (ammonia)	milligrams per litre	4	4	3.27	6.93	7.76
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.4	6.88	7.1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	7	11.75	16
Sodium	milligrams per litre	4	4	161	171	183
Standing Water Level	metres	4	4	3.32	3.43	3.62
Sulfate	milligrams per litre	4	4	82	137	190
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	880	1240	1460
Total organic carbon	milligrams per litre	4	4	14	45.5	80
Total petroleum hydrocarbons	milligrams per litre	1	1	350	350	350
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.087	0.087	0.087

Monitoring Point 17

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	547	572	623
Aluminium	milligrams per litre	1	1	0.55	0.55	0.55
Arsenic	milligrams per litre	1	1	<.001	<.001	<.001
Barium	milligrams per litre	1	1	0.006	0.006	0.006
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	178	193.75	214
Chloride	milligrams per litre	4	4	787	818.25	848
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	millisiemens per centimetre	4	4	3870	3977.5	4060

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Copper	milligrams per litre	1	1	0.002	0.002	0.002
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	151	154.25	160
Manganese	micrograms per litre	1	1	0.044	0.044	0.044
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.05	0.05	0.05
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.025	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	-0.5	-0.5	-0.5
pH	pH	4	4	6.6	6.73	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	2	2	2
Sodium	milligrams per litre	4	4	435	463.25	500

Standing Water Level	metres	4	4	4.02	4.12	4.23
Sulfate	milligrams per litre	4	4	279	291.5	319
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2130	2375	2590
Total organic carbon	milligrams per litre	4	4	2	8.75	28
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	2	2	2
Zinc	milligrams per kilogram	1	1	0.007	0.007	0.007

Monitoring Point 18

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	435	449	483
Aluminium	milligrams per litre	1	1	0.69	0.69	0.69
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.033	0.033	0.033

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Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	.0002	.0002	.0002
Calcium	milligrams per litre	4	4	78	90.75	104
Chloride	milligrams per litre	4	4	112	395.75	504
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	millisiemens per centimetre	4	4	2410	2532.5	2640
Copper	milligrams per litre	1	1	0.007	0.007	0.007
Ethyl benzene	micrograms per litre	1	1	2	2	2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	.003	.003	.003
Magnesium	milligrams per litre	4	4	73	75	79
Manganese	micrograms per litre	1	1	0.229	0.229	0.229
Mercury	milligrams per litre	1	.1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	0.03	0.03	0.03

Nitrite	milligrams per litre	1	1	0.01	0.01	0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.023	0.04
Organochlorine pesticides	milligrams per litre	1	1	0.5	0.5	0.5
Organophosphate pesticides	milligrams per litre	1	1	0.5	0.5	0.5
pH	pH	4	4	6.9	7.03	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	1	1	1
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	326	361.5	397
Standing Water Level	metres	4	4	6.1	6.29	6.43
Sulfate	milligrams per litre	4	4	106	113.5	123
Toluene	milligrams per litre	1	1	2	2	2
Total dissolved solids	milligrams per litre	4	4	1270	1332.5	1380
Total organic carbon	milligrams per litre	4	4	1	6	19
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	2	2	2

Zinc	milligrams per kilogram	1	1	0.024	0.024	0.024

Monitoring Point 19

Groundwater quality monitoring, Monitoring point labelled GMW109D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297604.9 N6184068

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	222	229.5	249
Aluminium	milligrams per litre	1	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.126	0.126	0.126
Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	0.0001	0.0001	0.0001
Calcium	milligrams per litre	4	4	78	84	90
Chloride	milligrams per litre	4	4	363	370.75	382
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	millisiemens per centimetre	4	4	1600	1657.5	1700

Copper	milligrams per litre	1	1	0·006	0·006	0·006
Ethyl benzene	micrograms per litre	1	1	2	2	2
Fluoride	milligrams per litre	1	1	0·4	0·4	0·4
Lead	milligrams per litre	1	1	0·001	0·001	0·001
Magnesium	milligrams per litre	4	4	44	45·25	47
Manganese	micrograms per litre	1	1	0·035	0·035	0·035
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	1	1	0·01	0·048	0·14
Organochlorine pesticides	milligrams per litre	1	1	0·5	0·5	0·5
Organophosphate pesticides	milligrams per litre	1	1	0·5	0·5	0·5
pH	pH	4	4	7·2	7·35	7·5
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	1	1	1
Potassium	milligrams per litre	4	4	2	2	2
Sodium	milligrams per litre	4	4	174	189·25	201

Standing Water Level	metres	4	4	2-86	3.04	3.23
Sulfate	milligrams per litre	4	4	24	25.5	28
Toluene	milligrams per litre	1	1	2	2	2
Total dissolved solids	milligrams per litre	4	4	769	930.25	1060
Total organic carbon	milligrams per litre	4	4	1	3	9
Total petroleum hydrocarbons	milligrams per litre	1	1	30	50	30
Total Phenolics	milligrams per litre	1	1	0.05	0.05	0.05
Xylene	milligrams per litre	1	1	1	1	1
Zinc	milligrams per kilogram	1	1	0.012	0.012	0.012

Monitoring Point 20

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	711	741	816
Aluminium	milligrams per litre	1	1	0.05	0.05	0.05
Arsenic	milligrams per litre	1	1	0.003	0.003	0.003
Barium	milligrams per litre	1	1	0.055	0.055	0.055

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Benzene	milligrams per litre	1	1	1	1	1
Cadmium	milligrams per litre	1	1	0.0001	0.0001	0.0001
Calcium	milligrams per litre	4	4	120	124.5	134
Chloride	milligrams per litre	4	4	954	1022	1120
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	0.01	0.01	0.01
Conductivity	millisiemens per centimetre	4	4	4720	4972.5	5170
Copper	milligrams per litre	1	1	0.008	0.008	0.008
Ethyl benzene	micrograms per litre	1	1	2	2	2
Fluoride	milligrams per litre	1	1	1-1	1-1	1-1
Lead	milligrams per litre	1	1	0.005	0.005	0.005
Magnesium	milligrams per litre	4	4	129	133	137
Manganese	micrograms per litre	1	1	1.77	1.77	1.77
Mercury	milligrams per litre	1	1	.0001	.0001	.0001
Nitrate	milligrams per litre	1	1	.01	.01	.01

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Nitrite	milligrams per litre	1	1	.01	.01	.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.07	0.09	0.12
Organochlorine pesticides	milligrams per litre	1	1	0.5	0.5	0.5
Organophosphate pesticides	milligrams per litre	1	1	0.5	0.5	0.5
pH	pH	4	4	6.7	6.8	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	1	1	1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	760	819.25	882
Standing Water Level	metres	4	4	1.46	1.51	1.64
Sulfate	milligrams per litre	4	4	283	289	302
Toluene	milligrams per litre	1	1	2	2	2
Total dissolved solids	milligrams per litre	4	4	2500	2750	2930
Total organic carbon	milligrams per litre	4	4	2	6	17
Total petroleum hydrocarbons	milligrams per litre	1	1	50	50	50
Total Phenolics	milligrams per litre	1	1	.05	.05	.05
Xylene	milligrams per litre	1	1	2	2	2

Zinc	milligrams per kilogram	1	1	0.010	0.010	0.010

Monitoring Point 21

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 22

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 23

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 24

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 25

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 26

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 27

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 28

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 29

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 30

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 31

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

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

Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 32

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	1	12	0	0.00098	0.07013

Monitoring Point 33

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	0	*			
Ammonia	milligrams per litre	0				
Calcium	milligrams per litre	0				
Chloride	milligrams per litre	0				
Conductivity	milligrams per litre	0				
Dissolved Oxygen	milligrams per litre	0				
Filterable iron	milligrams per litre	0				

* This requirement was added to EPA licence version date 23 August 2013
Annual Sampling completed prior to this requirem

Fluoride	milligrams per litre	0				
Magnesium	milligrams per litre	0				
Nitrate	milligrams per litre	0				
pH	pH	0				
Potassium	milligrams per litre	0				
Sodium	milligrams per litre	0				
Sulfate	milligrams per litre	0				
Temperature	degrees Celsius	0				
Total organic carbon	milligrams per litre	0				
Total Phenolics	milligrams per litre	0				
Total suspended solids	milligrams per litre	0				

Monitoring Point 34

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

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	0	*			
Ammonia	milligrams per litre	0				

* This requirement was added to EPA Licence version date 23 August 2013
Annual sampling completed prior to this requirement

Calcium	milligrams per litre	0				
Chloride	milligrams per litre	0				
Conductivity	milligrams per litre	0				
Dissolved Oxygen	milligrams per litre	0				
Filterable iron	milligrams per litre	0				
Fluoride	milligrams per litre	0				
Magnesium	milligrams per litre	0				
Nitrate	milligrams per litre	0				
pH	pH	0				
Potassium	milligrams per litre	0				
Sodium	milligrams per litre	0				
Sulfate	milligrams per litre	0				
Temperature	degrees Celsius	0				
Total organic carbon	milligrams per litre	0				
Total Phenolics	milligrams per litre	0				
Total suspended solids	milligrams per litre	0				

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).

PLEASE FIND UPDATED STATEMENT OF COMPLIANCE CONDITIONS (BELOW) MARCH 2016

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C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☑ the boxes)

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

(✓ a box)

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

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

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

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

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

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

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

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

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

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

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

3. How many pages have you attached?

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

1

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C2 Details of Non-Compliance with Licence

Licence condition number not complied with
EPL 5862 - condition 06.4
Summary of particulars of the non-compliance **(NO MORE THAN 50 WORDS)**
Exhumation of landfilled waste at the Wollongong Waste & Resource Recovery Park (Whytes Gully) without written approval from the EPA.
If required, further details on particulars of non-compliance
Council operative excavated into previously landfilled waste to dispose of bulky materials.
Date(s) when the non-compliance occurred, if applicable
5 May 2014
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
AE79SP
Cause of non-compliance
Creating offensive odour
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
To help ensure a similar licence breach does not take place in the future a Safe Operating Procedure has been developed for the Placement and handling of Special Waste Materials
Action taken or that will be taken to prevent a recurrence of the non-compliance
Staff inducted and trained in the Safe Operating Procedure 'Placement and Handling of Special Waste Materials

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)

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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: http://www.wollongong.nsw.gov.au/services/household/Pages/wastesitesanalyticalmonitoringdata.aspx

4 Has the PIRMP been tested?

(✓ a box) ☑ Yes ☐ No

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

The PIRMP was last tested on: 31 JULY 2013

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: 1 JULY 2014

6 How many times has the PIRMP been activated in this reporting period? 0

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

The PIRMP was activated on: N/A

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

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

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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/websiteanalyticalmonitordata.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.

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G 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 and F 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-2013 to 28-May-2014 or ___/___/___ to ___/___/___

SIGNATURE: _____ SIGNATURE: _____

NAME: (printed) W. PETERSON NAME: (printed) _____

POSITION: WASTE SERVICES POSITION: _____

DATE: 26 / 07 / 2014 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