Additions to Awaba Waste Management Facility

Submissions Report and Revised Statement of Commitments

Reference: 600308

22 March 2013

Prepared for Lake Macquarie City Council
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Cover Photo: Awaba Waste Management Facility (Source: Lake Macquarie City Council)

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Statement of Certification

This Environmental Assessment has been prepared under Part 3A of the Environmental Planning and Assessment Act 1979. Although Part 3A of the EP&A Act has since been repealed the provisions still apply to this proposal in accordance with Schedule 6A of the EP&A Act.

Environmental Assessment Approved by:

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Project to which the Environmental Assessment relates:

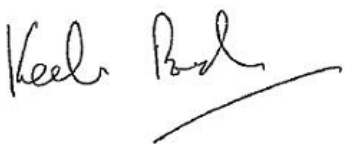
Project Description:	Proposed Additions to Awaba Waste Management Facility, Lot 372 DP 723259, Wilton Road, Awaba
Applicant's Name:	Lake Macquarie City Council
Applicant's Address:	126 – 138 Main Road Speers Point NSW 2284

Certification:

I certify that I have approved this Submissions Report and Revised Statement of Commitments and to the best of my knowledge:

- It has been prepared in accordance with Part 3A of the EP&A Act 1979 and the Regulations (under the provision of Schedule 6A as a transitional Part 3A project);
- It has been prepared in accordance with the Director-General's Requirements dated 21 September 2010; and
- It does not contain information that is either false or misleading.

Signature:



Kester Boardman

Manager – Environment and Sustainability

Date: 22 March 2013

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Glossary and Abbreviations

AHD	Australian Height Datum. A geodetic datum for altitude measurement in Australia
AVD	Average Delay. Provides an indication of the length of delay experienced by vehicles at an intersection and is measured in seconds
AWMF	Awaba Waste Management Facility
AWS	Automatic Weather Station
BioBanking	A biodiversity banking and offsets scheme, which enables proponents to offset biodiversity impacts through a scheme of acquiring credits which can be traded
DECC	Former NSW Department of Environment and Climate Change (now OEH)
DECCW	Former NSW Department of Environment, Climate Change and Water (now OEH)
DGRs	Director-General's Requirements
DoP	Former NSW Department of Planning (now DP&I)
DP&I	NSW Department of Planning and Infrastructure
DPI	NSW Department of Primary Industries
EA	Environmental Assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
HWC	Hunter Water Corporation
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LGA	Local Government Area
LMCC	Lake Macquarie City Council
Major Development SEPP	*State Environmental Planning Policy (Major Development) 2005*
NO_x	Oxides of Nitrogen
OEH	NSW Office of Environment and Heritage
PHA	Preliminary Hazard Assessment
PoEO Act	*Protection of the Environment Operations Act 1997*
Proponent	The organisation or individual who are proposing the development. The proponent for the expansion of the AWMF is LMCC.
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SEWPaC	Australian Department of Sustainability, Environment, Water, Population and Communities
WWPS	Waste Water Pump Station

1 Overview of Project

This chapter provides a brief introduction to the proposed additions to the Awaba Waste Management Facility and details the structure of the Submissions Report.

1.1 Background and Proposal

Lake Macquarie City Council (LMCC) is the proponent for the works, and is proposing to expand the capacity of the Awaba Waste Management Facility (AWMF) located off Wilton Road, Awaba within the Lake Macquarie Local Government Area (LGA). The AWMF is situated on Crown Land that is controlled by LMCC as the appointed Corporate Manager of the Awaba Waste Management (R170042) Reserve Trust (Gazette of 20th July 2001, folio 5478).

The proposed additions to the AWMF form part of LMCC's Waste Strategy, which proposes a sustainable way forward for the management of the city's waste. The landfill operates under an existing development consent for a maximum emplacement level of 94mAHD. Mitchell McCotter (1993) projected that based on this approved level, landfill capacity equates to 2.9 million cubic metres (if final cover material and topsoil are deducted). Under current conditions, the AWMF receives approximately 100,000 tonnes of waste annually, with an expected increase by approximately 1.2 to 1.3 percent per year. At this rate it has been estimated that the AWMF has only 39 months of landfill volume remaining.

The proposed development will enable the existing AWMF to be extended through the provision of two additional excavated landfill cells (Areas A and B) and continued emplacement over the existing landfill area (Area C) which will extend the lifespan of the landfill site by an estimated 20 years.

The focus of LMCC's Waste Strategy is to implement resource recovery and diversion actions to minimise waste generated and maximise resource recovery rates. With the implementation of sustainable measures such as this it is anticipated that waste management in the Lake Macquarie LGA will not be dominated by landfilling in the future. However, there will always be a portion of future waste streams that will not be recoverable for beneficial re-use and as such a suitable disposal mechanism will be required into the future.

The additions to the AWMF only form part of LMCC's Waste Strategy and will manage the unavoidable non-recoverable component of waste into the future. The Project will also extend the lifespan of the existing landfill whilst additional sustainable waste minimisation practices are being developed. Extension of the current landfill site is preferred to development of a new landfill site elsewhere, particularly as the site is already disturbed from existing landfill operations.

The key components of the project include the following:

- Staged excavation of two new areas on-site to create additional landfill space (Areas A and B);
- Additional emplacement over the existing landfill Area C;
- Expansion of the on-site leachate management system;
- Installation of a package pumping station on-site and a rising main to transfer excess leachate to the No. 6 Waste Water Pump Station (WWPS) at Rathmines;
- Installation of additional sediment management basins;
- Expansion of the landfill gas management system;
- Construction of a permanent transfer station;
- Construction of a wheel wash facility;
- Replacement of the existing weighbridges; and
- Construction of an additional reuse centre with amenities.

A more detailed description of the project can be found in the Environmental Assessment (EA) Report. No modifications to the project described in the EA report are proposed as a result of the public exhibition responses received, however additional information is provided (Appendix A-E) to provide additional detail and explanation of the proposal in response to comments received, in particular from the EPA.

1.2 Project Justification

The proposed additions to the AWMF are considered to be the most appropriate option overall for the Lake Macquarie LGA in terms of addressing the current and future waste management needs of the community. The explored alternatives to the preferred option of proposed additions to the AWMF include the "do nothing" option which would require the transportation of waste outside the LGA boundary for disposal. This option would be likely to transfer social impacts/costs to another region outside the Lake Macquarie LGA, which has implications in terms of social equity. The "do nothing" option is not acceptable in a social context, nor is it appropriate in the context of Council's waste strategy and the guidelines of the *NSW Waste Avoidance and Resource Recovery Strategy 2007* (DECC, 2007).

The AWMF is the only functioning landfill site in the Lake Macquarie LGA. The landfill operations operate under an existing development consent for a maximum emplacement level of 94mAHD. Mitchell McCotter (1993) projected that based on this approved level, landfill capacity equates to 2.9 million cubic metres (if final cover material and topsoil are deducted). Conservative assumptions were used to derive the capacity, namely:

- A higher waste generation rate than is currently occurring (0.96m^3/person compared to 0.92m^3/person);

- No allowance was made for the removal of vegetation from the waste stream going to landfill. (It is proposed that vegetation will be removed from the waste-stream in the future); and

- Consideration was not made for reductions in the waste stream due to recycling. The encouragement of recycling is consistent with government policy and also community expectations.

The expansion of this existing site is considered to provide the lowest impact solution whilst accommodating the LGA's waste requirements in accordance with Council's waste strategy. Expanding the existing facility means that there would be no requirement to utilise another, separate site for a new landfill facility (which would cause disturbance and social impacts for another new area).

Due to the nature of the proposed development (i.e. extensions to an existing facility), changes in land use would not be required, and demographic changes to the Awaba township or the Lake Macquarie LGA would be unlikely to occur. The proposed development is not anticipated to generate changes to the level of income across the community, nor instigate changes to the community structure, character or beliefs of the Awaba township or the LGA as a whole. Social cohesion and quality of life in the vicinity of the proposal is not anticipated to change given that the AWMF is an already operational, existing facility.

The health and safety of the community is unlikely to be negatively impacted by the proposed development due to the stringent waste treatment and hazard management controls that are currently occurring and that would continue to be implemented at the AWMF. The proposed additions have been designed using industry best-practice techniques and standards so that environmental and health and safety issues can be sufficiently addressed. Some isolated incidents of criminal activity have occurred at the site in the past, mainly relating to vandalism. Criminal activity and anti-social or nuisance behaviour is unlikely to increase as a result of the proposal, given that the AWMF is an existing facility. In addition, design features of the proposed development aim to inhibit such illegal behaviour.

The installation of new waste treatment facilities can have negative social outcomes including decreased housing affordability for areas within close proximity of a new site (e.g. Bouvier *et al*., 2000 and Nelson *et al*., 1992). However, in the case of the AWMF, housing affordability is unlikely to be affected by the proposed extensions, given that the site is already used as a waste treatment facility and has been since the 1980s.

1.3 Statutory Context

In accordance with Clause 6 (and Schedule 1) of State Environmental Planning Policy (Major Development) 2005 (Major Development SEPP), the Minster is of the opinion that the proposed additions to the AWMF are of a kind to which Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies. As such, LMCC (the proponent) sought project approval under Part 3A of the EP& A Act. Since the commencement of the EA, Part 3A of the EP&A Act was repealed. However, in accordance with Schedule 6A of the EP&A Act, Part 3A of this Act continues to apply to and in respect of a transitional Part 3A project. The proposed additions to and expansion of the AWMF is considered a transitional Part 3A project as it is:

A project for which environmental assessment requirements for approval to carry out the project, or for approval of a concept plan for the project, were notified or adopted before the relevant Part 3A repeal date

As such, the provisions of the now repealed Part 3A of the EP&A Act apply to this project.

LMCC prepared and submitted a Major project application accompanied by a Preliminary Environmental Assessment, on 11 August 2010.

Following consultation with relevant government authorities, the Director-General of the Department of Planning and Infrastructure (DP&I) (formerly Department of Planning) prepared and issued the Director-General's Requirements (DGRs) under Section 75F of the EP&A Act. The Director-General issued the DGRs to LMCC for the additions to the AWMF on 21 September 2010.

Amended DGRs were issued by the Director-General of the DP&I on 3 July 2011. The DGRs were amended to include the requirements of Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) in response to the proposed works being declared a controlled action under the EPBC Act.

This Submissions Report and Revised Statement of Commitments will be submitted to the Director General, thereby fulfilling the proponent's requirements under the EP&A Act.

1.4 Structure of the Document

Table 1.1 outlines the structure of the Submissions Report and provides a brief description of the information contained within each chapter.

Table 1.1: Structure of the Submissions Report

Report Chapters and Appendices	Description
Chapter 1: Overview of the Project	This chapter provides a brief introduction to the proposed additions to the Awaba Waste Management Facility and details the structure of the environmental assessment report.
Chapter 2: Project Exhibition Details	This chapter describes the project exhibition process and provides details of when and where the project was placed on public exhibition. A summary of the key issues identified during the exhibition is also provided.
Chapter 3: Summary of Submissions	This chapter documents the number of responses received and identifies who provided them. A response to each issue raised is then provided.
Chapter 4: Revised Statement of Commitments	Revised Statement of Commitments resulting from submissions received during notification
Chapter 5: References	Provides the references used in the preparation of this report. Additional references are also included in specialist technical reports where appropriate.

Report Chapters and Appendices	Description
Appendix A	Additional information package provided to EPA in relation to landfill design and staging.
Appendix B	Report on the 3 bin system.
Appendix C	Map showing 'Green Systems' across the LMCC area.
Appendix D	Preliminary Hazard Analysis (PHA) provided to DoPI as an additional information package.
Appendix E	Additional groundwater monitoring data provided to NSW Office for Water.

2 Project Exhibition Details

This chapter describes the public exhibition process and provides details of when and where the project was placed on public exhibition. A summary of the key issues raised during the exhibition is also provided.

2.1 Public Exhibition of the Environmental Assessment

In accordance with Part 3A of the EP& Act, the AWMF EA was publically exhibited between 14 September 2012 and 30 October 2012. The EA was on exhibition for a period of 6 weeks and hard copies were available at:

- DP&I (Head Office);
- Lake Macquarie City Council; and
- Nature Conservation Council.

A copy of the EA was also available to the public on the DP&I website throughout this period.

An additional community drop in session was held during the exhibition period on 10 October 2012 to provide the public and stakeholders with an opportunity to ask specific questions about the Project. This session was attended by DP&I, LMCC and Cardno staff.

Once the public exhibition period had closed, the DP&I provided LMCC with copies of submissions received during the exhibition period.

It is noted that no modifications to the project described in the EA report are proposed as a result of the public exhibition responses received, however additional information is provided (Appendix A) to provide additional detail and explanation of the proposal in response to comments received, in particular from the EPA.

2.2 Summary of key issues

Section 3 of this document provides a response to each submission received during the public exhibition. A number of the 22 responses received identified similar issues. The project team identified 5 key issues, each of which is summarised and discussed in **Sections 2.2.1–0** below.

2.2.1 Biodiversity

Respondents 5, 6, 8, 12, 14,15, 17, 18, 19 raised issues relating to biodiversity. (Respondents are identified in **Section 3.2.1**).

SEWPAC and OEH both identified a requirement to formally establish a BioBanking site prior to undertaking any of the proposed works. A number of respondents made suggestions about land parcels which could be used to offset the development through conservation of those lands.

The Statement of Commitments includes a commitment by LMCC to:

- Finalise a BioBanking Statement for the Lot 372 Development Site;
- Finalise a BioBanking Agreement for a BioBank Site (comprising part of Lot 372, part Lot 373 and an additional suitable area of land);
- Undertake these assessments using the BioBanking Assessment Methodology;
- Upon establishment of the Awaba BioBank Site, LMCC will ensure that 392 Ecosystem Credits of the required vegetation types and 33,853 Tetratheca juncea Species Credits will be retired within the BioBanking Scheme.

The areas proposed for Biobanking on Lots 372 and 373 are shown in Figure 1. It is noted that the Awaba BioBank site currently comprises two Lots:

- Lot 372 which is currently Crown Land under the ownership of the NSW State Government and held in trust (the Trustee being Lake Macquarie City Council).
- Lot 373 which is owned by LMCC.

Prior to the Biobanking agreement being obtained, it is understood that Lot 372 would need to be acquired by LMCC, and this is noted in the revised statement of commitments. LMCC still consider that a condition of approval in this regard is not necessary, however should the Department of Planning and Infrastructure countenance an approval which includes such a condition, LMCC would not object.

The Awaba BioBank site will also include a third lot which is currently under ownership of another, confidential party. LMCC have an agreement to purchase the third lot required, with the agreement being subject to approval being granted for the expansion of the AWMF to proceed. SEWPAC have been provided with details of the third lot in order to assist them in their appraisal

of the project, however the details of this site are at this stage confidential, and are not disclosed in this report.

Both OEH, and SEWPAC have indicated that statement of commitments made in relation to BioBanking and biodiversity offsetting are sufficient and adequately meet their requirements.

LMCC noted that a number of the responses received during the exhibition of the EA identified specific parcels of land which could be conserved as a way of providing biodiversity offsets. These included areas of land that were considered to be of high ecological value or to be important in linking green corridors by the respondent.

As noted above, an additional land parcel is being purchased by LMCC in order to provide for suitable biodiversity offsetting, and at this stage the location of that land parcel is considered to be confidential. The criteria for the land to be purchased were that it should:

- Contain similar ecosystems and species as are present at the development site;
- Be within reasonable proximity of the development site; and
- Be available for purchase by LMCC.

The proposed site has been identified to SEWPAC and is considered to meet all these essential criteria.

It is noted that there is an existing mining lease and an exploration lease over the proposed biobanking site (ML1452 and EL5138), and it is understood that written consent must be obtained for a biobanking agreement for land that is the subject of a mining lease or mineral claim under the Mining Act 1992 from the holder of the lease or claim.

As part of the biobanking agreement process, consent is also required from the Minister for the Environment and the Minister for Resources and Energy prior to the biobanking agreement being made. The revised statement of commitments (**Table 4.1)** includes a commitment to reaching this agreement prior to finalising a biobanking agreement, however consent from these parties to make the application and obtain approval is not required at this time. This is consistent with the response received from the Department of Trade and Investment Resources and Energy dated 28 February 2013.

2.2.2 Landfill design / Leachate Management / Gas collection

Respondents 1, 10 and 15 raised issues relating to Landfill design / Leachate Management / Gas collection

The EPA and a number of other submissions requested further information relating to how landfill gas and leachate could be effectively collected from all areas of the proposed landfill site. Most notably the EPA requested that additional details of the proposed landfill design and construction methodology be provided to them to assist them with their assessment of the proposal. NSW Office of Water also requested, and have been provided with, additional groundwater monitoring data to help them in their assessment of the proposal.

In response to the EPA request a supplementary document package was issued to them (dated 13 November 2012), which included:

- Additional plan drawings showing how the expansion of the landfill will be staged, and identifying the locations and indicative timing at which base liners, sidewall liners, piggy back liners and final capping will be installed;
- Additional cross sectional drawings identifying the heights of existing and final surfaces;
- Additional information about the void space (in m^3) which will be created by each of the new landfill cells.

The package of information provided to the EPA is included in full as **Appendix A.**

Following issue of the document package, a technical meeting was held at the Department of Planning and Infrastructure (DP&I), which was attended by the EPA, LMCC (proponent), Cardno and GHD (proponents consultants) and ERM (consultant acting on behalf of DP&I) to discuss the design package. Following the meeting, EPA provided a further written response (dated 7 December 2012) in relation to the project which states that:

> *'The proposal provides for 3 new cells, 2 of which will be newly excavated areas and a third will be landfilled over a proportion of the historical waste. A Piggy Back Liner (PBL) will be placed between the historical waste and new cell above. Based on the advice received at meeting with the proponent, Council, the consultants and officers from Department of Planning and Infrastructure and the EPA, the EPA consider that the infrastructure can be installed and measures can be implemented to ensure that landfill gas within the waste underlying the PBL can be managed.'*

During the preparation of this submissions report, NSW office for water requested that additional data showing groundwater monitoring records from the site was provided. LMCC routinely monitor groundwater at the site in accordance with the conditions of their Environmental Protection Licence, and report the results to the EPA on an annual basis.

The following additional data has been provided to the NSW office of water:

- A summary of the monitoring data (in .pdf format) was provided to NSW office for water on 5 March 2013;
- A plan showing the monitoring locations was provided to NSW office of water on 6 March 2013;
- The monitoring data was re-submitted to NSW office of water in Microsoft excel format on 12 March 2013.

A copy of the additional data which has been provided can be found in **Appendix E** (in .pdf format) along with the plan of monitoring locations.

2.2.3 Visual Impact

Respondent 16 raised the issue of visual impact.

A community response identified a concern that the proposed landfill facility would be visible from the Awaba township, and that this would have a significant impact on visual amenity from that location. The response questioned whether the expansion could be undertaken to a lower final height.

The proposed final height of the landfill has been determined by design considerations which aim to maximise the volume of waste which can be accommodated at the site, providing a long term, secure waste management strategy for LMCC.

An analysis of the terrain and relative locations of the facility and Awaba township indicates that the AWMF will not become visible from Awaba until the landfill reaches a height of around 105m AHD, assuming vegetation on the ridgeline remains in place and has a height of 10-15m. The final height of the facility will be 110m AHD, so it will only be visible during the later stages of filling. Moreover, due to the distance from the Awaba township and the progressive covering and revegetation of the emplacement, the proposed development is not considered likely to introduce an adverse visual impact to the visual catchment of the locality.

The landfill could be developed to a lower height, however this would require alternative waste disposal facilities to be identified and developed. In contrast to the current proposal, development of a new facility elsewhere would likely have a significantly greater impact on the receiving environment than use of the existing site.

2.2.4 Odour

Respondents 15 and 16 raised issues relating to odour

2 respondents raised issues in relation to odour from the existing landfill operation, and one of these respondents also expressed concern about the potential health impacts associated with gases released from the existing site.

An odour assessment has been undertaken which predicts levels of odour will not exceed relevant criteria. Despite this, the landfill management plan contains measures to minimise odour generation at the site. We do not consider any change to the odour control and monitoring standards is required.

It is also noted that separate comments were received from both the EPA and LMCC in relation to odour. These submissions expressed the view that the odour modelling carried out was appropriate, and did not identify any unacceptable predicted levels of odour at sensitive receptors.

2.2.5 Preliminary Hazard Analysis (PHA)

DP&I identified the need to undertake a PHA in accordance with the requirements of SEPP 33 for the proposed expansion of the landfill facility.

In response to this requirement, a PHA for the facility was undertaken and issued to the DP&I as a supplementary document (dated 13 November 2012). The PHA concluded that:

- The hazard analysis does not identify any risks with a residual risk classified as Major, and does not identify any significant hazards or major off site consequences for the project. It is considered that the identified mitigation and management measures will effectively control the hazards, such that the project would not result in a significant risk to human health, life or property or the biophysical environment.

The full PHA is provided as **Appendix D.**

3 Summary of, and Response to Submissions

This chapter documents the number of responses received and identifies who provided them. A response to each issue raised is then provided.

3.1 Submissions Summary

In total responses from 22 groups or individuals were received. These were broken down as follows:

- 10 agency submissions (noting that both EPA and Centennial Coal provided an initial response, and a later follow up response. In each case, the 2 documents from each organisation have been treated as being from 1 respondent);
- 3 special interest group submissions;
- 9 community submissions.

3.2 Respondents details

Responses were received during the public exhibition period from the organisations and individuals identified in **Sections 3.2.1-3.2.3**

3.2.1 Agency Stakeholders

Respondent ID	Respondent Name
1	Environment Protection Agency (EPA)
2	Hunter Water Corporation (HWC)
3	NSW Roads and Maritime Services (RMS)
4	NSW Rural Fire Service (RFS)
5	NSW Office of Environment and Heritage (OEH)
6	Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)
7	NSW Mine Subsidence Board
8	Lake Macquarie City Council (LMCC)
9	Catchment and Lands
10	NSW Office of Water

3.2.2 Special Interest Groups

Respondent ID	Respondent Name
11	Rathmines Progress Association (RPA)
12	Centennial Coal
13	No Open Cut Mines for Awaba

3.2.3 Community

Respondent ID	Respondent Name
14	Robyn Charlton
15	Paul Moors
16	David and Simone Mowczan
17	Confidential 1
18	Confidential 2
19	Kim Weller
20	Lindsay Jamison
21	Sadie Williams
22	Craig Williams

3.3 Response to Issues

Each of the 22 responses received has been summarised in **Table 3.1.** The majority of the responses received raised more than 1 issue, and where this is the case, each issue has been considered on a separate line in the table.

The project team have considered each issue raised, and **Table 3.1** also provides a response to each of the issues.

Table 3.1. Detailed Response to issues.

SUBMISSIONS IN REPLY
Additions to Awaba Waste Management Facility
600308/Rep2744_v4

Respondent #	Respondent	Issue Category	Issue Summary	Response
1	EPA Letter 1	Landfill Design	Cross-sectional concept details and drawings for each of the cells in areas A, B and C is required.	A supplementary information package was provided to the EPA to provide the additional information requested. A copy of the additional information provided is contained in Appendix A.
		Landfill Design	Plan drawings showing the horizontal extent of the proposed new cells in relation to the site boundaries, existing waste emplacement etc. is required.	A supplementary information package was provided to the EPA to provide the additional information requested. A copy of the additional information provided is contained in Appendix A.
		Landfill Design	Clarification is required regarding the extent of the waste that will be placed against batters of existing cells and locations of same.	A supplementary information package was provided to the EPA to provide the additional information requested. A copy of the additional information provided is contained in Appendix A.
		Landfill Design	Confirmation is required regarding the actual size and capacity of cells A and B. The EA appears inconsistent with the July 2010 GHD Feasibility Analysis.	A supplementary information package was provided to the EPA to provide the additional information requested. A copy of the additional information provided is contained in Appendix A.
		Landfill Design	The EPA seeks that an extension of time be granted upon which to submit a detailed submission so as to ensure that the information can be received and given appropriate consideration.	N/A
	EPA Letter 2	Air Quality	The EPA has reviewed the Air Quality Impact Assessment prepared by PAE Holmes (March 2012), and notes that there is a low risk of adverse air impacts provided operations are well managed and consistent with those proposed in the EA.	Comment noted. No response required.
		Odour	The EPA notes that the predicted odour, dust and NOx impacts at sensitive receptors are well below EPA criteria. Given the low risk of potential impacts existing licence conditions relevant to odour are sufficient for the proposed expansion.	Comment noted. No response required.
		Noise and Vibration	The EPA notes that the intensity of operations at the subject Premises is not proposed to increase and therefore it is expected that operational noise levels will not change significantly over time. Existing background noise levels have not been provided and the operational noise has therefore not been predicted in the EA.	Comment noted. No response required.
			The EPA has recommended noise level limits on the current EPL; however, the EPA has proposed that a comprehensive Noise Assessment be undertaken by January 2016 identifying all noise generating activities on the site and site specific operational noise levels that are consistent with EPA policies.	Comment noted. LMCC expect this requirement to become a condition of consent, and will ensure any such condition is complied with.
			The EPA has noted that the construction noise at sensitive receivers has been predicted using 'maximum' equipment sound power levels given in the draft Construction Noise Guide(DECC 2008) coupled with hemispherical representative of the overall noise level. Noise from the construction of the rising main will not affect any resident for an extended period of time.	Comment noted. No response required.
			Noise from the Premises must not exceed: • An LA10 (15 minutes) noise emission criterion of 45 dB(A) (7am to 6pm) Monday to Sunday; • An LA10 (15 minutes) noise emission criterion of 45 dB(A) during the evening (6pm to 10pm) Monday to Friday; • At all other times, an LA10 (15 minutes) noise emission criterion of 35 dB(A), except as expressly provided by the EPL.	Comment noted. LMCC expect this requirement to become a condition of consent, and will ensure any such condition is complied with.
			Noise from the Premises is to be measured at any point within 6 metres of the nearest affected residence or other noise sensitive areas in the vicinity to determine compliance with this condition.	Comment noted. LMCC expect this requirement to become a condition of consent, and will ensure any such condition is complied with.
			Construction must only take place within the hours of 7am to 6pm Monday to Friday, 8am to 1pm Saturday. No construction may take place on Sundays or Public Holidays.	Comment noted. LMCC expect this requirement to become a condition of consent, and will ensure any such condition is complied with.
1			The proponent must prepare and implement a detailed Construction Noise Management Plan (CNMP), prior to commencement of construction activities. The Noise Assessment must be performed in accordance with the NSW Industrial Noise Policy (EPA 2000) or the relevant policy adopted by the EPA at the time of the Noise Assessment and include the following: • Identification of any noise sensitive locations, which must be mapped or comprehensively described, • The existing background and ambient noise levels determined for each sensitive receiver, • Derivation and identification of the project specific noise levels for each sensitive receiver, • The expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc.) likely to be generated from noise sources during operation. Include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods or references used to determine noise source levels, • The noise levels likely to be received at the most sensitive receivers, including potential impacts for any identified significant meteorological conditions, • Discuss the findings of the predictive modelling and direct monitoring and, where relevant noise criteria have not been met, recommend additional mitigation measures, • Include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation • After application of all feasible and reasonable mitigation measures, quantify the residual level of noise impact by identifying locations of where noise level exceeds the criteria and the extent of exceedance; numbers of people or areas affected; time when criteria will be exceeded; likely impact on activities; change in ambient conditions; and the result of any community consultation or negotiated agreement.	Comment noted. LMCC expect this requirement to become a condition of consent, and will ensure any such condition is complied with.

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			The proposal provides for 3 new cells, 2 of which will be newly excavated areas and a third will be landfilled over a proportion of the historical waste. A Piggy Back Liner (PBL) will be placed between the historical waste and new cell above. Based on the advice received at meeting with the proponent, Council, the consultants and officers from Department of Planning and Infrastructure and the EPA, the EPA consider that the infrastructure can be installed and measures can be implemented to ensure that landfill gas within the waste underlying the PBL can be managed.	Comment noted. No response required.
			The EPA notes that the Department of Planning and Infrastructure may consider a staged approval process for the proposed cell design and construction. To this end, regarding cell design details, the EPA requests that information be provided at the Licence variation application stage, if the proposal is approved.	Comment noted. LMCC will ensure information requested as a condition of approval is provided in a timely manner.
		Cell Design and Lining System	Should approval for the proposal be granted the EPA recommends that comprehensive cell design details are required to be submitted to the EPA at the Licence Variation Application Stage (for Sidewall, Base and Piggyback components) that include but are not necessarily limited to: •Plans with cross sections at suitable scale depicting dimensions of the proposed landfill cell extensions. The floors of the cells should have transverse gradients of greater than 3% and longitude gradients greater than 1%. All levels should be relative to AHD. A plan must also be provided depicting the boundary of the Premises subject to the development application and the lot and DP numbers of this land, • Engineering design detail of the proposed cell extension lining and proposed anchoring, • Engineering design detail of the proposed cell extension capping, • Plans and design specifications and arrangements of leachate collections and disposal systems, • Plans indicating the design specifications and arrangement of landfill gas collection systems, • The details required in the items above are to be prepared by a suitably qualified engineer who has considerable experience in the design and construction of medium to large scale municipal waste landfills. The engineer must have qualifications acceptable to the Institute of Engineers Australia.	Comment noted. LMCC will ensure information requested as a condition of approval is provided in a timely manner.
			The cell design must meet all the recommendations and requirements of the Mine Subsidence Board. Confirmation must be provided to the EPA at Licence Variation Application Stage that the mine subsidence board has reviewed and approved the final cell design details.	Comment noted. LMCC will ensure information requested as a condition of approval is provided in a timely manner.
		Conditions of Approval	The EPL 5873 is held by Lake Macquarie City Council for the scheduled activity of Waste Disposal-application to land at the Premises. Prior to commencing any works in relation to the proposal the Licence holder will be required to apply to the EPA for a Licence Variation Application. The EPA, in considering the Licence Variation Application will apply Licence conditions as considered appropriate, at that time, to control the impact of pollution from the Premises.	Comment noted. LMCC undertake to apply for a Licence Variation with respect to the existing EPL 5873 prior to commencing works associated with the proposal.
11	Rathmines Progress Association (RPA)	Leachate	Other disused tips (Kilaben bay and Dorrington Road) present in the vicinity of Kilaben Bay were not mentioned. Capping, leachate, noxious weeds, public safety and health issues from these sites.	This issue is not relevant to the proposal to expand the capacity of the AWMF, and has not been addressed in this response.
		Capping	Please advise if Dorrington Road tip (which is intended to be longwalled - LW110 and LW111) was capped when closed.	This issue is not relevant to the proposal to expand the capacity of the AWMF, and has not been addressed in this response.
		Mine Subsidence	The RPA has had several meetings with Centennial Coal regarding the Newstan Life Extension and Subsidence Management Plan Longwalls 101 to 103. Please advise if any of this information was received by you.	The content of the meetings with RPA was not provided to Cardno, however information has been provided by Centennial Coal in relation to managing subsidence through the consultation process, and the detailed design of the Landfill expansion will ensure that the subsidence parameters provided by them are allowed for.
		Hazardous waste	The EA did not discuss the disposal of asbestos at the facility. It is understood that there is a register kept of asbestos weight delivered, name and address of person or company. Please supply total quantities for the last two years.	Records of asbestos disposal at the site are maintained. 167.1 tonnes of asbestos containing materials was disposed of at the site during the period 1/7/11 - 30/6/12, and 405.88 Tonnes during the preceding year.
		Construction timeline	Please give a construction timeline for proposed sewer pipeline, i.e. before or after longwall 110 and 111 are completed.	The proposed sewer pipeline will be constructed prior to the commencement of filling of the new landfill cells, with construction expected sometime in 2013 or 2014, assuming approval is granted. We do not have information on the proposed timeframes for completion of Longwalls 110 and 111 , and cannot comment on the timeframes for these activities which are being undertaken by Centennial Coal.
		Leachate	In the event of environmental catastrophe due to leachate contamination, the onus of proof is on LMCC (us as rate payers) to prove that it was not LMCCs fault event though there has been longwalling under LMCC assets. Is this correct?	Consideration of the legal responsibility in the event of leachate leakage due to events outside the control of LMCC is beyond the scope of the EA, however the risk of leachate loss is being formally considered during landfill design, and as part of a risk management strategy for the site. The AWMF facility is being designed to accommodate the predicted levels of mine subsidence. Once the AWMF is approved and constructed in accordance with the approval, LMCC is insured through the Mine Subsidence Board for the impacts of any mining activity which occur as a result of subsidence beyond the predicted parameters.
		Hazards and risks	It is understood that significant quantities of gas are released upon longwalling. Please advise if methane gas capture and energy generation on site has any dangerous conflict with released gas from the longwall underneath.	The lining systems which will be applied at the AWMF will effectively isolate the landfill mass from the surrounding ground. Gas collection systems within the AWMF will be designed to safely manage the gas from the AWMF by collection and combustion for energy generation. Gas released during longwall mining will need to be assessed and suitably managed by Centennial Coal, however due to the location of generation, it is not expected to interact or conflict with the gas generated at the AWMF, or the gas collection infrastructure at the AWMF.

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		Water quality	No follow up to community consultation questionnaire. Environmental degradation of Stockyard Creek including higher than ANZECC trigger results for Lords, Stockyard and Kilaben Creeks. Please advise if you were aware of this.	The community consultation response submitted was in relation to the proposed development of an Alternative Waste Treatment Facility (AWT) adjacent to the AWMF site. A separate EA for the AWT is currently being prepared, and a formal response to the issues raised in the questionnaire will be provided in the AWT EA. It is noted however, that the project team is aware of the comments made in relation to Lords, Stockyard and Kilaben Creeks. Testing of stormwater quality at the site is undertaken in accordance with the sites Licence requirements, and can be used to demonstrate that the source of any downstream issues is not the AWMF.
		Consultation	Please advise of the AWMF final submission date to NSW Planning.	This submissions report is being prepared for submission to the Department of Planning in the first week of February 2013. It will be submitted with a revised statement of commitments. The proponent does not expect to submit any additional information, (unless requested by the Department of Planning to do so) after this time.
		Consultation	Please provide your email in case we have more questions.	Questions about this submission should be directed to the Department of Planning and Infrastructure. Contact details are provided on the Department's web page which can be located at http://www.planning.nsw.gov.au/contact-us
		Consultation	We consider the RPA to be stakeholders in the EA process. We request to be included in the information streaming between LMCC and Centennial Coal with reference to this EA.	LMCC are committed to engaging community and stakeholder groups in order to inform key Council decisions. Consultation is undertaken at appropriate times and using appropriate, defined and transparent methods. We do not consider however that it is practical to make public all discussions between LMCC and Centennial Coal, and in some cases are unable to do so for commercial reasons, however the final outcomes of any solutions will be made publically available through Council's normal channels or the approvals process.
3	Roads and Maritime Services	Traffic	RMS has no objection to the subject development provided that the following is addressed and included in the Ministers conditions of approval: - Construction Traffic Management Plan (CTMP) including a Vehicle Movement Plan should be submitted to RMS for review and acceptance prior to construction.	The Statement of Commitments includes a commitment to prepare and implement a Construction Traffic Management Plan. This will be submitted to RMS for review and acceptance prior to construction as requested.
		Pipeline design	As the provision of a new rising main between the site and Rathmines will cross a State road, we have attached an Appendix with RMS requirements for the design and construction of pipelines in and across the road reserve.	The RMS requirements in the document provided will be adopted as minimum design standards during the detailed design phase.
4	Rural Fire Service	Bushfire management	The new reuse centre and amenities shall comply with Section 3 and Section 7 of the Australian Standard AS3959-2009 Construction of buildings in bush fire-prone areas.	The standards defined in Section 3 and Section 7 of the Australian Standard AS3959-2009 will be adopted as minimum design standards during the detailed design phase.
		Bushfire management	A Bush Fire Emergency Evacuation Plan shall be prepared for the facility or the existing plan is to be amended to include the new additions.	The Statement of Commitments includes a commitment to revise the site specific Fire Management Plan within the Awaba Landfill Environmental Management Plan to ensure it remains current considering the proposed works.
14	Robyn Charlton	Biodiversity offsetting	I believe that it is of utmost importance that Council purchases the Crown land that is marked 'DP755218' as it is important land to build the wildlife corridor from the mountains to the lake. Other land to be considered for purchase and conservation include DP1149082 and DP1164232 as they are also an important part of the wildlife corridor. (Note that this submission also included a number of maps of the area).	LMCC are committed to purchasing suitable land to biobank in order to offset the biodiversity impacts of the development. The criteria for the land to be purchased are that it should contain similar ecosystems and species as are present at the development site, should be within reasonable proximity of the development site, and be available for purchase by LMCC. If the offsetting proposal provides for complimentary community benefit this will be seen as an additional positive outcome.
15	Paul Moors	Consultation	Community consultation should allow ample time for the busy community to feel comfortable with its understanding of the project. I have not been able to achieve this.	The comment is noted. LMCC have made significant effort to engage the community in the assessment process, as described in Section 4 of the EA.
		General	Dumping fees should be eliminated to discourage illegal dumping.	In order to ensure that there is a waste service available to the residents of LMCC, it is necessary to levy fees in order to provide and maintain these services. We acknowledge the issue of illegal dumping, and LMCC have a range of measures in place to address this issue.
		Waste management	Greater focus should be on creating a regional waste disposal centre, using existing open cut mine holes over a number of Hunter Council areas.	A regional waste strategy has been considered previously, however this was found not to be viable. Further information is contained in Section 2.3 of the EA.
		Leachate	There does not seem to be many details (other that Table 6.14) on the quality of leachate discharged at Rathmines into the Rathmines No. 6 WWPS or its effect on Lake Macquarie. The leachate should be treated to eliminate all components not of natural origin. Leachate used for spraying should be of this quality and should not contribute to the pollution of the area.	Discharges of leachate from the site through the leachate pipeline to Rathmines have been discussed with Hunter Water Corporation, who have confirmed that the quality and quantity of the proposed discharge can be successfully managed and treated at the Rathmines No.6 WWPS. Leachate is currently sprayed on site under the terms of the EPA licence. This occurs only on landfilled areas, and is subject to licence requirements.
		Wastewater	The projects wastewater should not be treated in isolation, there are a number of other sources of pollution to Lake Macquarie from human uses and industries including mining, power stations etc. should aim to reduce to total pollution load to Lake Macquarie, not increase it.	Overland flows are directed around the landfill site in order to prevent the generation of wastewater wherever possible. There is no significant wastewater generation as a result of the operations, however leachate is generated. Discharges of leachate from the site through the leachate pipeline to Rathmines have been discussed with Hunter Water Corporation, who have confirmed that the quality and quantity of the proposed discharge can be successfully managed and treated at the Rathmines No.6 WWPS. Leachate is currently sprayed on site under the terms of the EPA licence. This occurs only on landfilled areas, and is subject to licence requirements.
		Mine subsidence	The community should not bear any costs arising from making profits from coal mining, nor dealing with the Mine Subsidence Board. Mining under any of the AWMF, the pipeline, or surrounding areas should be prohibited given the uncertainty of predicting mine subsidence.	Control of which areas will be mined in the future is beyond the control of LMCC, however it is noted that the Mine Subsidence Board have provided mine subsidence parameters which will be incorporated into the landfill design.
		Landfill gas	Landfill gas should be collected for power generation. Penalties should be issued for fugitive emissions and flaring with regard to the greenhouse gases. Such penalties may be able to justify an auxiliary compressor installation for downtime of the main compressor.	Infrastructure for the capture of landfill gas for power generation is installed at the site, and will be upgraded at the site during the proposed expansion. Flaring is a less preferred option, since there is already a financial incentive to generate and sell electricity. Additional penalties would not change the current arrangement.
		Odour	the current waste site can frequently be smelt on the road from Toronto south. There should be a lifting of odour control and monitoring standards.	An odour assessment has been undertaken which predicts levels of odour will not exceed relevant criteria. Despite this, the landfill management plan contains measures to minimise odour generation at the site. We do not consider any change to the odour control and monitoring standards is required.

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		Biodiversity offsetting	Council should take the opportunity to purchase Crown Land known as DP755218 as a priority, and also DP1149082 and DP1164232. These lots would facilitate the establishment of a permanent wildlife corridor for this area consistent with Council's proposed conservation area.	LMCC are committed to purchasing suitable land to biobank in order to offset the biodiversity impacts of the development. The criteria for the land to be purchased are that it should contain similar ecosystems and species as are present at the development site, should be within reasonable proximity of the development site, and be available for purchase by LMCC. Specific parcels of land which are being considered cannot be publically identified at this stage due to commercial reasons.
16	David and Simone Mowczan (Note this is a well structured 28 page submission)	Non-compliance	We would like to bring your attention to the history of the current facility including the ruling by the Land and Environment Court in 1999 and multiple licence non-compliances over the last 10 years. Given this history of the current site we are not confident that Council can ensure the health and safety of the community if the site is extended.	Comment noted. No response required.
		Odour	Up until 2006 we had not smelt the facility from our home. From 2006 onwards the smell started. We reported the smells, however there are no records of our reports. Only since the application to extend the facility has Council started to document the complaints.	LMCC will continue to record any records of odour complaints using the procedures which have been in place prior to, and since lodgement of the application.
		Odour	We do not think that using data from a facility in Sydney is applicable to the Awaba landfill.	The Air Quality Modelling report presented in Appendix L of the EA uses measured odour emissions data from the Eastern Creek landfill operation in Sydney, and assumes that the emissions from the Awaba sites will be equivalent. Table 5.2 of Appendix L of the EA provides the actual values used in the report, measured in Odour units (OU) released from an area of exposed surface (m2) each second. This application of the Eastern Creek data is considered to be scientifically valid, because the characteristics of the waste being landfilled is similar, and because it is being treated and managed in a similar way. It is also noted that Table 5.2 of Appendix L of the EA presents a range of measured values, and the value chosen for the assessment is the maximum of these values as described in Section 5.3.1 of the same document. This is considered to provide a conservative assessment of odour impact (i.e. is likely to predict a greater level of impact than will actually occur).
		Air Quality	A study needs to be undertaken to evaluate the human health impacts of the proposal given that studies have been done to suggest a higher risk of cancers and birth defects when living close to landfills. Application has not described the harmful effects experienced currently by residents or identified enough strategies to control exposure of the public to landfill gas and odours.	LMCC has prepared the EA to meet the Director General Requirements, and all other requirements identified during stakeholder consultation. A human health impact assessment is not considered necessary by LMCC, and has not been requested by any regulatory agency.
		Visual amenity	We believe that there will be increased birds, vermin and trucks being able to be seen as the landfill becomes visible over the hills. Noise will also increase. Also increased health risks from the landfill not being sheltered by the surrounding hills. I see no reason why the expansion cannot occur without having to rise above the mountain height.	The proposed final height of the landfill has been determined by design considerations which aim to maximise the volume of waste which can be accommodated at the site, providing a long term, secure waste management strategy for LMCC. An analysis of the terrain and relative locations of the facility and Awaba township indicates that the AWMF will not become visible from Awaba until the landfill reaches a height of around 105m, assuming vegetation on the ridgeline remains in place and has a height of 10-15m. The final height of the facility will be 110m, so it will only be visible during the later stages of filling. The landfill could be developed to a lower height, however this would require alternative waste disposal facilities to be identified and developed. Development of new facilities are expected to have significantly greater impacts than use of the existing site. The impacts associated with visual and noise impacts from the expansion are discussed in Sections 6.9 and 6.13 of the EA, and have been found to be minor.
		Waste management	More research needs to be done to provide a more accurate assumption to the success of this costly 3 bin system. We feel that the survey does not accurately represent the opinion of the whole community. Over the period 2008-2009 there was actually a decline in the amount of recycling in the LGA.	An additional report evaluating the effectiveness of the 3 bin system is appended as Appendix B. This includes a triple bottom analysis and demonstrates that the preferred system being pursued by Council is the cheapest option for the LGA.
		Waste management	The recycling centre/tip shop at the AWMF where people could go to purchase second hand items is no longer operational and this has not been mentioned in the application.	Noted. The shop has ceased operation prior to lodgement of the EA, however recycling activities are continued at the site including using the recycling centre to recover materials from the mixed waste stream.
		General	we believe that this is a case of environmental racism, since Awaba is a small / minority community and this project will impact the community immensely, the economic impact on the community will be irreversible, house prices will be affected and our quality of life will be affected deleteriously.	This comment has been noted. The EA has been undertaken to determine the impacts of the development on the local environment.
2	Hunter Water Corporation	Odour	Hunter Water will require an odour control plan to be submitted to support the application	An odour control plan will be provided to Hunter Water with the application for them to take the leachate.
		Trade Waste	Three samples will be taken by Hunter Water to determine Trade Waste Category	Comment noted. No response required.
		Wastewater	Wastewater quality testing will include but not be limited to the following: Biochemical Oxygen Demand, Non Filterable Residue, pH, Chemical Oxygen Demand, Zinc, Total Kjeldahl Nitrogen, Sulphate, Copper, Chromium, Pesticides - Aldrin, BHC, BHC-A, BHC-B, BHC-C, DDT, DDD, DDE, Dieldrin, HCB, Heptachlor, Lindane, Chlordane.	Comment noted. No response required.
		Wastewater	A sewer Magflow meter will need to be installed to measure discharge and for rating purposes.	The required sewer Magflow meter will be incorporated into the detailed design, and will be installed during construction.
		Wastewater	Whilst there may be a sampling point at the AWMF pump station, Hunter Water will also be able to sample from the receiving access chamber (F3590) via grab or auto sample.	Comment noted. No response required.
		Wastewater	Inspection points along the rising main will need to be installed to verify the ongoing integrity of the pipe and to avoid possible environmental issues from leaks and breaks	The required inspection points will be incorporated into the detailed design, and will be installed during construction.
		Wastewater	The access chamber to which discharge is proposed will require epoxy lining	The required epoxy lining will be incorporated into the detailed design, and will be installed during construction.
		Wastewater	No sludge to be discharged to the receiving access chamber	Environmental controls will be put in place to prevent the discharge of sludge to the receiving access chamber, and the Landfill Environmental Management Plan will be amended accordingly.
		Wastewater	Times and rates of discharge to be agreed	Comment noted. No response required.

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		Wastewater	The proponent has full responsibility for management of odours/septicity	Noted. LMCC accept this responsibility, and will put in place environmental controls to prevent or manage odours and septicity. The Landfill Environmental Management Plan will be amended accordingly.
		Wastewater	A hydraulic assessment application would require a note that the supporting drawings are to be in Hydraulic Format	Noted. A hydraulic assessment application will be made in due course, noting that the supporting drawings will be submitted in Hydraulic format.
5	OEH	Aboriginal Cultural Heritage	OEH acknowledges that the Aboriginal cultural heritage assessment has been undertaken in accordance with the OEH's assessment guidelines. The results of the Aboriginal cultural heritage assessment indicate that Aboriginal cultural heritage values located within the project area will be impacted by the development proposal. It is noted that the proponent has developed a range of appropriate management and mitigation strategies in consultation with the registered Aboriginal parties to address these likely impacts. OEH has recommended conditions of approval below to address these matters. OEH has no additional concerns with the Aboriginal cultural heritage assessment for the project application and recommends that the following conditions of approval for Aboriginal cultural heritage are reflected in any approval conditions for the project.	Comment noted. No response required.
		Aboriginal Cultural Heritage	The proponent must consult with and involve all the registered Aboriginal parties for the project, in the ongoing management of the Aboriginal cultural heritage values. Evidence of the consultation must be collated and provided to the consent authority upon request.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a Cultural Heritage Management Plan (CHMP) is prepared in partnership with the Registered Aboriginal Parties (RAPs) and implemented for the construction phase of the proposed works. The CHMP will demonstrate that effective community consultation with local Aboriginal communities and the RAPs has been undertaken during the preparation of the CHMP and will collate and present all consultation undertaken with the RAPs. The CHMP will include procedures for ongoing Aboriginal consultation and involvement and ongoing management of all Aboriginal cultural heritage values associated with the project area.
		Aboriginal Cultural Heritage	The proponent must prepare a Cultural Heritage Management Plan (CHMP). The CHMP is to be implemented in consultation with the registered Aboriginal parties.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a CHMP is prepared in partnership with the Registered Aboriginal Parties (RAPs) and implemented for the construction phase of the proposed works. The CHMP will include procedures for ongoing Aboriginal consultation and involvement and ongoing management of all Aboriginal cultural heritage values associated with the project area.
		Aboriginal Cultural Heritage	The proponent is to provide fair and reasonable opportunities for the registered aboriginal parties to monitor any initial ground disturbance activities. In the event that additional Aboriginal objects are uncovered during the monitoring program, the objects are to be recorded and managed in accordance with the requirements of Sections 85A and 89A of the National Parks and Wildlife Act 1974	Noted. The Statement of Commitments includes a commitment by LMCC to provide an opportunity for the Registered Aboriginal Parties (RAPs) to undertake a monitoring and collection program and monitor the initial ground disturbance works associated with all sections of the excavations (ground surface impacts) so that any potentially impacted artefacts may be collected by the RAPs. LMCC have also made a commitment to ensure that any new Aboriginal artefacts uncovered due to the development and/or subsurface excavation or monitoring activities will be recorded and registered with the EPA as part of the assessment process in accordance with the requirements of Section 89A of the NPW Act.
		Aboriginal Cultural Heritage	All Aboriginal sites impacted by the project must have an Aboriginal Site Impact Recording (ASIR) form completed and be submitted to the AHIMS Registrar within three (3) months of being impacted.	Noted. LMCC will ensure ASIR forms are completed for all Aboriginal artefacts uncovered due to the development and/or subsurface excavation or monitoring activities and submit them to the AHIMS Registrar within three months of being impacted.
		Aboriginal Cultural Heritage	If human remains are found, work must stop in the immediate area. The NSW police are to be contacted immediately. If the remains are deemed to be Aboriginal, the proponent must contact the Environment Line on 131 555 and representatives of the local Aboriginal Community.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that work is ceased immediately in the event that any bone artefacts are uncovered during earthmoving or other activities, in accordance with the National Parks and Wildlife Act 1974, “stop work” provisions. LMCC will ensure the NSW Police are contacted immediately and if the remains are deemed to be Aboriginal, the Environment Line on 131 555 and the RAPs are also contacted.
		Aboriginal Cultural Heritage	An Aboriginal Cultural Education Induction Program, developed in conjunction with relevant Aboriginal parties, must be developed for the induction of all Personnel and contractors involved in the construction activities. Records of inductions should be maintained.	Noted. The Statement of Commitments includes a commitment by LMCC to develop and implement an Aboriginal Cultural Heritage Induction Program for all personnel associated with the project. LMCC will ensure this Program is developed in conjunction with the RAPs and that all records of inductions are maintained.
		Threatened Biodiversity Assessment	The main issues in regards to threatened biodiversity pertain to the provision of biodiversity offsets and the pre-clearing surveys and any translocation of threatened fauna found.	Comment noted. No response required.
		Biodiversity offsetting	OEH acknowledges the proposed BioBank Agreement site contains additional threatened species and vegetation communities not found in the development footprint, and these extra credits may be retired as needed for other developmental projects in accordance with the rules of BioBanking.	Comment noted. No response required.
		Pre-clearing surveys and translocation of threatened fauna	OEH notes that the EA lacks specific details on who would be involved in any pre clearance surveys and where any captured fauna found during such surveys will be released	The Statement of Commitments has been modified to include the requirement that suitably experienced wildlife handlers will be present during pre-clearance surveys to relocate any fauna located during the works.
		Pre-clearing surveys and translocation of threatened fauna	Any translocation of wildlife must be done in accordance with OEH policy - 'Policy for the Translocation of Threatened Fauna in NSW' (NPWS 2001) and translocation of threatened species will likely require a license (e.g. Section 132 under the National Parks and Wildlife Act 1974 and/or Section 91 under the Threatened Species Conservation Act 1995 if species are being relocated to areas outside the approved development consent area).	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a Fauna Management Plan (FMP) is prepared and implemented prior to commencement of the proposed works that will provide a protocol for responding to the detection and relocation of native fauna present in trees, hollows and logs that lie within the proposed areas for clearing. LMCC will ensure the FMP specifies that translocation of wildlife must be done in accordance with OEH policy (NPWS, 2001) and that translocation of threatened species must only be undertaken once the relevant license has been obtained, if required.
		Threatened Biodiversity Assessment	The proponent must establish a BioBanking Site over the proposed development footprint in accordance with the BioBanking Scheme.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a BioBanking Agreement is formalised for the site. LMCC will finalise a BioBanking Statement for the Lot 372 Development Site and a BioBanking Agreement for the proposed BioBank Site (comprising part of Lot 372, part Lot 373 and an additional suitable area of land (yet to be made available)), in accordance with the BioBanking Scheme.

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		Threatened Biodiversity Assessment	The proponent must provide an offset (BioBanking Agreement Site). The site must include parts of Lots 372 and 373 on DP 723259 and may include additional land. The site must be assessed using the BioBanking Assessment Methodology and must generate the same number of ecosystem and species credits as the Biobanking Site.	Noted. The Statement of Commitments includes a commitment by LMCC to finalise a BioBanking Statement for the Lot 372 Development Site and a BioBanking Agreement for the proposed BioBank Site (comprising part of Lot 372, part Lot 373 and an additional suitable area of land (yet to be made available)), assessed using the BioBanking Assessment Methodology. LMCC have also made a commitment that, upon establishment of the Awaba BioBank Site, LMCC will ensure that 392 Ecosystem Credits of the required vegetation types and 33,853 Tetratheca juncea Species Credits will be retired within the BioBanking Scheme.
		Threatened Biodiversity Assessment	The proponent must ensure that a BioBanking Agreement is established over BioBanking Agreement Site in accordance with the BioBanking Scheme.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a BioBanking Agreement is formalised for the site. LMCC will finalise a BioBanking Statement for the Lot 372 Development Site and a BioBanking Agreement for the proposed BioBank Site (comprising part of Lot 372, part Lot 373 and an additional suitable area of land (yet to be made available)), in accordance with the BioBanking Scheme.
		Threatened Biodiversity Assessment	Pre-clearing surveys are to conducted by suitably qualified and experience ecologist.	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a Vegetation Management Plan (VMP) and a Fauna Management Plan (FMP) are prepared and implemented prior to commencement of the proposed works. LMCC will ensure that the VMP and FMP stipulate that pre-clearance surveys are to be conducted by suitably qualified and experienced ecologists.
		Threatened Biodiversity Assessment	Translocation of any threatened fauna found in the development site is to be conducted in line with OEH policy - Policy for the Translocation of threatened Fauna in NSW (NPWS 2001).	Noted. The Statement of Commitments includes a commitment by LMCC to ensure that a Fauna Management Plan (FMP) is prepared and implemented prior to commencement of the proposed works that will provide a protocol for responding to the detection and relocation of native fauna present in trees, hollows and logs that lie within the proposed areas for clearing. LMCC will ensure the FMP specifies that translocation of any threatened fauna must be done in accordance with OEH policy (NPWS, 2001).
6	SEWPAC First Response (Letter to Department of Planning dated 2/11/2012)	Threatened biodiversity	Proponent is to advise whether any direct, indirect or facilitated impacts on the black-eyed susan (Tetratheca juncea) are likely to be unknown, unpredictable or irreversible.	Section 7.2 of the EA report states that it is considered unlikely by the project team that any relevant impacts of the project are unknown, unpredictable or irreversible. With regards to Tetratheca juncea specifically, the impacts on this species are known and predictable; there will be a loss of up to 2,302 plants and the associated habitat from the immediate population of 14,822 plants and the much wider population due to the project. Although the physical loss of individual Tetratheca juncea plants is irreversible, the impact will be effectively offset using the BioBanking scheme.
		Biodiversity offsetting	Before approval, further information is required about the proposed offsets under the NSW BioBanking scheme, to compensate to the unavoidable impact to matters of NES.	SEWPAC have considered supplementary information provided to them by LMCC, and have provided a second response dated 25 January 2013. The second response (included below) identifies that the information provided adequately addresses the department's requirements. No further response is required.
		Biodiversity offsetting	The proponent should conduct an assessment of how the proposed offset is consistent with the new Commonwealth EPBC Act Environmental Offsets Policy (October 2012)	SEWPAC have considered supplementary information provided to them by LMCC, and have provided a second response dated 25 January 2013. In light of the second response (included below), an assessment of consistency with the new Commonwealth EPBC Act Environmental Offsets Policy (October 2012) is not required.
		Biodiversity offsetting	The size of all proposed offset sites (ha) and a map of the areas that will form the offsets proposed for this development is required	Additional information has been provided to SEWPAC on this issue, however the information is considered confidential, and is not presented in this public response.
		Biodiversity offsetting	The quality of the proposed offset sites, including consideration of the site condition, context and species stocking rates as described in the EPBC Act Environmental Offsets Policy (October 2012)	SEWPAC have considered supplementary information provided to them by LMCC, and have provided a second response dated 25 January 2013. In light of the second response (included below), an assessment of consistency with the new Commonwealth EPBC Act Environmental Offsets Policy (October 2012) is not required.
		Biodiversity offsetting	The current status/risks/threats to the black-eyed susan on the proposed offset sites	There are a number of current threats to Black-eye susan due to the uncontrolled access and presence of weeds at the sites which will be protected under the offsetting program. Full details of how the sites will be managed to maintain and improve the habitat and level of protection will be provided when the agreement is established.
		Biodiversity offsetting	The timeframe in which proposed offsets will be secured	Offsets will be secured once the Project Approval is provided, and prior to the commencement of any works at the site as per the Statement of Commitments.
		Biodiversity offsetting	The timeframe in which proposed offsets will be managed	Offsets will be managed in perpetuity in accordance with the requirements of the Biobanking Agreement which will be made between LMCC and OEH.
		Biodiversity offsetting	Detail how the proposed offset sites will be managed, including how quality will be maintained or improved. Include descriptions of long-term monitoring, thresholds that will prompt corrective actions and what those will be. Describe management activities and associated timeframes	Full details of how the sites will be managed to maintain and improve the habitat and level of protection will be provided when the agreement is established. Opportunities exist to manage access, control illegal dumping and implement weed management programs.
		Biodiversity offsetting	Detail the expected future status/risks/threats to the black-eye susan in the event that offsets are secured managed as intended under the proposed biobanking agreement.	The residual risks will be managed to approach nil within the practical limits of science and resources. Management plans will be agreed with OEH prior to finalising the agreement.
		Biodiversity offsetting	Provide information on the estimated funds required to acquire and manage the proposed offsets	Additional information has been provided to SEWPAC on this issue, however the information is considered confidential, and is not presented in this public response.
		Biodiversity offsetting	Detail the contingencies in place should the proposed properties be unable to be secured as an offset for the project.	An alternative land parcel would be identified and purchased. (Note that this only relates to 1 of the three land parcels which will form the biobank site since 2 are already under Council control. There is an agreement in place to purchase the third required land parcel subject to approval of the EA, and the risk of proposed properties being unavailable is therefore considered very low.
	SEWPAC second response (Email to Department of Planning dated 25 January 2013)	Biodiversity offsetting	The department has considered that the information provided adequately addresses the department's requirements. Specifically, that the use of the lands including part Lot 372 and part Lot 373 DP 7233259 and [an additional Lot disclosed to SEWPAC, but not identified here] as mapped in Figure 2 of the Awaba Landfill Environment Assessment by Niche Environment and Heritage 2011 adequately offsets impacts on 2,302 Tetratheca juncea plants that will be removed by the proposed action.	Comment noted. No response required.

Respondent #	Respondent	Issue Category	Issue Summary	Response
		Biodiversity offsetting	The department has considered the specific circumstances of this proposal, and in this case is prepared to accept that a condition of approval be that the offset lands be secured (as a Biobanking site) prior to commencement of the action.	Comment noted. The requirement to formally enter into a Biobanking agreement prior to commencement of any works at the site has been included within the Statement of Commitments, and LMCC expect this to be a condition of approval.
12	Centennial Coal (Letter 1)	Biodiversity offsetting	Objection to the use of the land identified for BioBanking purposes, on the basis that Centennial has had prior tenure for coal mining which BioBanking could potentially prevent, therefore significantly eroding the economic viability of future mining.	LMCC have obtained legal advice which indicates that there is no barrier to surface mining infrastructure being present on a biobanked site, provided that certain conditions are met on the establishment of the biobank site. It is therefore clear that these issues can be resolved during the establishment of the management plans for the biobanking site. LMCC is aware that in order to form the biobanking agreement, consent is required from the leaseholder, the Minister for the Environment and the Minister for Resources and Energy. The revised statement of committments has been updated to reflect this. It is not considered necessary to obtain the leaseholder consent at this stage, however it is understood that it is required prior to finalisation of the Biobanking agreement. This is consistent with the response received from the Department of Trade and Investment Resources and Energy dated 28 February 2013. It is also noted that Centennial Coal would require approval from LMCC to undertake works on Council land under the terms of the Consolidated Mining Lease. LMCC would be unlikely to give approval to any proposal which compromises Council's own requirements. It is also noted that the second letter received from Centennial Coal (see below) withdrew the objection rasied in their first letter.
		Biodiversity offsetting	It is intended that further consultation be undertaken in an effort to ensure that, as far as reasonably practicable, both the proposed LMCC projects (AWMF and AWTF) and Centennial Newstan's mine expansion can co-exist.	LMCC agrees that the best solution is for the parties to continue to consult with a view to facilitating both the waste management and approved mining activities. This should occur post approval during development of management plans.
12	Centennial Coal (Letter 2)	Biodiversity offsetting	Ammends the submission in Centennial Coal Letter 1, to: 1. Clarify that Centennial Coal do not object to the proposal. 2. Confirm the view that LMCC Biobanking plans can co-exist with Centennial Coal mining plans for the area. 3. States a commitment to continue to work with LMCC in a co-operative manner.	Noted. LMCC agrees that the best solution is for the parties to continue to consult with a view to facilitating both the waste management and approved mining activities. This should occur post approval during development of management plans.
17	Confidential 1	Biodiversity offsetting	The proposed development involves the clearing of habitat containing threatened species such as Tetratheca juncea and land to offset this development is required. This provides the opportunity to conserve and protect a wildlife corridor connecting the Watagan Range to Lake Macquarie. Land adjacent to the Awaba State Forest and Sugarloaf Conservation Area should be purchased by Council to offset this development in order to maximise the benefit of these offsets for biodiversity in the local area. The purchase of Crown Land DP755218 and/or DP1149082, DP1164232 should be made a requirement of approval of this proposal. This is an excellent opportunity to protect an interconnected area of remnant bushland in the west Lake Macquarie area and to conserve the biodiversity of this area.	LMCC are committed to purchasing suitable land to biobank in order to offset the biodiversity impacts of the development. The criteria for the land to be purchased are that it should contain similar ecosystems and species as are present at the development site, should be within reasonable proximity of the development site, and be available for purchase by LMCC (i.e. not the subject of a land claim). If the offsetting proposal provides for complimentary community benefit this will be seen as an additional positive outcome.
18	Confidential 2	Biodiversity offsetting	Land adjacent to the Awaba State Forest and Sugarloaf Conservation Area should be purchased by Council to offset this development in order to maximise the benefit of these offsets for biodiversity in the local area. The purchase of Crown land DP755218 and/or DP1149082, DP1164232 should be made a requirement of approval of this proposal. This is an excellent opportunity to protect an interconnected area of remnant bushland in the west Lake Macquarie area and to conserve the biodiversity of this area	LMCC are committed to purchasing suitable land to biobank in order to offset the biodiversity impacts of the development. The criteria for the land to be purchased are that it should contain similar ecosystems and species as are present at the development site, should be within reasonable proximity of the development site, and be available for purchase by LMCC (i.e. not the subject of a land claim). If the offsetting proposal provides for complimentary community benefit this will be seen as an additional positive outcome.
19	Kim Weller	Biodiversity offsetting	I believe it is important for Council to recognise the obligation to buy appropriate land as offset to the expansion of Awaba Tip.	Comment noted. No response required.
		Biodiversity offsetting	The green corridor must be strengthened by the purchase of Crown Land viz DP755218 and/or DP1149082, DP1164232 so that threat to flora, fauna and habitat can be minimised. The extension of the corridor is part of the original Awaba Conservation Area proposed by Council in 1994. The Awaba Conservation Area is of high biodiversity value and also contains a significant population of Tetratheca Juncea, which is endemic to the NSW coastal area from the Hawkesbury Valley to the mid North Coast.	LMCC are committed to purchasing suitable land to biobank in order to offset the biodiversity impacts of the development. The criteria for the land to be purchased are that it should contain similar ecosystems and species as are present at the development site, should be within reasonable proximity of the development site, and be available for purchase by LMCC (i.e. not the subject of a land claim). If the offsetting proposal provides for complimentary community benefit this will be seen as an additional positive outcome.
		Biodiversity offsetting	Finally, I believe that Council should maintain green corridors in order to provide water catchment areas and safe habitat for fauna between housing developments.	It is beyond the scope of this proposal to deal with a city wide strategy, however it is noted that Council do maintain a strategy which supports these objectives. A map showing the 'Green System' is provided as Appendix C.
20	Lindsay Jamison	General	I write to you in request, a committee from the Department of Planning visit our local area and act as a mediator to both parties about this proposal as I disagree with the expansion put forward and its impacts.	The submission made has been received and reviewed by the Department of Planning and Infrastructure. How they chose to respond to the request is outside the control of either LMCC or Cardno. The EA sets out the need for the project in Section 2.
		General	LMCC has contracted Cardno to do a impact study on these areas for an undisclosed amount of money to have a draft copy of the councils view which I believe the council may edit before submission to the Department of Planning for a brighter outlook.	Noted. The EA is being reviewed by the Department of Planning and Infrastructure, and their representatives. This process of publically exhibiting the EA and inviting comments from the public and other agencies is designed to ensure that they have a full understanding of the issues, and the range of views about the proposed expansion of the AWMF. The legal process is designed to ensure no issues are hidden, and that all impacts are fairly considered.
		General	I seek to be part of the process to resolve the best solution for both Awaba Community and LMCC.	Comment noted. By taking the time to respond to the public exhibition, you have contributed to the process.
13	No Open Cut Mines for Awaba	General	Objection	The objection has been noted, however since no specific reason for the objection has been provided, no detailed response is possible.
21	Sadie Williams	General	Objection	The objection has been noted, however since no specific reason for the objection has been provided, no detailed response is possible.
22	Craig Williams	General	Objection	The objection has been noted, however since no specific reason for the objection has been provided, no detailed response is possible.
7	Mine Subsidence Board	Landfill Design	For the landfill cells and infrastructure underlying it, the Board require this development to be designed and constructed so that it is safe, serviceable and not damaged by the maximum subsidence parameters nominated in MSEC's report no. 537 Rev B, dated June 2012.	Noted. LMCC will ensure through detailed design that the facility is designed to accommodate the identified mine subsidence parameters. LMCC understand that a DA for the AWMF will not be issued unless this requirement has been satisfactorily addressed.

Respondent #	Respondent	Issue Category	Issue Summary	Response
		Landfill Design	For all other infrastructure improvements, the board requires this development to be designed and constructed so that it is safe, serviceable and economically repairable in consideration of the maximum subsidence parameters nominated in MSEC's report no. 537 Rev B, dated June 2012.	Noted. LMCC will ensure through detailed design that the facility is designed to accommodate the identified mine subsidence parameters. LMCC understand that a DA for the AWMF will not be issued unless this requirement has been satisfactorily addressed.
		Landfill Design	The design shall be certified by a structural engineer that the improvement will remain safe, serviceable, and resilient / repairable, under these subsidence parameters. Any damage requiring repair shall be slight, localised and economically repairable	Noted. LMCC will ensure through detailed design that the facility is designed to accommodate the identified mine subsidence parameters. LMCC understand that a DA for the AWMF will not be issued unless this requirement has been satisfactorily addressed.
		Landfill Design	To support the designers certification the proponent will be required to submit a Mine Subsidence Impact Statement	Noted. LMCC will ensure through detailed design that the facility is designed to accommodate the identified mine subsidence parameters. LMCC understand that a DA for the AWMF will not be issued unless this requirement has been satisfactorily addressed. A mine Subsidence Impact Statement will be produced by LMCC
		Landfill Design	Design drawings must show the location and detailing of mine subsidence mitigation measures such as articulation joints etc., taking into account the mine subsidence design parameters and requirements of the Building Code and Australian Standards	Noted. LMCC will ensure through detailed design that the facility is designed to accommodate the identified mine subsidence parameters. LMCC understand that a DA for the AWMF will not be issued unless this requirement has been satisfactorily addressed.
		Landfill Design	The proponent shall confirm that on completion of all building work, a qualified structural engineer will certify that the improvement has been constructed in compliance with the plans approved by the Board.	LMCC can confirm that on completion of all building work, a qualified Structural Engineer will certify that the improvement has been constructed in compliance with the plans approved by the Board.
8	Lake Macquarie City Council	Greenhouse Gas Emission	The intention of the project is to capture the majority of the greenhouse gases generated by the waste to landfill. Some 36% of the gas will be used to power a gas fired generator generating renewable energy (with 2% of this flared during generator downtimes).	Comment noted. No response required.
		Greenhouse Gas Emission	It is acknowledged that the predicted increases in emissions will be offset by Council's proposed waste diversion programs for recyclables and green waste, which are not allowed for in the greenhouse gas assessment.	Comment noted. No response required.
		Greenhouse Gas Emission	Data collected from the landfill gas monitoring program will be useful for tracking Council's greenhouse gas emissions, and reporting on carbon pollution obligations under the Commonwealth's Clean Energy Future program.	Comment noted. No response required.
		Air Quality	The air quality assessment has been undertaken using appropriate meteorological modelling and air pollutant dispersion modelling software, and has modelled the correct emissions for the industry and works. There are no cumulative exceedances of Criteria Air Pollutants, and/ or Odour at any neighbouring sensitive receptors.	Comment noted. No response required.
		Noise and Vibration	The noise assessment indicates no long term operational noise or vibration exceedances at sensitive receptors; however, there are some short term impacts for sensitive receptors during construction of the pipeline.	Comment noted. In accordance with the Statement of Commitments, a Noise and Vibration Management Plan will be prepared and followed during construction works. The plan will be prepared in accordance with the Interim Noise Construction Guidelines (DECC, 2009)
		Noise and Vibration	I support implementation of the proposed noise and vibration mitigation measures in the Construction Environmental Management Plan and/ or the Noise and Vibration Management Plan.	Comment noted. No response required.
		Biodiversity offsetting	In relation to the Council's draft Biodiversity Offsets Policy, the proposed offset areas are well in excess of those required by the draft calculator (a ratio of around 4.5:1 compared to the draft calculator requirement of 2.5:1). The main affected threatened species is Tetratheca juncea, with a loss of 2,302 clumps and 11,632 clumps available in the offset area, a ratio of 5:1 consistent with the draft calculator.	Comment noted. No response required.
		Biodiversity offsetting	There is potential for inconsistency with offsetting requirements for species listed under the Environment Protection and Biodiversity Conservation Act 1999. This will need to be resolved once Commonwealth approval has been given, and could be subject to a condition of approval to be resolved later.	Comment noted. No response required.
		Biodiversity offsetting	Progressive rehabilitation and re-vegetation of the landfill area is supported	Comment noted. No response required.
		Biodiversity offsetting	This plan should address prevention of litter and weed invasion into the adjacent biobank site. The development of protocols prior to clearing the site is also supported. Both the Vegetation and Fauna Management Plan should deal with the management of edge effects along the interface of the biobank and landfill site. The Fauna Management Plan should also deal with the management of pest species and may include the use of hollows and spouts to augment habitat in other areas.	When establishing the biobank site, it is a requirement that a long term management plan for the site is agreed, and subsequently implemented. This plan is expected to address the issues raised in the response, including litter and weed invasion, edge effects, and pest species. The plan will be prepared at the appropriate stage of the process to establish a biobank site.
		Biodiversity offsetting	There are a number of management plans referred to in the Environmental Assessment including a BioBank Site Management Plan, a Vegetation Management Plan, and a Fauna Management Plan. It would be preferable to have one management plan covering all of these issues to avoid potential inconsistency and conflict between these plans, which also need to take into account any BioBank site management guidelines.	It is considered that keeping the plans separate will allow for the specialist requirements of each of the plans to be more effectively managed than if the plans were to be combined, and would allow for individual accountability to be more easily allocated to the appropriate Managers. The plans can be reviewed as they are prepared to ensure consistency between them.
9	Crown Lands	Land Acquisition	It is noted that the subject site (Lot 372 DP 723259) is Crown land, and that there are extensive areas of Crown land adjacent and in the vicinity. Crown Lands is satisfied that the environmental assessment of the proposal as a major project is sufficient to address and ensure the Crown Estate will not be disadvantaged.	Comment noted. No response required.
		Land Acquisition	The current site is currently reserved under the Crown Lands Act 1989 for Rubbish Depot (Reserve 170042, notified 18 December 1987 (folio 7073)). It is managed by Lake Macquarie City Council via the Awaba Waste Management (R170042) Reserve Trust.	Comment noted. No response required.
		Land Acquisition	Crown Lands considers that for management purposes it is appropriate that Lot 372 be released from the Crown estate. As such it is Crown Lands' preference that Lake Macquarie City Council acquire Lot 372 in DP723259 under the Land Acquisition (Just Terms Compensation) Act 1991 and that a requirement for acquisition be incorporated as a condition in any approval of the application.	LMCC accepts that acquisition of the Crown Land Reserve (Lot 372) such that ownership is transferred from the NSW Government to LMCC will be required prior to the finalisation of a biobanking agreement. The revised statement of commitments for the project has been updated accordingly, however LMCC still consider that a condition of approval in this regard is not necessary. Should the Department of Planning and Infrastrcuture countenance an approval which includes such a condition, LMCC would not object.
10	NSW Office of Water	Groundwater	Additional groundwater monitoring bores must be authorised by a Part 5 licence under the Water Act 1912 (WA 1912).	Comment noted. No response required.

Respondent #	Respondent	Issue Category	Issue Summary	Response
		Excavation	Excavation for the landfill cells and sewer pipeline should also be authorised by a Part 5 licence under the WA 1912.	Comment noted. No response required.
		Excavation / Dewatering	Part 5 licences for excavations may also authorise dewatering of the bedrock. Any dewatering of alluvial sediments must be authorised by a water access licence under the Water Management Act 2000.	Comment noted. No response required.
		Groundwater	Pursuant to the Director General's requirement , the EA should include a description of the existing groundwater conditions using sufficient baseline data.	The DGRs required the presentation of baseline data on groundwater. New data was therefore collected during 2011 to show current conditions at the time the EA was prepared, and this information is presented in the EA. In addition, Council hold groundwater records going back to 1999, with data collected at wells installed in October 1998, and at additional wells installed in July 2005. Annual licencing reports have been provided to the EPA detailing groundwater conditions in accordance with the EPL requirements in each of the reporting years from 1999/2000 - 2011/2012. This data has been forwarded to NOW for analysis since the lodgement of the EIS (in March 2013).
		Groundwater	The EA does not include sufficient baseline data on groundwater levels and flow directions at the project site. Information on groundwater levels is limited to observations from test pit and borehole excavations in January 2011, and observations of low water levels in groundwater monitoring bores during water quality sampling. The lack of sufficient baseline data on groundwater levels and flows limits the Office of Water's ability to consider existing groundwater conditions in commenting on the proposed project.	The DGRs required the presentation of baseline data on groundwater. New data was therefore collected during 2011 to show current conditions at the time the EA was prepared, and this information is presented in the EA. In addition, Council hold groundwater records going back to 1999, with data collected at wells installed in October 1998, and at additional wells installed in July 2005. Annual licencing reports have been provided to the EPA detailing groundwater conditions in accordance with the EPL requirements in each of the reporting years from 1999/2000 - 2011/2012. This data has been forwarded to NOW for analysis since the lodgement of the EIS (in March 2013).
		Groundwater	If the proposed project is approved, baseline data on groundwater levels should be collected from the existing and proposed groundwater monitoring bores prior to construction commencing. Groundwater levels should continue to be monitored during construction and operations.	Noted. This is an expected condition of approval.
		Conditions of Approval	All water supplies for construction and operations are sourced from an authorised and reliable supply	Noted. This is an expected condition of approval.
		Conditions of Approval	The taking of water for purposes other than water supply, such as dewatering during construction, should be appropriately authorised.	Comment noted. No response required.
		Conditions of Approval	Landfill Environmental Management Plan: · The Office of Water is to be consulted on the update of the Landfill Environmental Management Plan and its application to the proposed project.	LMCC will consult with the Office of Water during the update of the Landfill Environmental Management Plan
		Conditions of Approval	Stormwater Management Plan: · The Office of Water is to be consulted on the preparation of the Stormwater Management Plan.	LMCC will consult with the Office of Water during the preparation of a Stormwater Management Plan
		Conditions of Approval	The Proponent shall prepare and implement a Site Water Management Plan. This Plan must be developed in consultation with the Office of Water and include: i. Site Water Balance, ii. Surface Water Management Plan, and iii. Groundwater Management Plan.	LMCC understand that this will become a condition of approval, and undertake to prepare and implement a Site Water Management Plan which includes the elements listed in the NSW Office of Water response.
		Conditions of Approval	The Site Water Balance must include details of: i. sources and security of water supply, ii. water use on site, and iii. water management on site.	As part of the Site Water Management Plan, LMCC will include a site water balance which includes the elements listed in the NSW Office of Water response.
		Conditions of Approval	The Surface Water Management Plan must include: i. detailed baseline data on surface water flows and quality, ii. surface water impact assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts, iii. a program to monitor surface water flows and quality, and iv. a protocol for the investigation and mitigation of identified exceedences of the surface water impact assessment criteria.	As part of the Site Water Management Plan, LMCC will include a Surface Water Management Plan which includes the elements listed in the NSW Office of Water response.
		Conditions of Approval	The Groundwater Management Plan must include: i. detailed baseline data on groundwater levels and quality, ii. groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, iii. a program to monitor groundwater levels and quality, and iv. a protocol for the investigation and mitigation of identified exceedences of the groundwater impact assessment criteria.	As part of the Site Water Management Plan, LMCC will include a Groundwater Management Plan which includes the elements listed in the NSW Office of Water response.

4 Revised Statement of Commitments

In light of the comments received, the Statement of Commitments contained in the EA has been reviewed, and have been modified as appropriate. The full revised statement of commitments is provided below as **Table 4.1. Bold text** has been used to indicate new, or modified commitments.

Table 4.1 Revised Statement of Commitments

Commitments
General
LMCC will undertake the proposed works as described in this EA in accordance with the mitigation and management measures identified in this EA.
LMCC will ensure that a *Construction Environmental Management Plan* (CEMP) is prepared and implemented for the proposed works. The CEMP will detail appropriate mitigation measures for a range of construction activities and will address soil erosion and sediment control, slope stability, uncovering of contaminated, saline and/or acid sulfate soil, spill management, dust suppression, construction noise and vibration (as a minimum).
LMCC will gain all necessary approvals and permits supporting both the construction and operational phases, including: ▪ Updating and obtaining a reissue of the existing EPL (Licence No. 5873) for the site, or obtaining a new EPL for the site; and ▪ Obtaining approval under Section 15 if the *Mine Subsidence Compensation Act 1961*.
LMCC will update and continue to apply the existing LEMP for the AWMF to incorporate any new management/mitigation measures and monitoring requirements considered necessary for the proposed works.
LMCC will undertake community consultation as identified in **Section 4.4** during the exhibition period of this EA Report, including holding information sessions for the community and stakeholders.
LMCC will ensure that site monitoring is undertaken in accordance with the existing and future Environmental Protection Licence (EPL) for the site.
Waste Management
LMCC will ensure that during construction the site will be kept clear of unnecessary construction waste. Waste materials generated during the construction phase on both the AWMF site and along the sewer pipeline route will be recycled or reused wherever possible in the first instance.
LMCC will stockpile and reuse soil and vegetation required to be excavated/cleared for the new landfill cells and either reuse these resources as daily cover material for the active tipping face (soil) or process as green waste and use as mulch (vegetation).
LMCC will, wherever practical, place any felled trees or tree limbs in nearby surrounding bushland to act as potential habitat for fauna and reduce the volume of green waste.
LMCC will extend the gas extraction infrastructure into the proposed new landfill Areas A, B and C on a progressive basis into the future so that the capacity for gas capture and energy generation will be enhanced.
LMCC will continue to apply cover material to the active tip face to suppress any litter from becoming airborne during strong winds and escaping into the surrounding environment. LMCC will also continue to undertake litter patrols to manage stray litter.
LMCC will construct the additional facilities at the AWMF out of recycled materials, wherever possible.
LMCC will adopt a phased “three-bin source separated organics” processing system as its preferred waste processing technology for targeting domestic waste, which includes the implementation of a three bin system for

domestic use (general rubbish, recycling and organic waste).

Soil and Contamination

LMCC will ensure that an *Erosion and Sediment Control Plan* (ESCP) will be prepared and implemented in accordance with the *Managing Urban Stormwater: Soils and Construction Volume 2* series (DECC, 2008a, 2008b and 2008c) prior to works commencing. The ESCP should include a range of measures in accordance with best practice, including but not limited to progressive/staged vegetation clearing, implementation of sediment fences and flow diversion structures, covering or wetting of stockpiles, usage of excavation materials as future daily cover, ceasing of works and checking the integrity of erosion and sediment controls during heavy rainfall, stabilisation of access points and the installation of rumble grids at access points, and rapid backfilling of excavated pipeline trenches.

LMCC will ensure that an *Acid Sulfate Soils Management Plan* must be prepared for the proposed works in accordance with the *Acid Sulfate Soils Manual* (Stone et al., 1998) that will focus on the trenching works for the installation of the sewer pipeline.

LMCC will ensure that a *Salinity Management Plan* will be prepared for the proposed works that will focus on the trenching works for the installation of the sewer pipeline.

LMCC will ensure that a *Contamination Management Plan* is prepared and implemented in the event that contaminated land is encountered during excavation. In such an event, works would cease immediately and OEH would be notified. Emergency measures (such as diversion of surface runoff away from contaminated areas) would also be implemented in a timely fashion.

Prior to construction, LMCC will consider the existing Geotechnique Report (Appendix F) and the results of the subsidence risk assessment currently being undertaken by Centennial Coal to support an application being prepared to support future mine-workings. (This report is currently being prepared in partnership with LMCC, the Mine Subsidence Board, Centennial Coal, GSS Environmental, GHD and MSEC). LMCC will undertake a design review to ensure that the final design considers the worst case mine subsidence parameters, and will accommodate the worst case ground movement identified in either document without suffering structural failure or compromising environmental protection.

LMCC will facilitate the management of erosion and sediment in the operational phase through stability control measures, utilisation of the proposed wheel was facility, progressive revegetation of capped landfill area and utilisation of the proposed road to minimise surface and vegetation disturbance.

Water Quality and Hydrology

LMCC will ensure that a Site Water Management Plan is prepared and implemented. This Plan will be developed in consultation with the Office of Water and shall include:

- **Site Water Balance, which will include:**
  - **Sources and security of water supply,**
  - **Water use on site, and**
  - **Water management on site.**
- **Surface Water Management Plan which will include:**
  - **Detailed baseline data on surface water flows and quality,**
  - **Surface water impact assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts,**
  - **A program to monitor surface water flows and quality, and**
  - **A protocol for the investigation and mitigation of identified exceedences of the surface water impact assessment criteria.**
- **Groundwater Management Plan which will include:**
  - **Detailed baseline data on groundwater levels and quality,**
  - **Groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts,**

- **A program to monitor groundwater levels and quality, and**
- **A protocol for the investigation and mitigation of identified exceedences of the groundwater impact assessment criteria.**

In accordance with the site's EPL, LMCC currently undertakes groundwater quality monitoring using annual or quarterly grab samples at five sites. Parameters monitored include alkalinity (as calcium carbonate), aluminium, ammonia, arsenic, biochemical oxygen demand (BOD), barium, benzene, cadmium, calcium, chloride, chlorinated volatile compounds, chromium (hexavalent), chromium (total), cobalt, conductivity, copper, ethyl benzene, fluoride, iron, lead, magnesium, manganese, mercury, nitrate, organochlorine pesticides, organophosphate pesticides, PCBs, phosphate, polycyclic aromatic , hydrocarbons, potassium, sodium, sulfate, toluene, total phenolics, total dissolved solids, total organic carbon, total petroleum hydrocarbons, zinc, pH. It is expected that the EPL will be amended for the site to account for the proposed site changes, and LMCC will continue to undertake monitoring according to the amended licence conditions. In addition, LMCC propose to install additional groundwater monitoring wells as shown in **Figure 5.5** to enable improved monitoring of groundwater quality.

LMCC will ensure that, should dewatering of groundwater be required as part of any excavation works, a licence is sought under the *Water Management Act 2000*.

LMCC will ensure that a *Stormwater Management Plan* is prepared and implemented for the construction phase of the proposed works to mitigate the impacts on water quality.

LMCC will ensure that temporary stormwater quantity and quality management measures are implemented during the construction phase, including the installation of silt curtains, hay bale filters and stormwater diversions.

In accordance with the site's EPL, LMCC currently undertakes stormwater quality monitoring using annual or quarterly grab samples at four sites. Parameters monitored include alkalinity (as calcium carbonate), aluminium, ammonia, arsenic, biochemical oxygen demand (BOD), barium, benzene, cadmium, calcium, chloride, chlorinated volatile compounds, chromium (hexavalent), chromium (total), cobalt, conductivity, copper, ethyl benzene, fluoride, iron, lead, magnesium, manganese, mercury, nitrate, organochlorine pesticides, organophosphate pesticides, PCBs, phosphate, polycyclic aromatic hydrocarbons, potassium, sodium, sulfate, toluene, total phenolics, total dissolved solids, total organic carbon, total petroleum hydrocarbons, total suspended solids, zinc and pH.

LMCC will ensure that the quality of stormwater leaving the site will be in accordance with the limits outlined by ANZECC (2000) and the existing EPL.

LMCC will ensure that a 30m buffer zone will be established from the watercourse centre-line and that all water management measures, both temporary construction phase measures and permanent measures, are located outside of this buffer.

LMCC will ensure that the proposed expansion will incorporate appropriate design principles for leachate basins, including ensuring that basin liners are utilised, active storage depths in the proposed basins are 0.75m from the permanent water level to the level of the primary spillway, and overflows from the basins are conveyed to the outfall(s) via 0.5m deep rock lined channel with base widths of 2m and side slopes of 1(V):2(H).

With regards to Hunter Water Corporation assets, LMCC will ensure that no sludge will be discharged to the receiving access chamber, if required.

Leachate

Leachate will be managed in accordance with best practice:

- The entire new landfill area will be lined (implementing a 'piggyback' liner over the existing waste using a LLDPE liner;
- Leachate will be collected, treated and managed/disposed of appropriately for the operational lifetime of the landfill; and
- The landfilling operations will be carefully staged, with care taken at all times to minimise the inflow of water into active landfill areas.

LMCC will incorporate aeration in the proposed 8ML leachate pond, as discussed in **Section 6.4.4** and determined in consultation with HWC, such that surplus leachate disposed of to the sewer network (via the

proposed sewer pipeline) meets HWC's quality requirements. The existing 6ML leachate pond will be retained, and operated in series to provide additional physical treatment.

LMCC will ensure that engineering cell design drawings that meet EPA specifications (including the provision of cross sections, cell extension lining, anchoring and capping, leachate collection and disposal system and gas collection system) will be developed as part of the detailed design. LMCC note that this information is also required as part of the required application to vary the existing EPL (Licence No. 5873) to permit the construction of the cell extension.

LMCC will seek to establish a Trade Wastewater Agreement with HWC for the discharge of leachate from the AWMF site to the HWC sewer system.

LMCC will ensure that a sewer flowmeter is installed, and a sampling point established, at the AWMF package pumping station so that volumes and quality of leachate discharged to the HWC sewer network can be monitored.

LMCC currently undertakes leachate quality monitoring via quarterly grab samples at one location, and this includes testing for alkalinity (as calcium carbonate), ammonia, biochemical oxygen demand (BOD), calcium, chloride, fluoride, iron, magnesium, manganese, nitrate, organochlorine pesticides, potassium, sodium, sulfate, total phenolics, total organic carbon, total petroleum hydrocarbons, total suspended solids and pH. LMCC will ensure that leachate quality monitoring continues in accordance with the conditions of the new EPL to be issued for the site.

Flora and Fauna

LMCC will ensure that a BioBanking Agreement is formalised for the site. LMCC will finalise a *BioBanking Statement* for the Lot 372 Development Site and a *BioBanking Agreement* for the proposed BioBank Site (comprising part of Lot 372, part Lot 373 and an additional suitable area of land (yet to be **made available**)) to offset the removal of 2,302 *Tetratheca juncea* plants and 7.2ha of native vegetation communities at the site (of a total 8.55ha of vegetation to be impacted). LMCC will make provision for these offset sites to be **managed in-perpetuity for conservation". The areas proposed to be biobanked on Lot 372 and 373 are shown in Figure 1.**

LMCC will provide DP&I with a *BioBank Site Management Plan* that commits the proposed Awaba BioBank Site to in-perpetuity management and a fund deposit calculated on this basis. The required management actions will be determined in consultation with OEH and can be estimated using Part A of the BioBanking Credit Pricing Spreadsheet (OEH, 2011c).

LMCC will ensure that Lot 372 is acquired from the Crown such that ownership is transferred to LMCC, prior to the BioBanking Agreement being formalised.

It is noted that there is an existing mining lease and an exploration lease over the proposed biobanking site (ML1452 and EL5138). LMCC will ensure that consent from the leaseholder, the Minister for the Environment and the Minister for Resources and Energy, will be obtained for the proposed biobanking agreement prior to the agreement being finalised.

Upon establishment of the Awaba Biobank Site, LMCC will ensure that 392 Ecosystem Credits of the required vegetation types and 33,853 *Tetratheca juncea* Species Credits will be retired within the BioBanking Scheme.

LMCC will ensure that a *Vegetation Management Plan* is prepared and implemented prior to commencement of the proposed works that will include details pertaining to procedures for clearing, landscaping and revegetation/rehabilitation works that are planned for the AWMF site during the construction, operational and post-closure phases and also immediately following completion of the installation of the sewer pipeline. The plan will include a *Vegetation Clearing Protocol* and a *Weed Management Sub-Plan*.

LMCC will ensure that a *Fauna Management Plan* is prepared and implemented prior to commencement of the proposed works that will provide a protocol for responding to the detection and relocation of native fauna present in trees, hollows and logs that lie within the proposed areas for clearing. LMCC will ensure that details regarding the most appropriate season(s) to undertake clearing with regard to reducing disturbance to fauna (especially nestlings) are included in addition to details regarding the proposed management of pest species during the proposed works. Where they have been prepared and where applicable, LMCC will consider the details set out in *Recovery Plans*, *Threat Abatement Plans* or *Priority Action Statements* for listed threatened species and

incorporate relevant mitigation measures into the *Fauna Management Plan*.

Suitably experienced wildlife handlers will be present during pre-clearance surveys to relocate any fauna located during the works.

Air Quality and Odour

LMCC will ensure that a *Construction Environmental Management Plan* is prepared and implemented prior to commencement of the proposed works, and that this plan will include management/mitigation procedures for air quality, odour and dust, including minimising the number of stockpiles on site, limiting unnecessary vegetation clearing, and reducing/controlling the number of trips and trip distances where possible.

LMCC will ensure that standard odour management practices for landfill sites will be utilised in the operational phase of the works, including the continuation of current practices such as daily covering/capping of the active tip face, gas monitoring programs and an odour complaints register.

LMCC will ensure that standard air quality management practices for landfill sites will be utilised in the operational phase of the works, including the maintenance of gas collection infrastructure, power generation unit, flare stack, and plant and equipment on site, and a flare stack emission monitoring program.

LMCC will ensure that air quality, odour and dust mitigation measures are implemented during the operational phase of the works, including covering/capping of waste, gas emission monitoring programs, and maintenance of gas infrastructure and site plant/equipment.

LMCC currently undertakes environmental monitoring of methane which includes monthly, in-situ monitoring of %(v/v) methane inside buildings at the site and also on the surface of the landfill. LMCC will ensure that this monitoring continues. Additional gas monitoring locations are proposed as part of the works as shown in Figure 5.4 of the EA.

LMCC will prepare an Odour Control Plan and provide it to Hunter Water in support of the development application.

Aboriginal Heritage

LMCC will ensure that a *Cultural Heritage Management Plan* is prepared in partnership with the registered Aboriginal stakeholders and implemented for the construction phase of the proposed works. The CHMP will demonstrate that effective community consultation with local Aboriginal communities has been undertaken during the preparation of the Plan. The CHMP will include procedures for ongoing Aboriginal consultation and involvement, management of all Aboriginal cultural heritage values associated with the project area, the responsibilities of all stakeholders, details of proposed mitigation and management strategies of all sites; including any additional investigation processes, salvage activities, monitoring, etc.; procedures for the identification and management of previously unrecorded sites (excluding human remains), and compliance procedures in the unlikely event that non-compliance with the CHMP is identified.

LMCC will ensure that further archaeological survey around the creek lines at the AWMF site and sub-surface testing of the midden site identified along the pipeline route is undertaken prior to the commencement of construction works to determine the full nature and extent of these archaeologically sensitive areas. These investigations will initially comprise a series of 1m² probes spaced evenly over the area of impact along the creek line, but may be expanded if artefact densities warrant further investigation or salvage. A monitoring and collection program will then be undertaken by the registered Aboriginal stakeholders during all proposed sub-surface excavations to allow collection of any artefacts that may be disturbed in this area (with subsequent relocation and reburial “in country” and in a location that will not be subject to any future impacts).

LMCC will ensure that a minimum buffer of 5m around culturally modified trees to be retained will be delineated and enforced to reduce the impacts on these sites. LMCC will conduct further investigations during the detailed design phase as to whether an increase in the size of the buffer distance around culturally modified trees of the project is achievable given site constraints.

LMCC will provide an opportunity for the Registered Aboriginal Parties (RAPs) to monitor the initial ground disturbance works associated with all sections of the excavations (ground surface impacts) so that any potentially impacted artefacts may be collected by the RAPs.

LMCC will develop and implement an Aboriginal Cultural Heritage Induction Program for all personnel associated with the project, to make them aware of the site's Aboriginal heritage values and artefacts that are to be conserved at the site.
LMCC will ensure that any new Aboriginal artefacts located uncovered due to the development and/or sub-surface excavation or monitoring activities will be recorded and registered with the EPA as part of the assessment process in accordance with the requirements of Section 89A of the NPW Act.
LMCC will ensure that work is ceased immediately in the event that any bone or stone artefacts, discrete distributions of shell or any other objects of potential cultural association are uncovered during earthmoving or other activities, in accordance with the *National Parks and Wildlife Act 1974*, "stop work" provisions.
LMCC will ensure that strategies for the management of Aboriginal sites will be developed in collaboration with the Registered Aboriginal Parties and documented in an Aboriginal Cultural Heritage Management Plan, as recommended by the two Aboriginal Cultural Heritage Assessment Reports (ACHAR).
LMCC will ensure that archaeological excavations of known or Potential Archaeological Deposit/archaeological sensitivity will be conducted (as recommended by the ACHAR) where impacts may result from construction works. The objective of any such excavations will be to confirm whether there is a likelihood of any objects being present (and therefore impacted by the works), and where this is the case to develop appropriate management strategies in collaboration with the Registered Aboriginal Parties and to formalise these in an Aboriginal Cultural Heritage Management Plan.
Non-Aboriginal Heritage
LMCC will ensure that none of the non-Aboriginal heritage items identified in the vicinity of the proposed works will be impacted by the proposed works by making the Contractors aware of the items and ensuring the Contractors avoid them.
Visual Landscape
LMCC will progressively excavate, fill and re-vegetate Areas A and B and subsequently fill and re-vegetate Area C (11 cell areas in total across Areas A, B and C) as shown in the Staging Plan in **Figure 6.9**, which has been developed to minimise the visual impacts of the proposed works.
LMCC will ensure that the application of daily cover to the active tipping face is continued during the construction and operational phases of the works to ensure regular concealment of the landfill emplacement.
LMCC will ensure that revegetation and rehabilitation will be undertaken at the site once the landfill has reached capacity, so that effective concealment of the emplacement will be achieved in the long term.
Greenhouse Gas
LMCC will continue to recover gases produced by the AWMF for energy generation and to minimise GHG emissions from the AWMF landfill. LMCC will increase the potential for landfill gas harvesting and electricity generation on site through the expansion of gas extraction infrastructure at the site.
Prior to the commencement of the proposed works, LMCC will review the design of the final landfill gas management infrastructure to ensure that it meets the objective of capturing the majority of the gases from the landfill emplacement.
LMCC will continue to monitor landfill gases generated for reporting purposes.
Traffic and Transport
LMCC will ensure that a *Construction Traffic Management Plan* is prepared and implemented for the proposed works.
LMCC will ensure that the intersection of Wilton/Wangi Roads is upgraded to appropriately provide for existing traffic volumes and to reduce average delays experienced at the intersection for vehicles turning right onto Wangi Road.

Hazards and Risks
LMCC will continue to undertake the procedures detailed in the *Awaba Landfill Environmental Management Plan* (LMCC, 2006) to achieve compliance with the EPL issued for the site.
LMCC will undertake a detailed risk review during the detailed design of the proposed additions, and any additional mitigation measures identified as being required will be incorporated into the *Awaba Landfill Environmental Management Plan*.
LMCC will revise the site-specific *Fire Management Plan* within the *Awaba Landfill Environmental Management Plan* to ensure it remains current considering the proposed works.
LMCC will continue to implement OH&S practices and adhere to relevant OH&S standards to ensure employee and user safety at the AWMF site.
LMCC will work with HWC, as required, to enable the AWMF, pipeline and WWPS risks to be managed in an integrated manner.
The standards defined in Section 3 and Section 7 of the Australian Standard AS3959-2009 (Construction of buildings in bush fire-prone areas) will be adopted as minimum design standards during the detailed design phase.
Noise and Vibration
LMCC will ensure that a *Noise and Vibration Management Plan* is prepared in accordance with the *Interim Construction Noise Guideline* (DECC, 2009b) and implemented for the construction phase of the proposed works.
LMCC will continue to undertake the procedures detailed in the *Awaba Landfill Environmental Management Plan* (LMCC, 2006) to mitigate operational noise at the site.
LMCC will ensure that construction normally takes place only between the hours of 7am to 6pm Monday to Friday, and 8am to 1pm Saturday, with no construction on Sundays or Public Holidays. LMCC will obtain prior written permission from the EPA for any construction activities which are required outside these times.
LMCC will ensure that a Construction Noise Management Plan (CNMP) is prepared and implemented prior to commencement of construction activities. The Noise Assessment will be performed in accordance with the NSW Industrial Noise Policy (EPA 2000) or the relevant policy adopted by the EPA at the time of the Noise Assessment and is expected to include the following: ▪ **Identification of any noise sensitive locations (these will be mapped or described);** ▪ **The existing background and ambient noise levels determined for each sensitive receiver;** ▪ **Derivation and identification of the project-specific noise levels for each sensitive receiver;** ▪ **The expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc.) likely to be generated from noise sources during operation. Noise source data will be included for each source in 1/1 or 1/3 octave band frequencies including methods or references used to determine noise source levels;** ▪ **The noise levels likely to be received at the most sensitive receivers, including potential impacts for any identified significant meteorological conditions;** ▪ **The findings of the predictive modelling and direct monitoring will be discussed and, where relevant noise criteria have not been met, additional mitigation measures will be recommended;** ▪ **Details of any proposed mitigation will be provided, including the attenuation that will be achieved and the revised noise impact predictions following mitigation; and** ▪ **After application of all feasible and reasonable mitigation measures, the residual level of noise impact will be quantified by identifying locations of where noise level exceeds the criteria and the extent of exceedance; numbers of people or areas affected; time when criteria will be exceeded; likely impact on activities; change in ambient conditions; and the result of any community consultation or negotiated agreement.**

5 References

Mitchell McCotter (1993). *Review of Environmental Factors for Increasing the Capacity of the Awaba Landfill*. September 1993. Reference No. 92141rpl.

DECC (2007b) *NSW Waste Avoidance and Resource Recovery Strategy 2007*. NSW Department of Environment Climate Change.

Bouvier, R. A., J. M. Halstead, K. S. Conway and A. B. Manalo (2000) *The Effect of Landfills on Rural Residential Property Values: Some Empirical Evidence.* Journal of Regional Analysis and Policy (2000)30:2.

Nelson, A. C., J. Genereux and M. Genereux (1992) *Price Effects of Landfills on House Values*. *Land Economics*. Vol. 68, No. 4, pp. 359-365. University of Wisconsin Press. Online: http://www.jstor.org/stable/3146693, accessed 22 June 2011.

Additions to Awaba Waste Management Facility

Appendix A
Additional Information Provided to EPA

Lake Macquarie City Council

Our Ref: 600308/002/06/ikb

13 November 2012

Cardno (NSW/ACT) Pty Ltd
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Re EA for the expansion of the Awaba Landfill

Dear Christine,

On Behalf of LMCC, and in response to the letter addressed to Chris Ritchie from Danielle Playford at the EPA and dated 12 October 2012, we are pleased to submit the following response which we believe provides the additional information requested by the EPA.

The response directly addresses the 5 numbered points in the EPA letter and comprises this document, and a series of attachment, the content of which is provided below in **Table 1.**

Table 1 – Attachments

Reference	Attachments	
1	Curriculum Vitae – David Barrett - Waste Management	
	Drawing Number	**Drawing Title**
2	SK012 Rev D	Proposed Site Layout
3	SK12A Rev A	Proposed Stages – Cells A, B and C
4	SK12B Rev A	Proposed Staging Cell A1
5	SK12C Rev A	Proposed Staging Cell A2
6	SK12D Rev A	Proposed Staging Cell A3
7	SK12E Rev A	Proposed Staging Cell B1
8	SK12F Rev A	Proposed Staging Cell B2
9	SK12G Rev A	Proposed Staging Cell B3
10	SK12H Rev A	Proposed Staging Cell B4
11	SK12I Rev A	Proposed Staging Cell C1
12	SK12J Rev A	Proposed Staging Cell C2
13	SK12K Rev A	Proposed Staging Cell C3
14	SK12L Rev A	Proposed Staging Cell C4
15	SK12M Rev A	Sections – Sheet 1 of 2
16	SK12N Rev A	Sections – Sheet 2 of 2
17	SK013 Rev D	Proposed Final Contours

Table 2 below provides our response to each of the five numbered points in the letter from the EPA, making reference where appropriate to the attachments listed in **Table 1** above.

Table 2 – Responses to questions raised by the EPA

EPA Question Number	EPA Question in Reference Document: DOC12/42605	Response and Reference Attachments
1	Cross sectional concept details and drawing for each of the cells in area A, B and C. These drawings should depict the:	Drawings SK12A to SK12L show staged plan views of the proposed lining areas inclusive of Base liner, sidewall liner and piggy back liner. Drawings SK12M and SK12N depict the cross-sectional views generated at 50 metre intervals through the site.
	i) proposed excavated depths	i) Excavations will occur only in limited areas of Areas A and B. Locations of excavations and the extent of excavations are identified in the Section Drawings SK12M and SK12N. The depth of excavation in these areas is indicated in m on the line titled (Depth Cut - / Fill+)
	ii) basal surfaces	ii) The locations of basal surfaces are identified on Plan Drawings SK12A to SK12L, and on Section Drawings SK12M and SK12N (There is a Basal Surface wherever the drawings show the presence of a Base Liner). Basal surfaces are present only in parts of Areas A and Area B.
	iii) slopes of excavated batters	iii) Batters are shown on Plan Drawing SK12. (Excavation batters of 1V:2.5H) Section Drawings SK12M and SK12N (Sidewall Liner)
	iv) slopes of existing waste batter	iv) Section Drawings SK12M and SK12N (no steeper than 1V:5H)
	v) other surfaces against which waste will be placed	v) Not Applicable. Waste will be placed only against the excavated batters, above the basal liner, or above the side wall liner shown in drawings SK12M and SK12N.
	vi) the extent of the proposed piggyback lining	vi) Plan Drawings SK12A to SK12L show the extent of the proposed piggyback lining, noting that drawing SK12A shows the final extent, and drawings SK12B to SK12L show the extent of piggyback lining at each stage of operation.
	vii) the proposed finished height of each sub-cell	vii) The proposed final height of the landform is 110m AHD. Contours showing the final landform are included on Plan Drawings SK12A, SK013.
2	Plan drawings showing the horizontal extent of the proposed new cells in relation to the site boundaries, existing waste emplacements and any other features.	This detail can be found on Plan Drawings SK012, SK12A to SK12L.
3	Clarification of the extent of the waste that will be placed against batters of existing cells and locations of same.	Drawing SK12N identifies where waste will be placed against batters of existing cells. Areas between the green and black lines represent areas in which waste will be placed against batters of previously filled cells. Areas between the green and magenta lines

EPA Question Number	EPA Question in Reference Document: DOC12/42605	Response and Reference Attachments
		represent areas in which waste will be placed on top of a piggyback liner which will be overlying existing areas of waste.
4	Confirmation on the actual size and capacity of cells A and B. The EA indicates that cells A and B will be filled and capped by December 2025, however, this is inconsistent with the Feasibility Analysis undertaken by GHD Consultants in July 2010 indicating that Cells A and B would provide between 20.4 and 25.6 years of capacity.	In preparing this response, some additional design work and modelling has been undertaken using 12D software. Relevant results of the modelling are shown in: Table 3 – Plan Area and Table 4 – Volume Calculations The data shown in these tables is considered to be the most current and accurate data available. The calculations shown in Table 4 show that the landfill expansion will provide capacity for an additional 2,543,546 Tonnes of waste. This is 0.3% greater than the value of 2,535,390 Tonnes which is presented in the EA. (This value being the sum of values in Tables 6.11-6.13 of the EA).
5	The details required in items one (1) and two (2) above are to be prepared or overseen by a suitably qualified engineer who has considerable experience in the design and construction of medium to large scale municipal waste landfills. The engineer must have qualifications acceptable to the Institute of Engineers Australia.	Please find attached the CV of David Barrett - GHD's Senior Chartered Engineer who has been responsible for the preparation of drawings and the calculations within or attached to this document.

Table 3 – Plan Areas

Cells	Unit	Total Plan Areas	Base Liner	Slope Liner	Piggy Back Liner
A1	m^2	23,349	9,055	5,103	9,191
A2	m^2	17,709	9,977	1,732	6,000
A3	m^2	13,656	8,381	-	5,275
B1	m^2	17,650	2,791	8,302	6,557
B2	m^2	16,397	617	1,394	14,386
B3	m^2	18,493	2,066	3,729	12,698
B4	m^2	18,374	4,289	4,774	9,311
C1	m^2	26,070	-	-	26,070
C2	m^2	12,765	-	-	12,765
C3	m^2	18,266	-	-	18,266
C4	m^2	24,201	-	-	24,201
Total	m^2	**206,930**	**37,176**	**25,034**	**144,720**

Table 4 – Void Calculations

Cells	Unit	Cell A	Cell B
Excavation to subgrade base and side slope levels	m^3	105,308	95,124
Final Cap Area	m^2	234,451	
Cap Thickness Benchmark (no gas) Clay = 500 mm Drainage = 300 mm Revegetation = 1000 mm	m	1.8	
Waste Density	t/m^3	0.89	
Total Void (including liners and cap structure)	m^3	3,401,020	
Volume of Base Layer/Liners	m^3	121,091	
Volume of Cap Layers/Liners	m^3	422,012	
Volume of Waste	m^3	2,857,917	
Waste Mass	t	2,543,546	

We note that although the information provided above makes reference to the volume of landfill space in m^3, and the mass of waste in Tonnes, we consider that is more appropriate to set conditions of approval based on the final landform which will be created (i.e. the maximum height and footprint of the final landfill site.) This will provide a positive incentive for LMCC to continually improve the operational efficiency of the facility, for example to achieve maximum diversion and compaction rates during operation.

We also note the landfill site is expected to experience settlement which could be the result of either the expected settlement of waste within the landfill, or due to the effect of possible mine subsidence. (Settlement rates associated with putrescible waste can be up to 20%). It is standard landfill design practice to allow for settlement of this nature when designing the infrastructure which will be required at the detailed design stage, and LMCC will ensure that he final design accounts for the cumulative worst case settlement parameters.

We look forward to the opportunity to discuss in more detail the content of this letter and attachments at a meeting with both the Department of Planning and Infrastructure and EPA on 20 November. In the meantime if you have any further questions in relation to this matter, please do not hesitate to contact either David Lovell at LMCC or Kester Boardman at Cardno.

Yours sincerely

Kester Boardman
Environment and Sustainability – Section Leader
for Cardno
Direct Line 9496 7815
Email: kester.boardman@cardno.com.au

Curriculum Vitae

David Barrett
Senior Engineer

Qualified: BE (Civil), University College Dublin, Ireland
Connected: Chartered Member, Institution of Engineers, Ireland

Relevance to project: David has recently joined GHD from Ireland. He is a Chartered Engineer with over 12 years' professional experience in the waste management, environment and mining sectors, encompassing:

- Design of Waste Management Facilities and Tailings Management Facilities (encompassing development, rehabilitation and closure projects)
- Regulatory Approvals
- Waste Management Development Plans
- Closure and Post-Closure Development Plans
- Design/Client/CQA Engineer on Engineered Clay, Geomembrane and Geosynthetic Placement Contracts
- Construction and Contract Management
- Construction Quality Assurance
- Tender Assessments

His consultancy experience comprises all facets of project management from conception through to commissioning. He has operated as Design/Client/CQA engineer on Integrated Waste Management Facilities, Landfill Cell, Landfill Cap and Gas Extraction System projects and Tailings Management Facilities (both development and restoration), inclusive of Construction Management, Contract Management, Preliminary Site Investigations, Environmental Impact Assessments, Preparation of Contract/Tender Documents, Public Works Contracts, Specified Engineering & Validation Reports and Construction Quality Assurance Reports for Regulatory Agencies.

David has extensive experience acting as the Clients Engineer supervising construction contracts of Waste Facility Developments, Tailings Management Facilities & Earthmoving Projects throughout Ireland and mainland Europe. For Construction Quality Assurance he has also set-up and managed onsite geotechnical and/or geomembrane laboratories carrying out the assurance testing to facilitate regulatory approval.

He has also developed Environmental Licence Compliance Plans, Waste Facility Development Plans and Environmental Management Systems for waste clients both public and private.

Job Manager
Project Lochiel | Lake Macquarie City Council, NSW
Assessment of the impacts of the proposed long wall mining activities on the current disposal footprint and future footprint expansions at the Awaba Waste Management Facility

Job Manager
Shoal Bay Landfill | Darwin, NT

Detailed design of the Cell 1 Extension of the Landfill followed by Construction Management.

Technical Reviewer
Buttonderry Landfill | Wyong Shire, NSW
Technical Reviewer on the detailed design of the Cell 3 of the landfill and the Stage 4 Waste Strategy

Job Manager
QAL | Gladstone, QLD
Job Manager delivering both the geotechnical and hydrogeological assessments carried out at the Mineral Waste Disposal Facility (MWDF) prior to detailed design works for the rehabilitation of the landfill site.

Job Manager
SITA, Newline Road Landfill | Raymond Terrace, NSW
Job Manager delivering the Stormwater Management Plan and the Final Landform/Capping detailed design works.

Job Manager
Xstrata Mines | Mount Isa, QLD
Job Manager delivering the Landfill Development Plans and the Closure & Post-Closure Plans for the existing onsite landfill as well as developing a waste management strategy for both the liquid and solid waste streams.

Resident Supervising Engineer
European Union | Kosovo
Detailed design & construction/contract management of works for closure of the post-war municipal landfills throughout Kosovo's eight main cities and supporting operational improvement, maximising use of the sanitary landfills, minimising environmental pollution and increasing public health and safety.
(Total Engineered Capped Area: 380,000 m^2)

Project Engineer/Resident Engineer
KTK Waste Management Facility | Kildare, Ireland
Design and submittal of Specified Engineering reports gaining regulatory approval for one of the largest private sector waste management facilities in Ireland. Subsequent to approval; construction and contract management of seven (7) consecutive phases of the waste management facility inclusive of works supervision, management of onsite CQA, payment certifications, compilation of all as-built/CQA data, construction validation CQA reporting including gaining regulatory completion approvals.
(Geomembrane/Geosynthetic Lined Area: 200,000 m^2)
(Engineered Clay Lined Area: 120,000 m^2)

Project Engineer/Resident Engineer
Kerdiffstown Waste Management Facility | Kildare, Ireland
Design and submittal of Specified Engineering reports gaining regulatory approval for a large private sector waste management facility. Subsequent to approval; construction and contract management of Phase 1 of waste management facility inclusive of works supervision, management of onsite CQA, payment certifications, compilation of all as-built/CQA data, construction validation CQA reporting including gaining regulatory completion approvals.
(Geomembrane/Geosynthetic Lined Area: 70,000 m^2)
(Engineered Clay Lined Area: 50,000 m^2)

Clients Representative
County Council | Silvermines, Tipperary, Ireland
Construction and contract management of the rehabilitation of a closed lead and zinc tailings management facility , installation of reed bed systems, water separation systems, minimising environmental pollution and increasing public knowledge of health & safety.
(Geosynthetic Lined Area: 180,000 m^2)

Resident Engineer
Silliot Hill Landfill | Kildare, Ireland
Construction and contract management of the capping works for 3 consecutive phases including assessment of a landfill gas extraction system. Design and supervision of installation of ancillary infrastructure for Waste Licence compliance.
(Geomembrane/Geosynthetic Lined Area: 75,000 m^2)

Clients Engineer
Galmoy Mines | Kilkenny, Ireland
Construction and contract management of a large composite geomembrane/geosynthetic lining contract for a tailings management facility inclusive of works supervision, staffing and training of on-site geotechnical/geomembrane laboratory, management of onsite CQA, account certifications, compilation of all as-built/CQA data, construction validation CQA reporting including gaining regulatory approvals.
(Geomembrane/Geosynthetic Lined Area: 180,000 m^2)

Resident Engineer
Knockharley Landfill | Meath, Ireland
Construction and contract management of the Phase 3 design for Greenstar's non-hazardous facility including external environmental pollution control measures.
(Geomembrane/Geosynthetic Lined Area: 50,000 m^2)
(Engineered Clay Lined Area: 40,000 m^2)

Resident Engineer
Donohill Landfill | Tipperary, Ireland
Detailed design, construction and contract management of the rehabilitation works for Phase 2 of a fully engineered capping system including installation of landfill gas and leachate extraction infrastructure.
(Geomembrane/Geosynthetic Lined Area: 20,000 m^2)

Project Engineer/Resident Engineer
KTK S&G Landfill | Kildare, Ireland
Design and submittal of Specified Engineering reports gaining regulatory approval for cell construction and site infrastructure on an inert landfill. Subsequent to approval; construction and contract management inclusive of works supervision, management of onsite CQA, payment certification, compilation of all as-built/CQA data, construction validation CQA reporting including gaining regulatory completion approvals. (Engineered Clay Lined Area: 75,000 m^2)

Resident Engineer
Ballydonagh Landfill | Westmeath, Ireland
Construction and contract management of a fully engineered capping system of the landfill including the installation of the bio-gas extraction system. (Geomembrane/Geosynthetic Lined Area: 50,000 m^2)

Project Engineer/Resident Engineer
Hollywood Landfill | Dublin, Ireland
Design and submittal of Specified Engineering reports gaining regulatory approval for four (4) cells on an inert landfill. Subsequent to approval; construction/contract management throughout each phase through to commissioning and waste acceptance.
(Engineered Clay Lined Area: 70,000 m^2)

Senior Project Engineer
Silliot Hill Landfill | Kildare, Ireland
Contract management of the installation of fifty (50) drill pads and subsequent 1 m diameter gas extraction wells throughout Phases 1A & 2 including safe disposal of bore waste.

Project Manager
Galmoy Mines | Kilkenny, Ireland
Achieved regulatory approval and subsequent supervision of geomembrane placement contracts for the tailings management facility engineering works expediting Mine Closure Plans.

Director
GeoTesting Ltd | Kildare, Ireland
Materials testing for major earthworks projects throughout Ireland. Establishment of an INAB accredited laboratory carrying out earthworks testing on major roadworks. CQA testing (engineered clay, geomembrane and geosynthetic lining projects) with interpretive reporting for multiple landfill/tailings facilities.

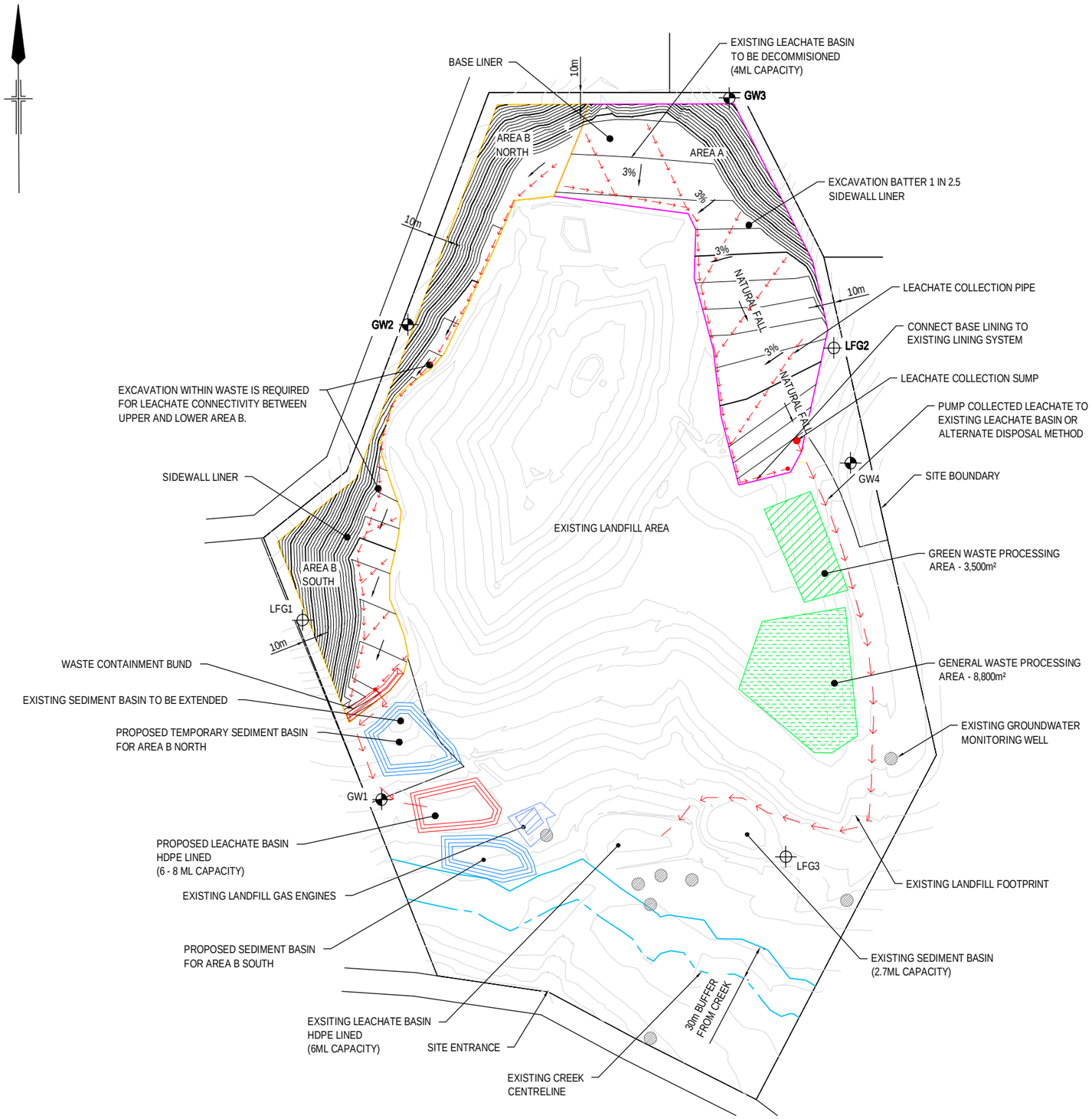
Other related areas of interest
- Chartered Engineer

  Institute of Engineers of Ireland
- Front Line/Project Management

  IMI – Irish Management Institute
- Managing the Construction Design Process

  Institution of Occupational Safety and Health
- Practical Management Control of Landfill Gas

  The Chartered Institute of Wastes Management



DESIGN ASSUMPTIONS:

1. EXISTING SITE CONTOURS AS SUPPLIED BY COUNCIL DATED FEBRUARY 2010.
2. EXCAVATION BATTERS ARE 1 (V) : 2.5 (H).
3. GEOTECHNICAL STABILITY ANALYSIS OF THE EXCAVATION BATTERS TO BE UNDERTAKEN AS PART OF THE DETAILED DESIGN WORKS.

LEGEND:

- LOT BOUNDARY
- PROPOSED EXCAVATION CONTOURS
- AREA A
- AREA B
- PROPOSED LEACHATE COLLECTION SYSTEM
- LEACHATE COLLECTION SUMP
- 3% BASAL GRADIENTS
- PROPOSED GROUNDWATER MONITORING WELLS
- PROPOSED LANDFILLGAS MONITORING WELLS
- EXISTING GROUNDWATER MONITORING WELLS

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

D	REVISED AND ISSUED TO CLIENT		08.11.12
C	REVISED TO MGA		15.03.11
rev	description	app'd	date

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED SITE LAYOUT

GHD
Suite 10, 6 Reliance Drive Tuggerah Business Park
PO Box 3220 Tuggerah NSW 2259
T 61 2 4350 4100 F 61 2 4350 4101
E centralcoastmail@ghd.com W www.ghd.com

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scale 1:2000 for A1 | job no. 21-19318
date NOV 2012 | rev no. D

approved (PD) SK012

Plot Date: 12 November 2012 - 12:01 PM Plotted by: Craig Davies
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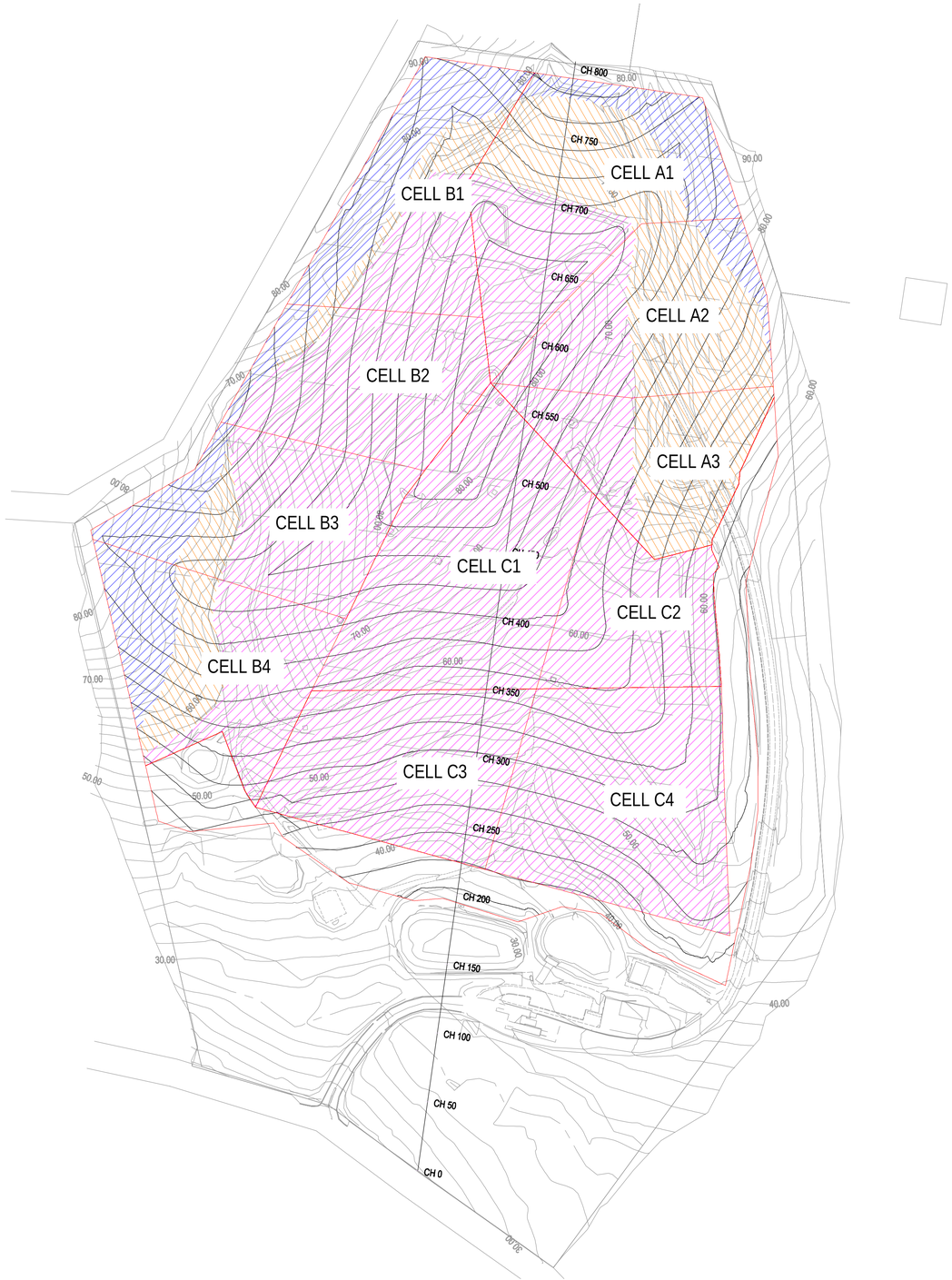

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED STAGES
CELLS A, B AND C

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scale	1:2000 for A1	job no.	21-19318
date	NOV 2011	rev no.	A

approved (PD) .....

SK12A

Plot Date: 8 November 2012 - 3:30 PM Plotted by: Craig Davies
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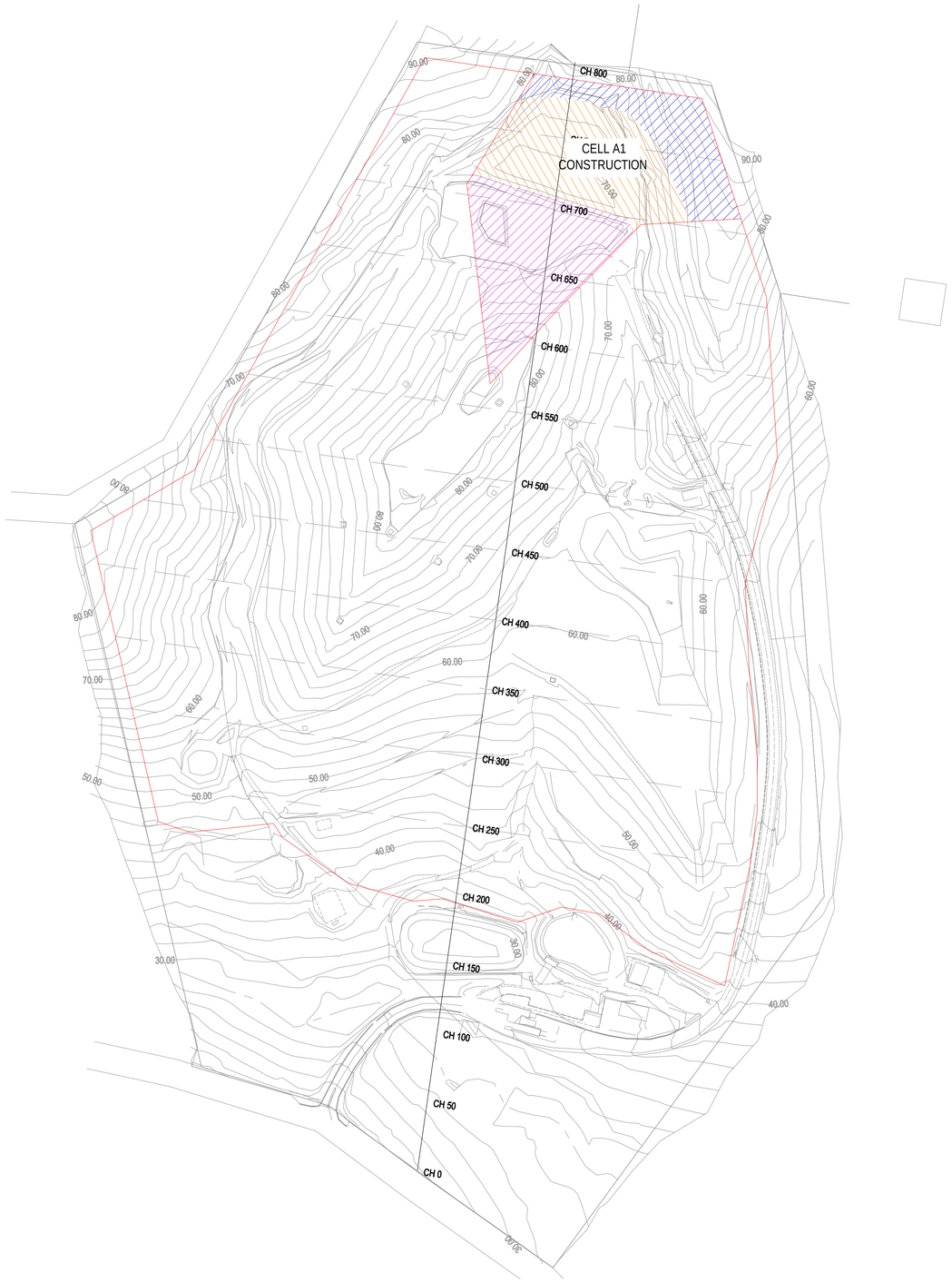

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED STAGING CELL A1

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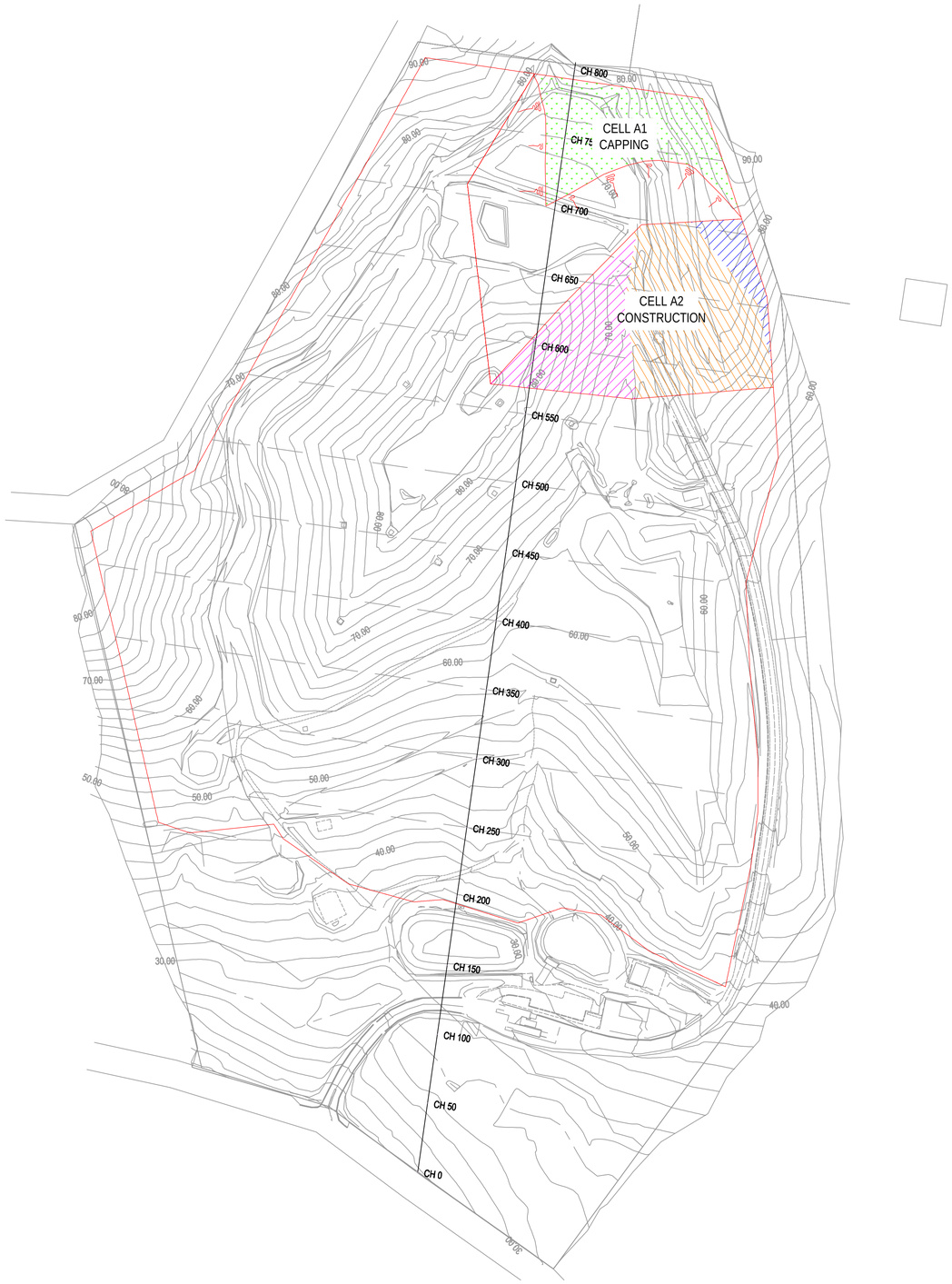
scale	1:2000 for A1	job no.	21-19318
date	NOV 2011	rev no.	A

approved (PD) SK12B

Plot Date: 8 November 2012 - 3:31 PM Plotted by: Craig Davies Cad File No: N:\AU\Sydney\Projects\21\19318\CADD\Drawings\21-19318-SK012_STAGING.dwg



LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
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date NOV 2011 rev no. A

approved (PD) SK12C

Plot Date: 8 November 2012 - 3:31 PM Plotted by: Craig Davies

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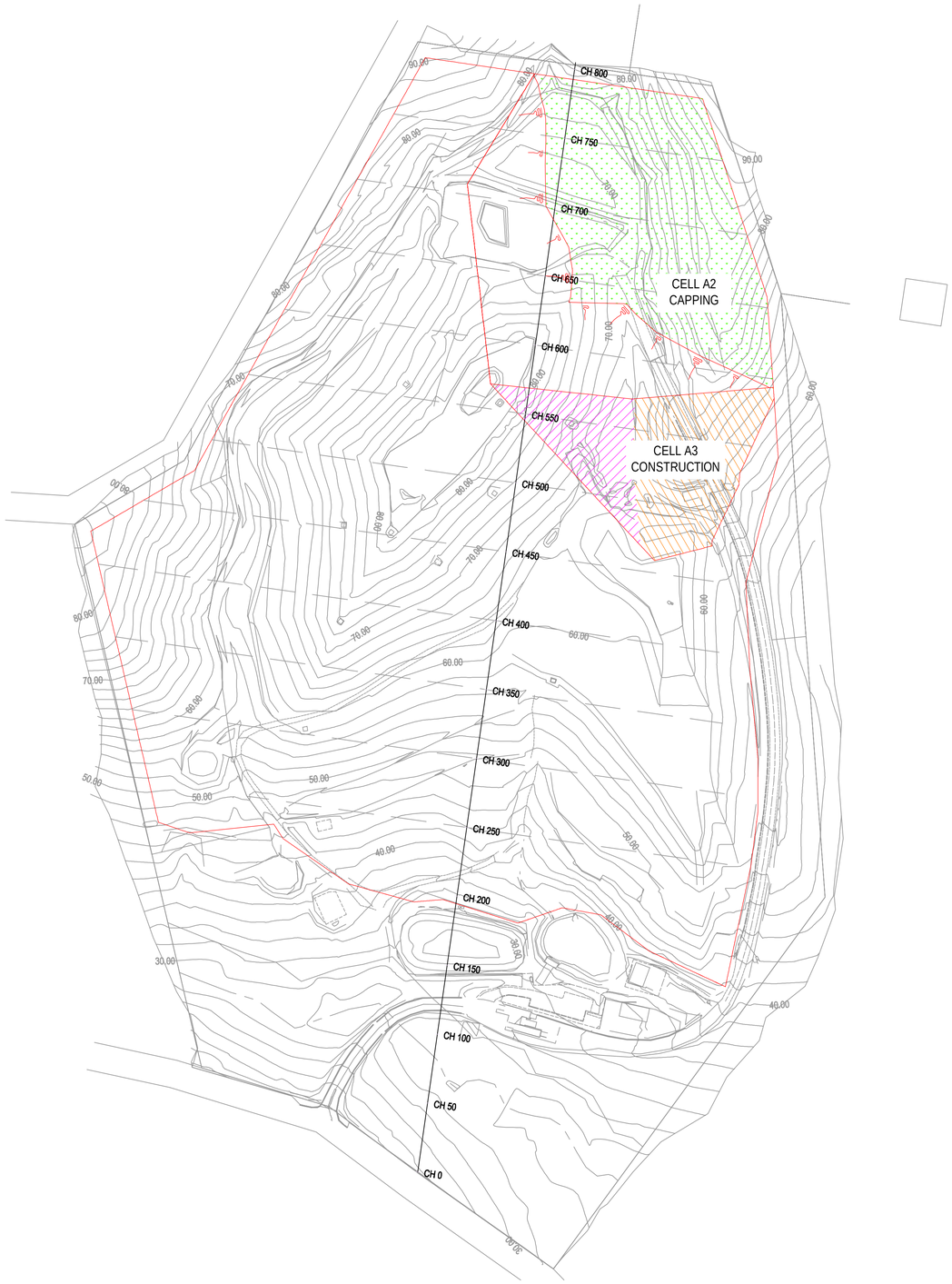

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
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scale 1:2000 for A1 job no. 21-19318
date NOV 2011 rev no. A

approved (PD) .....

SK12D

Plot Date: 8 November 2012 - 3:31 PM Plotted by: Craig Davies
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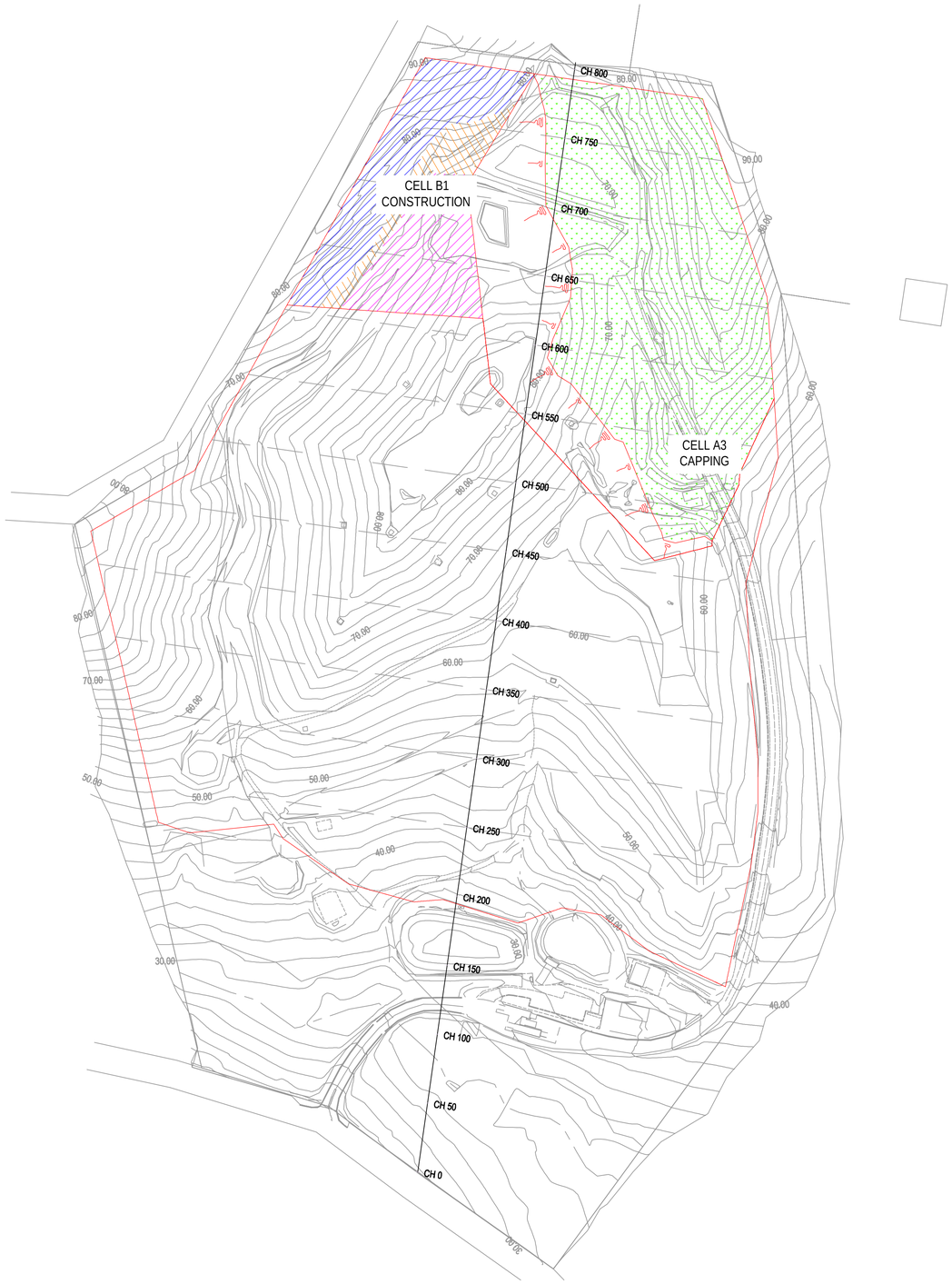

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
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date NOV 2011 rev no. A

approved (PD) SK12E

Plot Date: 8 November 2012 - 3:32 PM Plotted by: Craig Davies

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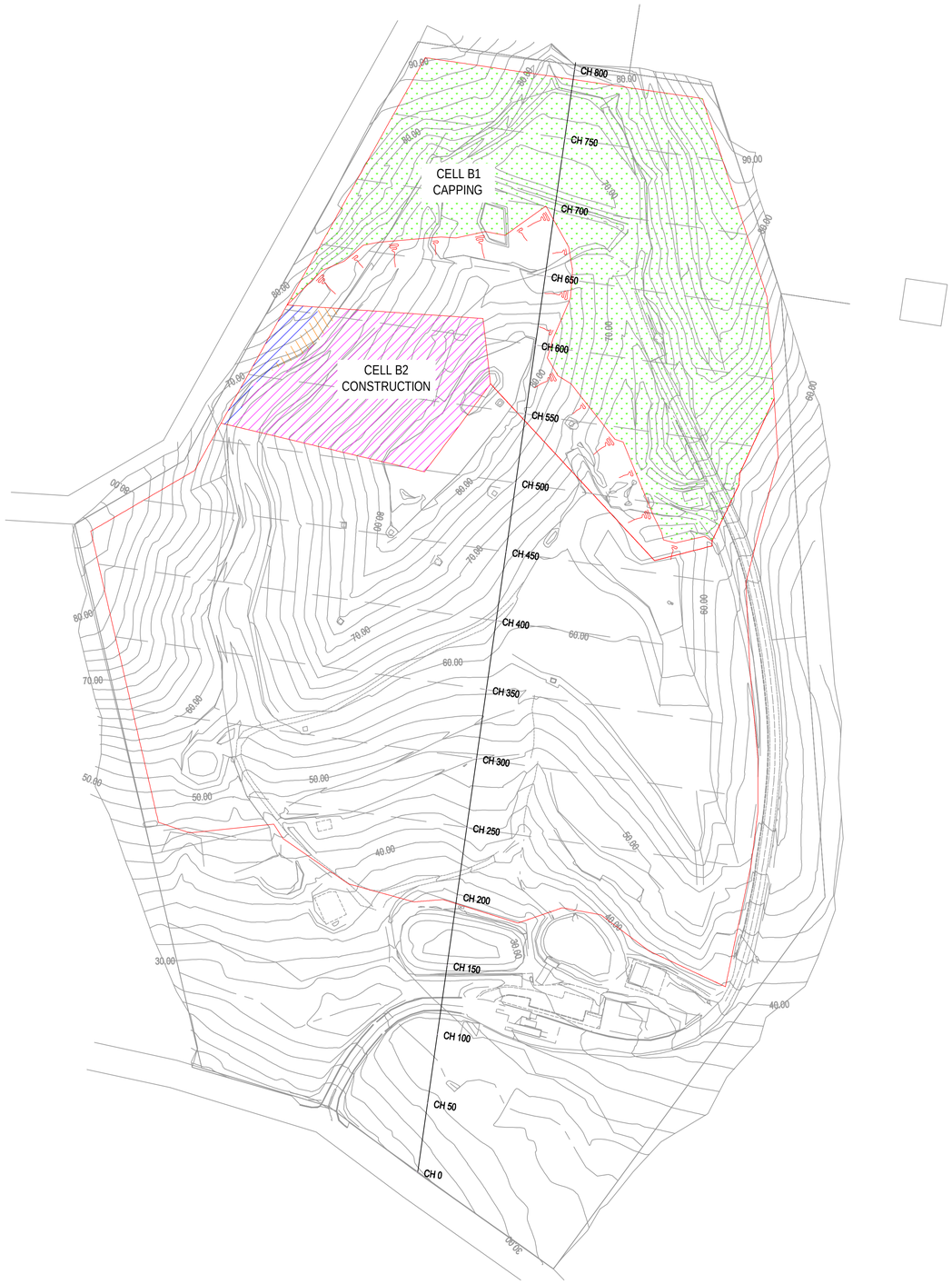

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

A	INITIAL ISSUE		06.11.12
rev	description	app'd	date

LAKE MACQUARIE CITY COUNCIL
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date	NOV 2011	rev no.	A

approved (PD) .....

SK12F

Plot Date: 8 November 2012 - 3:32 PM Plotted by: Craig Davies

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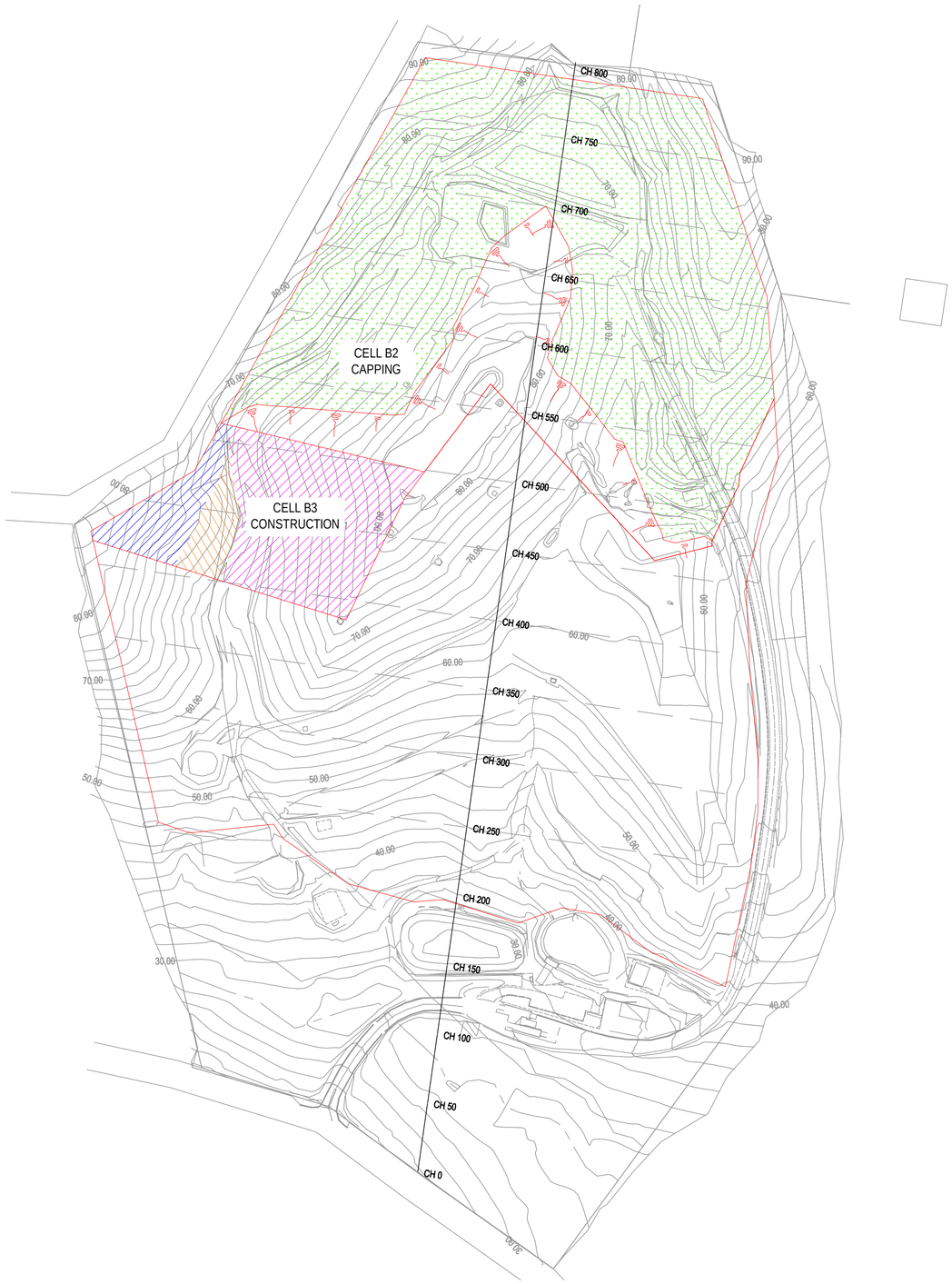

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

A	INITIAL ISSUE		06.11.12
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date NOV 2011 rev no. A

approved (PD) .....

SK12G

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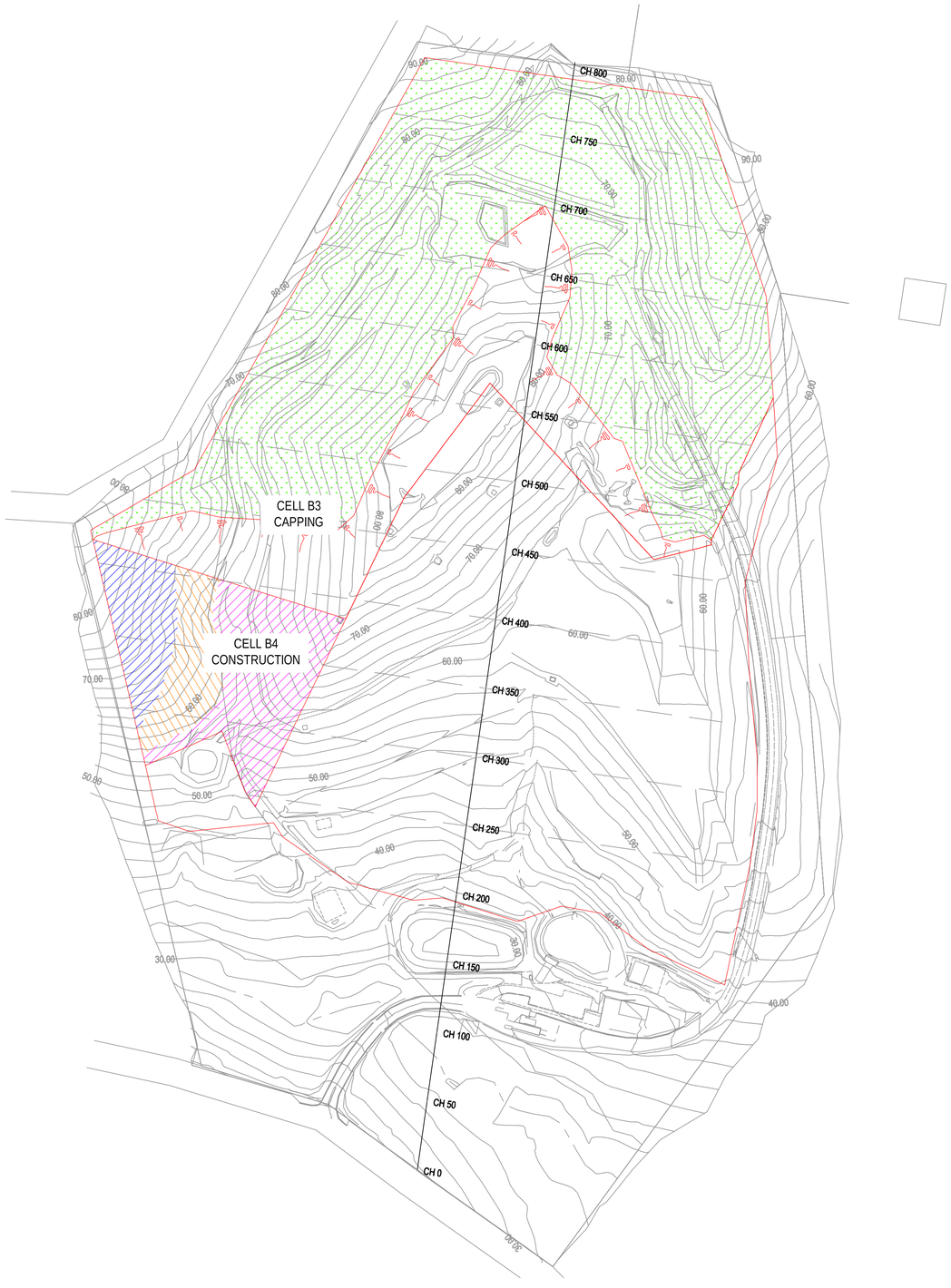

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED STAGING CELL B4

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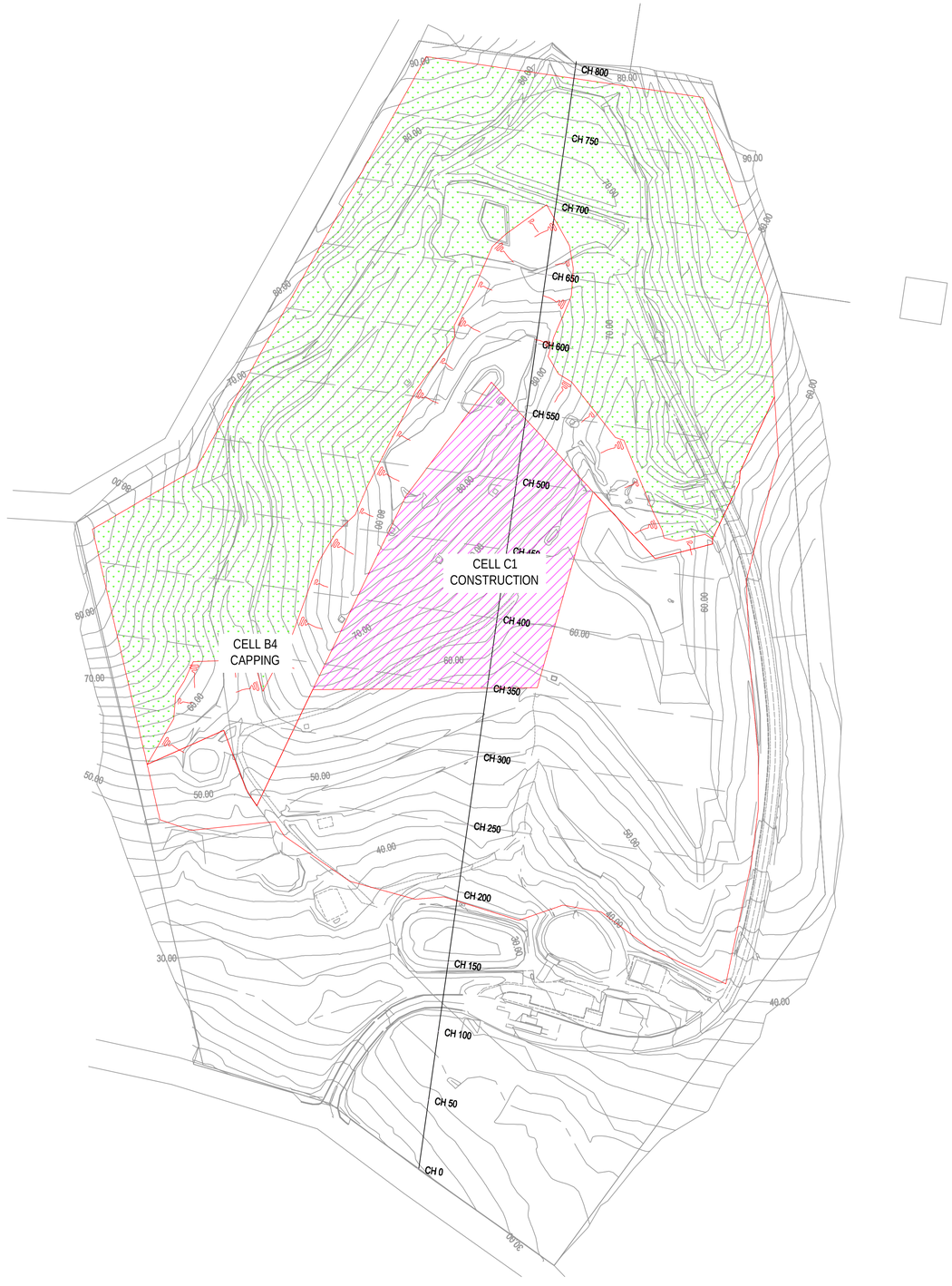
date	NOV 2011	rev no.	A

approved (PD) SK12H

Plot Date: 8 November 2012 - 3:33 PM Plotted by: Craig Davies Cad File No: N:\AU\Sydney\Projects\21\19318\CADD\Drawings\21-19318-SK012_STAGING.dwg



LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

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AWABA LANDFILL

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date NOV 2011 rev no. A

approved (PD) SK12I

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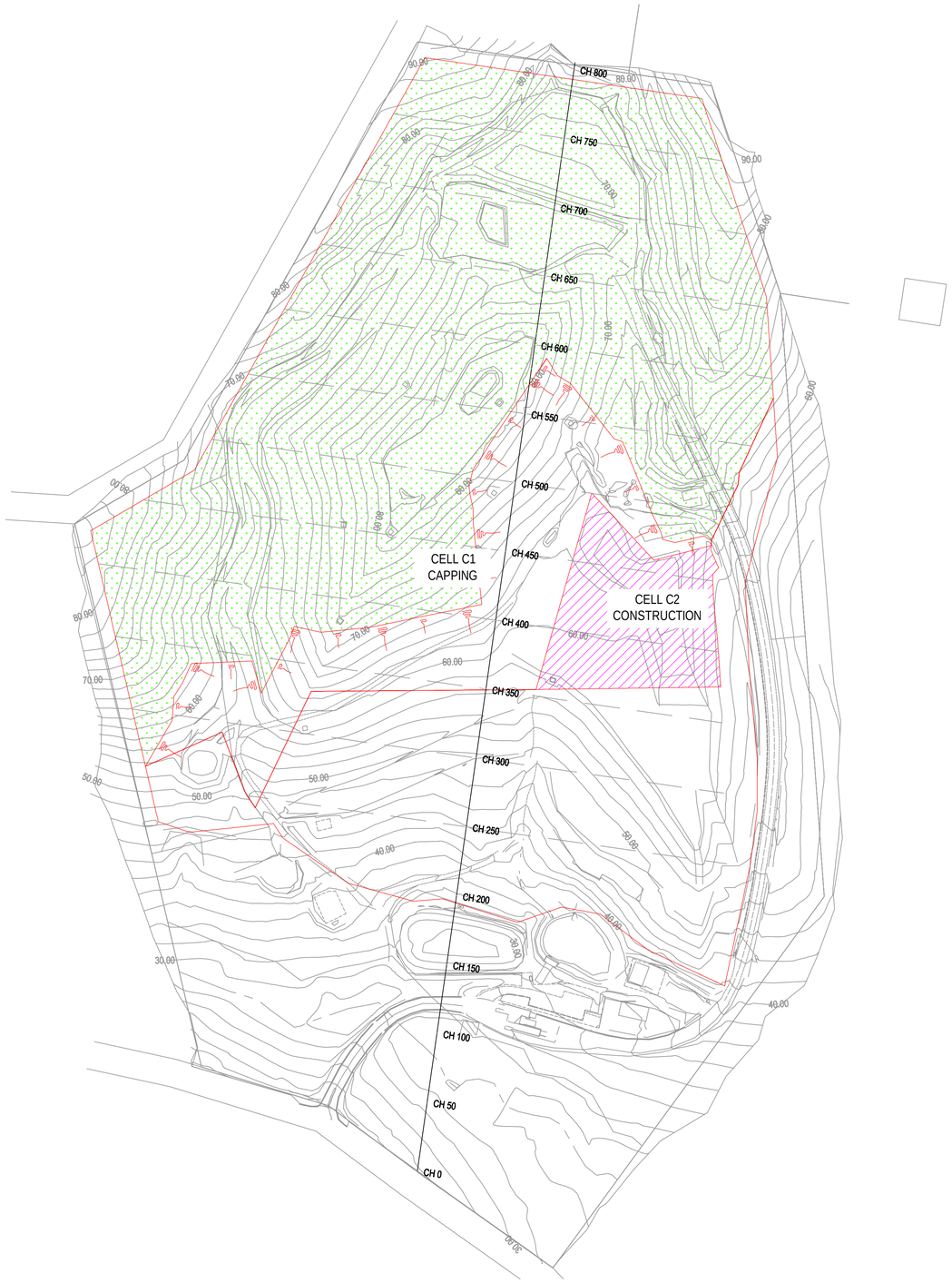

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

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date	NOV 2011	rev no.	A

approved (PD) SK12J

Plot Date: 8 November 2012 - 3:33 PM Plotted by: Craig Davies
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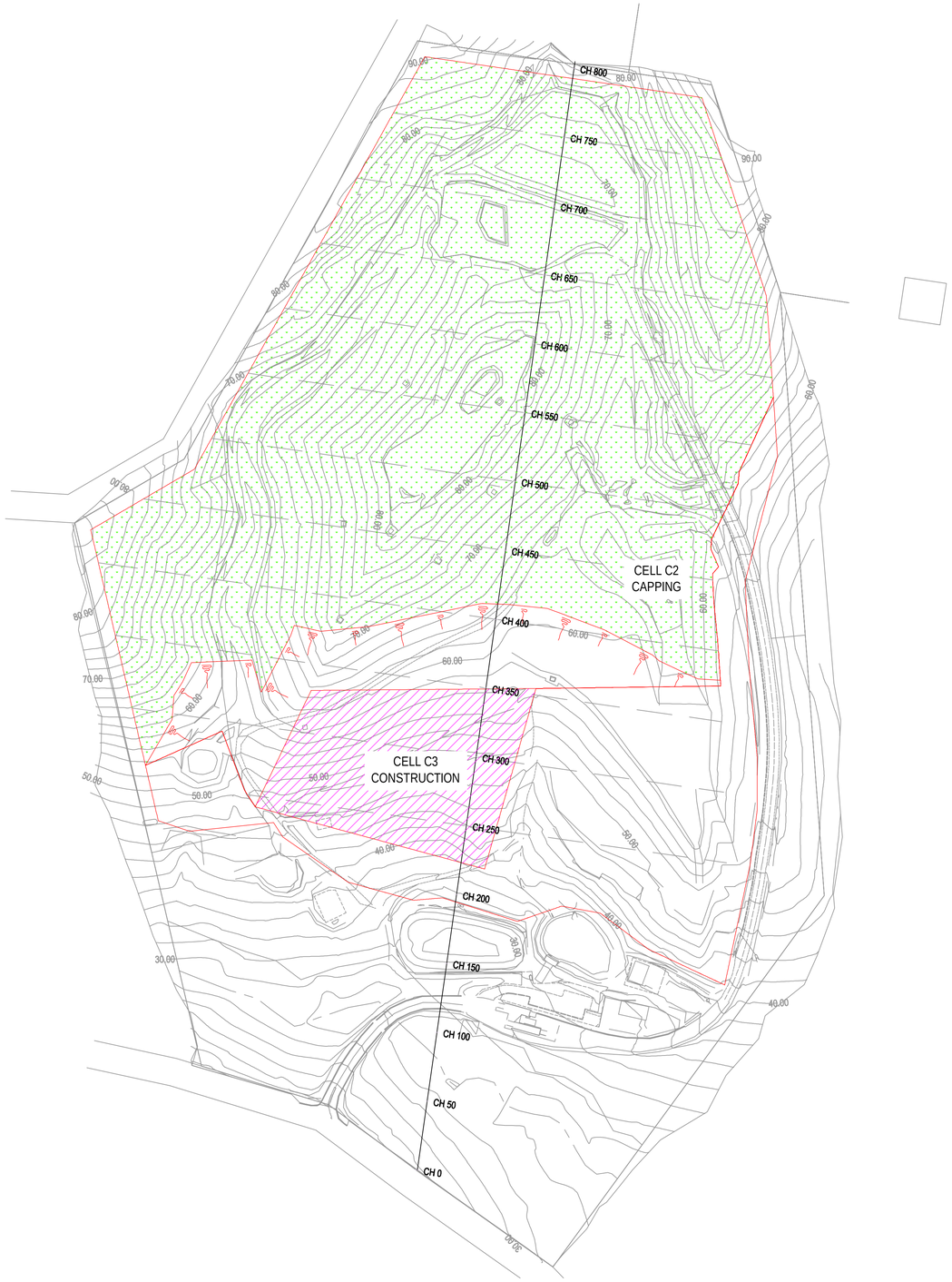

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED STAGING CELL C3

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date NOV 2011 | rev no. A

approved (PD) SK12K

Plot Date: 8 November 2012 - 3:33 PM Plotted by: Craig Davies
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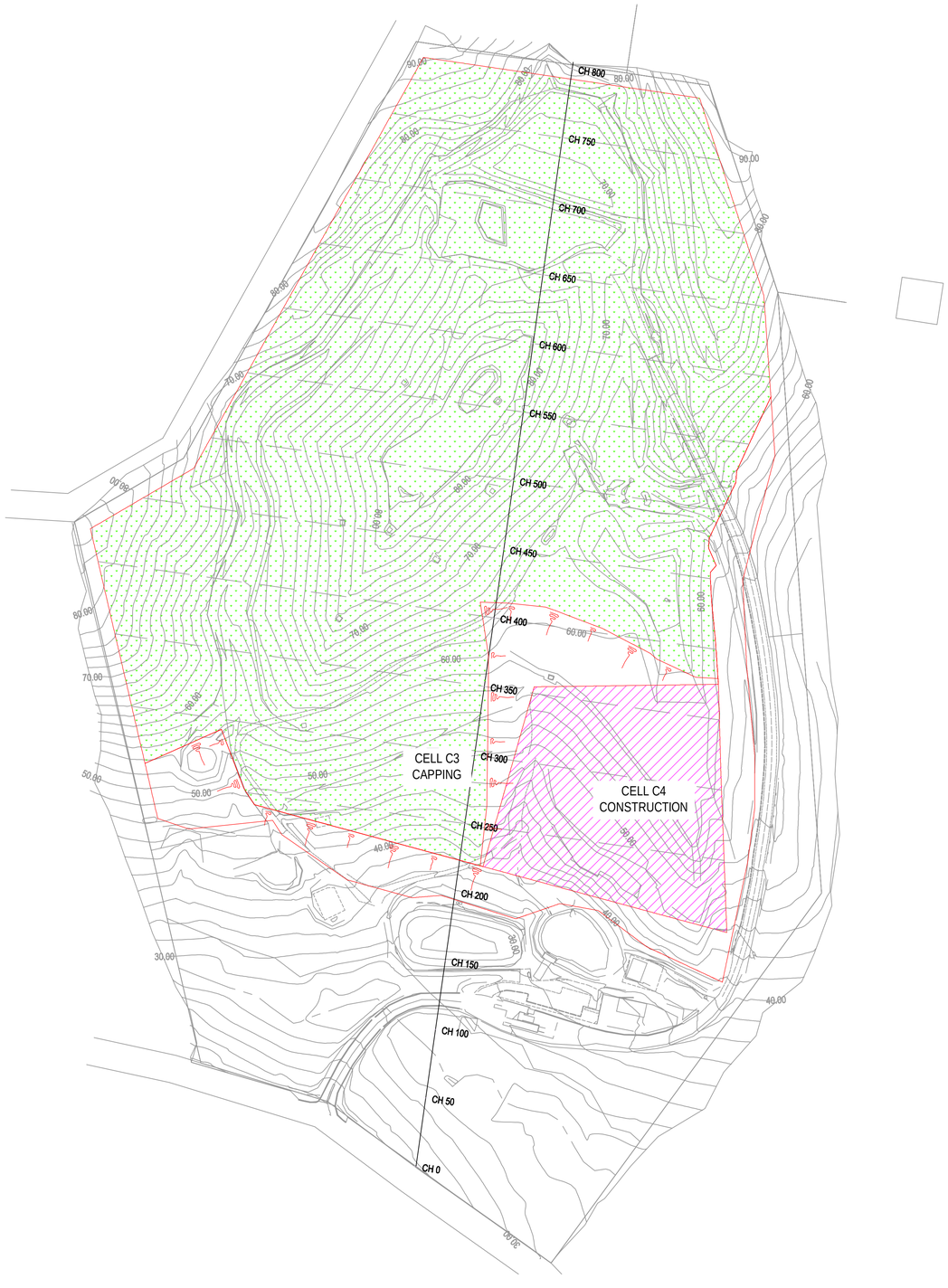

LEGEND

- EXISTING SURFACE (FEB 2010)
- FINAL CAP
- CELL BOUNDARIES / WASTE EXTENTS
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		06.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

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date	NOV 2011	rev no.	A

approved (PD) SK12L

Plot Date: 8 November 2012 - 3:34 PM Plotted by: Craig Davies
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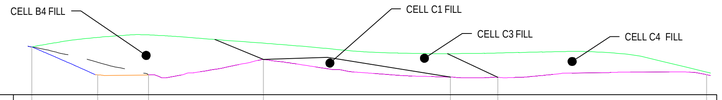
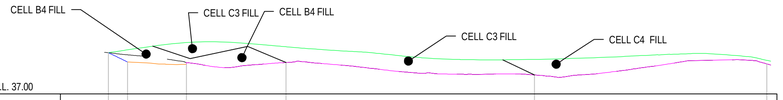


DATUM R.L. 45.00

CELL BASE	76.1	57.88	57.76	67.9	56.42	56.25	57.98
CAP	76.11	82.31	84	78.54	71.72	72.14	59.66
DEPTH CUT - / FILL +	0	-8.19	-0.24	-0	0	0	-0
EXISTING SURFACE LEVEL	76.1	66.07	58	67.9	56.42	56.25	57.98
OFFSET FROM CENTRELINE	-269.28	-226.15	-193.09	-118.02	3.96	35.04	171.36

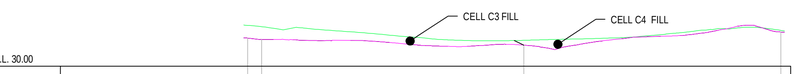
CH 350



DATUM R.L. 37.00

CELL BASE	63.81	57.79	56.26	57.4	49.31	56.47
CAP	63.82	65.66	70.48	67.67	59.47	58.8
DEPTH CUT - / FILL +	0	-4.62	-1.15	0	0	-0
EXISTING SURFACE LEVEL	63.81	62.41	57.42	57.4	49.31	56.47
OFFSET FROM CENTRELINE	-249.91	-237.4	-198.88	-133.9	28.19	180

CH 300



DATUM R.L. 30.00

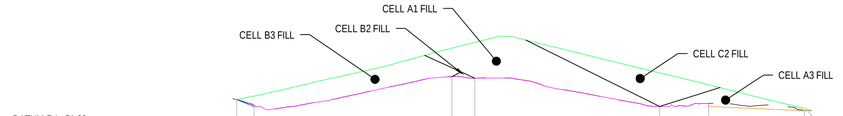
CELL BASE	48.29	47.44	43.68		52.19
CAP	56.59	55.71	46.82		53.32
DEPTH CUT - / FILL +	-0	-0	0		0
EXISTING SURFACE LEVEL	48.29	47.44	43.68		52.19
OFFSET FROM CENTRELINE	-159.06	-149.79	21.35		189.02

CH 250

DATUM R.L. 35.00

CELL BASE	46.09	45.9
CAP	47.78	46.45
DEPTH CUT - / FILL +	0	0
EXISTING SURFACE LEVEL	46.09	45.9
OFFSET FROM CENTRELINE	188.21	198.05

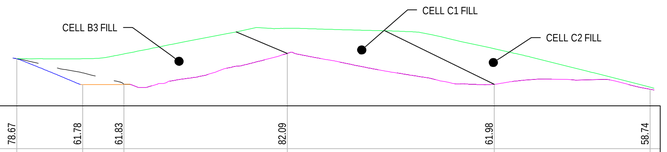
CH 200



DATUM R.L. 51.00

CELL BASE	68.41	64.87		83.5	82.53		64	63.97		61.24	61.33	
CAP	68.48	70.77		102.01	105.75		85.87	78.17		62.64	62.09	
DEPTH CUT - / FILL +	0	-0		-0	-0		0	-2.03		-0.23	-0	
EXISTING SURFACE LEVEL	68.41	64.87		83.5	82.53		64	66		61.47	61.33	
OFFSET FROM CENTRELINE	-220.58	-209.24		-80.15	-65.21		55.59	87.56		150.03	152.3	

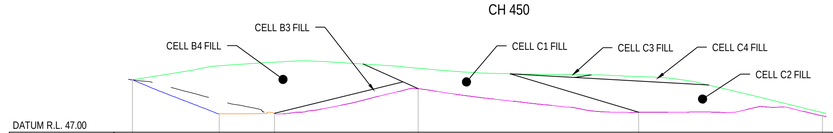
CH 500



DATUM R.L. 48.00

CELL BASE	78.67	61.78	61.83	82.09	61.98	58.74
CAP	78.76	78.69	81.83	98.56	85.21	60.15
DEPTH CUT - / FILL +	-0	-7.73	-0.17	0	-0	-0
EXISTING SURFACE LEVEL	78.67	69.5	62	82.09	61.98	58.74
OFFSET FROM CENTRELINE	-262.96	-219.92	-192.97	-86.32	48.74	150.56

CH 450



DATUM R.L. 47.00

CELL BASE	81.16	59		59.35	75.39		59.99	57.7				
CAP	81.2	90.36		92.74	88.78		83.24	59.83				
DEPTH CUT - / FILL +	0	-8.74		-0	-0		0	-0				
EXISTING SURFACE LEVEL	81.16	67.74		59.35	75.39		59.99	57.7				
OFFSET FROM CENTRELINE	-288.65	-232.01		-195.93	-102.15		41.89	161.79				

CH 400

LEGEND

- EXISTING SURFACE
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL
SECTIONS
SHEET 1 OF 2

GHD
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scale 1:2000 for A1 | job no. 21-19318
date NOV 2011 | rev no. A

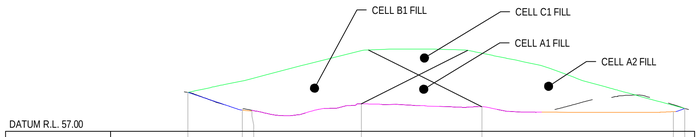
approved (PD) .....

SK12M

Plot Date: 8 November 2012 - 3:30 PM Plotted by: Craig Davies Cad File No: N:\AU\Sydney\Projects\21\19318\CADD\Drawings\21-19318-SK012_SECTIONS.dwg

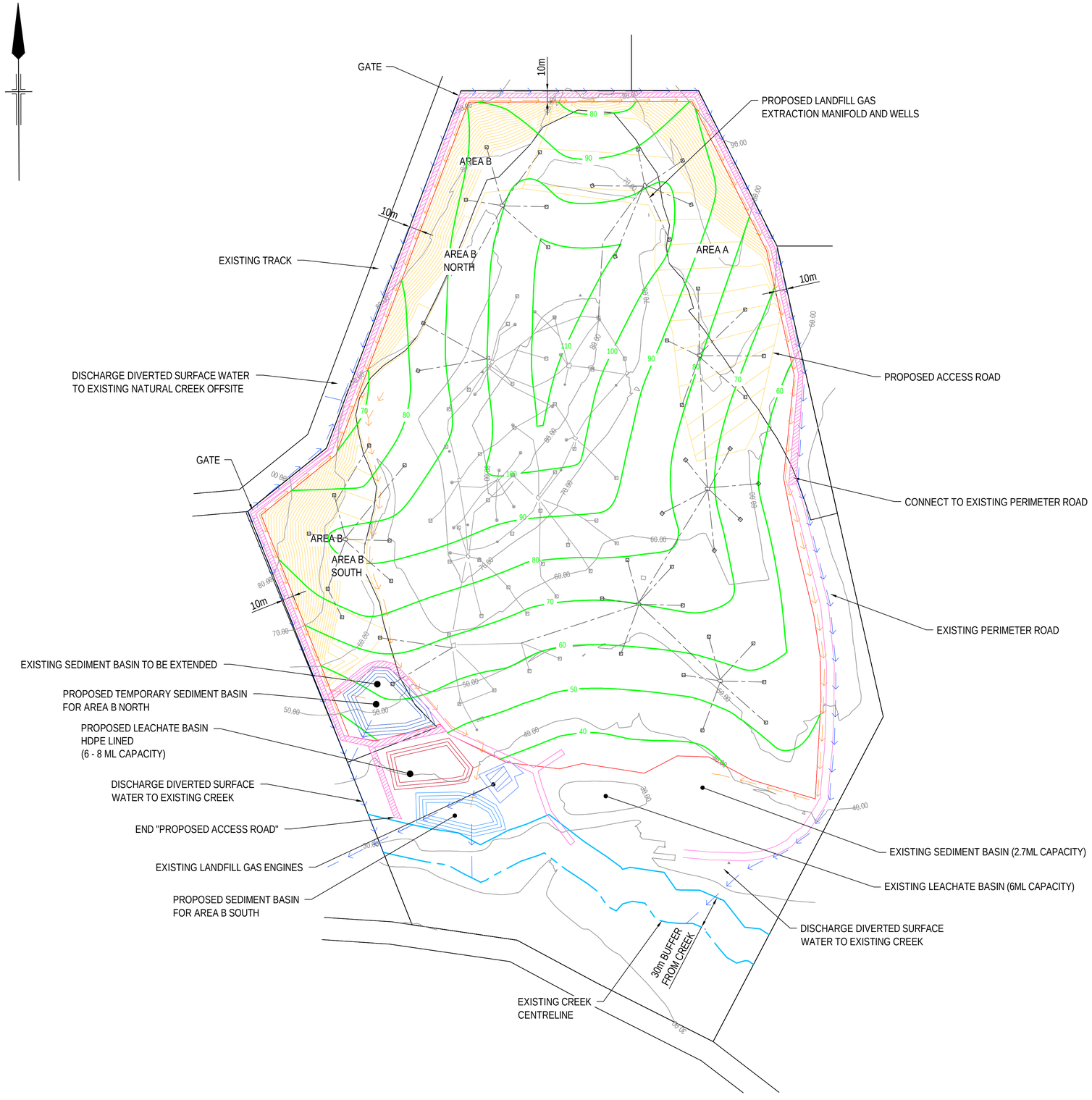
LEGEND

- EXISTING SURFACE
- BASE LINER
- SIDEWALL LINER
- PIGGY BACK LINER
- FINAL CAP
- TEMPORARY WASTE BATTER



DATUM R.L. 57.00

| | | |



DESIGN ASSUMPTIONS:

1. EXISTING SITE CONTOURS AS SUPPLIED BY COUNCIL DATED FEBRUARY 2010.

LEGEND

- LOT BOUNDARY
- PROPOSED FINAL SITE CONTOURS
- PROPOSED LANDFILL FOOTPRINT
- EXISTING CREEK
- PROPOSED EXCAVATION
- EXISTING ACCESS ROAD
- PROPOSED ACCESS ROAD
- PROPOSED STORMWATER DRAIN
- PROPOSED SURFACE WATER DIVERSION BUND/SWALE
- EXISTING GAS MANAGEMENT SYSTEM
- PROPOSED GAS MANAGEMENT SYSTEM

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
D	ISSUE FOR CLIENT REVIEW		20.04.10
C	ACCESS ROAD REVISED		08.11.12

LAKE MACQUARIE CITY COUNCIL
AWABA LANDFILL

PROPOSED FINAL CONTOURS

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scale 1:2000 for A1 | job no. 21-19318
date NOV 2012 | rev no. D

approved (PD) .....

SK013

Plot Date: 12 November 2012 - 12:03 PM Plotted by: Craig Davies Cad File No: N:\AU\Sydney\Projects\21\19318\CADD\Drawings\21-19318-SK013.dwg

Additions to Awaba Waste Management Facility

Appendix B
Report on Three Bin System

Lake Macquarie City Council

11STRAT006 Lake Macquarie Waste Strategy Project - Adoption of Processing Technology

Council Ref: F2010/01055 - D02025729
Report By: Director - City Strategy - Tony Farrell

Précis:

Council commenced the Waste Strategy Project in November 2009 following adoption of a Project Management Plan by the Waste Advisory Committee.

The Waste Strategy Project has progressed through identification of viable technology options for the processing of waste to adoption and exhibition of a favoured draft processing solution.

The draft processing solution is particularly significant to the overall strategy as it determines collection arrangements and therefore the nature of the interface between the domestic waste management system and the households that are the users of the system. The exhibition of the draft processing solution presented a staged source separated organics (SSO) (three bin) collection system as the favoured option, and a mixed waste advanced waste treatment (two bin) system as the main alternative.

The exhibition was successful in generating over two hundred responses and when complemented by a randomly sampled questionnaire survey, should provide Council the confidence to make a decision on its favoured processing system.

As a SSO (three bin) system is the most favourable solution when compared to the criteria adopted for assessing waste management system options, and it is the option most favoured by the community of Lake Macquarie, this report recommends the adoption of a staged SSO waste management system for Lake Macquarie.

Adoption of a processing technology will facilitate the continued development and implementation of a Waste Strategy for the City that addresses our known existing, and emerging, waste management needs.

Recommendation:

A. Council adopt a waste processing strategy comprising;

   1. A phased, three bin, source separated organics (SSO) system with phasing of;

      a) Phase 1 – a source generated green (garden) (SSG), fortnightly collection commencing as soon as is practicable;

      b) Phase 2 – a source separated organics (garden and kitchen) (SSO), weekly collection commencing as soon as practicable;

   2. A weekly Mixed Solid Waste (MSW) collection during Phase 1 of the SSO system and a fortnightly MSW collection during Phase 2 of the SSO system.

   3. Continuation of a fortnightly dry recyclables kerbside collection.

B. Prepare appropriate specifications and tender for the staged implementation of a

three bin SSO service. Allow for non-conforming AWT variants within that tender.

C. Request a further report examining options for waste service delivery to multi-unit dwellings in the City.

D. Request a further report examining options for practical waste service user pay systems in the City.

Background:

Prior to the commencement of the current Waste Strategy Project, Council's previous long term waste strategy was to participate in a regional two bin solution where all Mixed Solid Waste (MSW) from Maitland, Cessnock, Newcastle and Lake Macquarie LGAs would be delivered to a central point for processing. The process was modelled to achieve 70% diversion of waste from landfill, generate energy, and in addition to processing 100% of collected domestic waste, would have had capacity to receive and process commercial waste streams. To deliver this solution, the four Councils formed a company, Hunter Integrated Resources (HIR), to manage procurement and administration of the service.

The delivery of the service was delayed by the complexity of the solution, which at the time of conception would have been unprecedented in Australia. There was also significant difficulty in obtaining assurances from relevant State agencies about regulations that would govern the operation of the plant and the products emanating from the facility. Finally, the advent of the Global Financial Crisis led to a dramatic and unaffordable increase in the cost of delivering the processing facility. These barriers led to the project being abandoned by mutual agreement of the parties.

With the demise of a regional solution to waste management, the other pressures on Council's existing waste management services were brought into stark relief. The most critical issues driving the need for an urgent response include;

Awaba Waste Management Facility Capacity: Council's only active landfill at Awaba has limited capacity to continue accepting waste. Under the terms of the existing approval for the site, it has a maximum estimated life of 4 years and 9 months as at February 2011. This capacity is based on the most recent volumetric survey of the facility undertaken (December 2010) and assuming the full approved air space can be utilised. It is likely that practical limitations associated with the operation of the site will act against 100% of the approved capacity being realised.

Waste Levy: In order to discourage land filling, the NSW Government charges a levy, on a per tonne basis, for all material that is disposed of in a landfill. The levy for Lake Macquarie is set at $65.30 per tonne for FY 2010/11 and is scheduled to increase by $11.50 (plus CPI) per tonne, per year until 2015/16. In total, Council forfeited $6.1 million to the NSW Government in waste levies in the 2009/10 financial year. The cost of the levy to the Lake Macquarie waste service is likely to be about $18.7 million by 2016 if no increase in diversion away from landfill is achieved and the long term growth trends in waste generation continue.

Carbon Tax: Landfill operations generate methane through the anaerobic decomposition of organic materials interred within them. Methane is considered a very harmful greenhouse gas and is targeted in discussions about greenhouse gas pollution reduction. There is a real possibility that a carbon tax will eventually be implemented in Australia and that methane producing activities such as landfilling will attract the tax.

The previous Federal Government's proposal to introduce an Emissions Trading Scheme (ETS) for carbon pollution would have added an estimated $600,000 to the cost of operating Awaba landfill in year 1 increasing to $1.3 million by year 3. It is not possible to predict the timing, nature or quantum of new carbon pollution reduction schemes in Australia, but current indications are it will be a polluter pays scheme and that it will be on the agenda of the Federal Government in the current parliamentary term.

NSW Waste Diversion Policies: The NSW Government has adopted a policy of diverting a minimum of 66% of domestic waste from landfill by 2014. There are also diversion targets for Commercial and Industrial Waste (C&I, 63%) and Construction and Demolition Waste (C&D, 76%), also by 2014. These are known as the WARR Targets (Waste Avoidance and Resource Recovery). There is no legislative enforcement of these diversion targets as yet, however the Government has three measures in place to promote compliance.

The waste levy is the strongest incentive to achieve compliance. The other financial motivator is the Government's Waste and Sustainability Improvement Payment (WaSIP) scheme. WaSIP returns a small portion of the waste levy receipts to local government for sustainability activities, provided programs are in place to pursue compliance with the WARR targets. In the current financial year, Council can expect a WASIP payment of approximately $990,000 growing to $1.6 million in 2016. The third plank of its implementation scheme is the limitation on new landfill facility approvals, described in more detail below under *Landfilling Options (Options 5 & 6).*

Community Expectations: The work undertaken to formulate the 10 Year Community Plan identified a community expectation that Council, in its operations and services, should become more sustainable over time. During consultation for the Community Plan, the environment ranked very highly (1st in importance) amongst Council's areas of responsibility. The current domestic waste management system does not maximise the City's contribution to environmental stewardship due to the large volumes of resources being discarded to landfilling. Though satisfaction with current waste management services ranks highly amongst residents, it would be reasonable to expect that satisfaction will fall away as costs rise (e.g. due to the waste levy) without a commensurate improvement in environmental performance.

Council surveyed its residents specifically on waste issues in November, 2009. The results of that survey are included as Appendix 1 to this report. Key relevant findings from that survey include;

- Limited support for the transfer of waste from Lake Macquarie to another LGA (38% 'would not' and 33% 'may' support).
- Concern about the volume of waste generated in the City (51% concerned and 25% very concerned).
- Significant support for the introduction of kerbside green waste collection service (82% 'would' support, 10% 'maybe would' support).

Background:

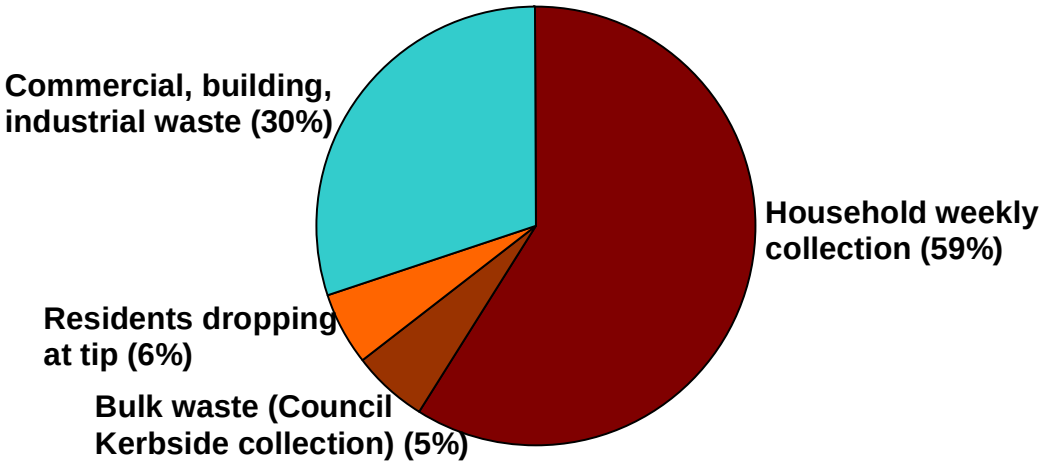
The Waste Strategy Project is being developed to respond to the pressures of

- Finite, limited landfill capacity;
- Increasing waste levies;

- Potential carbon pollution taxes;
- NSW waste diversion policies; and
- Community Expectations.

It is doing so by formulating a new domestic waste service for the City. Initial efforts are being maximised to advance understanding and responses to the domestic waste stream but other waste streams will also need to be targeted in due course. Domestic waste is being targeted because it currently comprises 70% of all material presenting at Awaba for filling. Council maintains detailed records of the source of the waste that enters the Awaba site for landfilling and domestic waste streams are the largest. The following graph depicts the sources;

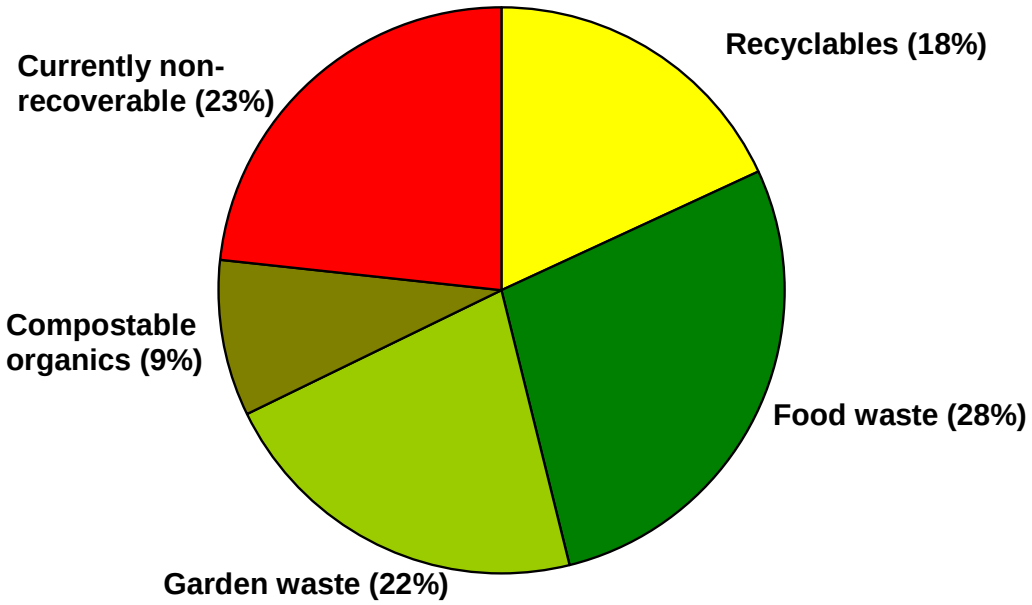
Graph 1: Waste Presented at Awaba from audit – Lake Macquarie, May 2010



It should be noted that in part the breakdown in source is skewed towards domestic waste because of pricing decisions taken by Council. C&I and C&D waste (shown as Commercial, building, industrial waste in Graph1), because it is self hauled, can be taken to the most cost effective receival point. Domestic waste, usually due to licensing limitations on waste facilities, but also because it is typically a local Council's responsibility to manage, flows to the relevant Council's facility. LMCC has been able to price away from Awaba a proportion of the C&I and C&D waste that may otherwise have presented there, to other sites that have capacity and whose business model requires higher volumes of discretionary waste to be attracted.

As well as the volume of domestic waste that needs to be dealt with, the makeup of that waste within the domestic stream indicates some immediate opportunities to divert significant proportions of the domestic waste stream. In particular, only about 23% of what is typically deposited in a Lake Macquarie residential mobile garbage bin (MGB) cannot be readily diverted away from landfilling. The proportions are;

Graph 2: Bin contents from audit – Lake Macquarie, July 2010



The above graph shows the average contents of MGB's audited in Lake Macquarie in July 2010. The section of the graph coloured red and labelled "Currently non-recoverable (23%)" depicts that portion of the MSW stream that can't be easily retrieved for reprocessing or reuse. The recyclables (18%) fraction of the waste stream can potentially be diverted through the existing kerbside recycling service offered by Council. The three green shaded sections of the graph, compostable organics (9%), garden waste (22%) and food waste (28%) could be processed through decomposition (composting or anaerobic digestion) and converted to composts and soil conditioners. They represent 59% in total.

Council has commissioned additional waste audits to improve its understanding of the domestic waste stream and support the development of the waste strategy. Additional completed surveys indicate the July 2010 results are typical and therefore form a reasonable basis developing the waste strategy. Specific results include;

- October audit: 67% organic
- MUD audit: 56.63% organic
- Home composting audit: 63% organic

Due to the extent of the MSW and the organic fractions within it, solutions that target those particular waste components are key to devising an effective waste strategy. Especially noteworthy in the above results is the experience with multi-unit dwellings. A key issue in the delivery of an SSO service is the community perception that MUD's do

not generate volumes of organic waste comparable to single unit dwellings. The result of the audit is that in make-up, the composition of the waste stream is comparable.

A number of key elements of the Waste Strategy Project have been completed;

- Part 1 of the project is completed. It comprised a *Review of Waste Input Data and Forecasting Assumptions.* The stage one report informs the modelling of the options and is being used to benchmark negotiations for the temporary diversion of non-putrescible waste from the Awaba landfill site.
- Part 2 of the project is the *Strategic Waste Options and Triple Bottom Line Analysis Part 2; MSW and Organics.* That work evaluated and ranked the 10 most feasible processing solutions and led to the selection of the two most favoured options used in the exhibition of the draft processing strategy.
- Part 3 examines minor waste streams *Strategic Waste Options and Triple Bottom Line Analysis, Part 3: 'Minor' Waste Stream.*
- Part 4 examines the issues associated with implementing the favoured waste strategy and is titled *Strategic Waste Options and Triple Bottom Line Analysis Part 4; Implementation Considerations.* It was a key document supporting the recent exhibition of the draft Waste Strategy – Processing Technology.
- A waste auditing program is advanced with three stages complete, and two still to commence. Completed are the first MGB Audit (July) and Landfill Audit (May) while the second and third MGB Audits were undertaken concurrently with a Recycling Bin audit (October & January). One further MGB Audit is still to commence, to account for seasonality in the waste stream, in April and a follow up audit of premises participating in the home composting trial will occur in about September 2011.
- A stand alone report was also commissioned titled *Review of "Best Practice" Waste Management Alternatives*. That report examines world best practice, potentially relevant to Lake Macquarie, in various waste streams management.

Each of the reports described above has been loaded on Council's website and is available for public scrutiny. The Part 1 Report has been edited to remove commercial-in-confidence information provided to Council's consultant by third parties.

As part of the work to devise a waste strategy, a waste awareness campaign has been delivered. The community waste awareness campaign complements other activities that make up this project, including a home composting program, a community consultation program around the future of waste service delivery for the city, and an education campaign for the introduction of new or altered waste services for the city. The waste awareness campaign is described in greater detail in Appendix 2, however the objectives of the waste awareness campaign are to:

- Prime residents with the necessary information around waste management that will encourage them to accept and perform behavioural changes of their household waste management into the future.
- Reach the entire residential population of Lake Macquarie with the desired messages
- Raise community understanding of:

- personal responsibilities around waste;
- current waste management practices and their impact, i.e. finite nature of landfill;
- different types of waste, e.g. e-waste, organic waste, hazardous waste etc.;
- increasing waste costs, i.e. State levies, and their impact at the local level;
- possible carbon pollution liabilities under Federal Government plans;
- need to reduce organic waste going to landfill, owing to the carbon emissions it produces and associated environmental and economic costs;

- Provide confidence to the Lake Macquarie community that Council is abreast of waste management issues; and
- Demonstrate that Council will consult with the community to develop safe, cost-effective, and convenient waste management solutions.

Following determination of a preferred waste processing technology, the campaign will continue at a low intensity up until about July 2011 concentrating on the 'call to action' message, "Avoid, Reduce, Reuse, Recycle". In the latter part of 2011, and if Council selects a three bin system, the awareness campaign will evolve into an education program preceding the introduction of Stage 1 of the SSO system.

No Regrets Activities

At the outset of the Waste Strategy Project, a number of no regrets activities were identified. These activities are considered *No Regrets* as they make a positive contribution to the City's waste management problem regardless of the eventual choices made by Council on a waste solution. Progress is being made on those no regrets activities as follows.

EOI, Provision of Waste Processing and/or Disposal Project (Awaba Waste Diversion): An Expression of Interest (EOI) was advertised for parties interested in taking a portion, or all, of any of the waste streams currently landfilled at Awaba. The intention is to identify any short term opportunities that exist to extend Awaba's life in a commercially sound manner. To accompany the EOI, a valuation of the approved airspace in the landfill was undertaken by Council's Business Analyst, Waste Environment and Rangers with advice from Council's consultant. The purpose of that analysis was to provide a basis of comparison between the airspace value and prices in the EOI responses. The air space value effectively representing a benchmark to determine whether any diversion options represent value for money. That analysis is included in the Part 1 Report and is commercial in confidence.

The EOI resulted in 11 tender responses and those were considered by Council at its meeting of 8 November 2010. Council resolved to dismiss all tenders and negotiate. Those negotiations have been delayed by staff vacancies though recent successful recruitments should now permit progress.

Proposed Capacity Extension – Awaba Waste Management Facility: The potential to expand the capacity of the current landfill at Awaba is desirable under any circumstances. Even though it is almost certain that Council's waste strategy will not be dominated by landfilling in the future, there will be a portion of the waste stream that is not recoverable for beneficial re-use. Council being able to control its

own destiny on the disposal of these fractions is very desirable. Additionally, the implementation of the strategy once adopted may take two to three years to implement, due to land acquisition, development approval, tendering and financing processes. Apart from leaving little space capacity in the landfill, it would not be desirable to go to the market, for any element of the implementation, in a vulnerable commercial position with no alternative waste management option. An increased capacity at Awaba represents a safety net to Lake Macquarie while the new waste strategy is being devised and implemented, and a solution for disposal of residual wastes that cannot be economically recovered from the waste stream.

An engineering analysis was undertaken to determine whether, in concept, an extension of the capacity of Awaba was feasible on the current footprint. That feasibility is documented in *Report for Awaba Waste Management Facility – Feasibility Analysis: GHD,* which has been loaded onto Council's website. The analysis returned a positive result and Council resolved in June 2010 to pursue a development application (project approval) for the extension. Since that time a Preliminary Environmental Assessment (PEA) has been completed by Council's Senior Development Planner and submitted to the Department of Planning (DoP) for consideration. The PEA has also been loaded onto Council's website.

The PEA is used to make a cursory analysis of the project and formulate Director General's Requirements (DGRs), effectively a specification, for the full Environmental Assessment (EA). The DGRs have been incorporated into a specification for a tender to undertake the EA. Consulting firm Cardno has been appointed to undertake the EA and commenced work at the beginning of January 2011. A project approval by the end of calendar year 2011 is feasible, though needs ideal circumstances to be achieved.

It is given that a requirement of the DGRs would be an assessment of the potential impact of the capacity extension on local flora and fauna. An important requirement of Council's own investigation guidelines is to ensure flora surveys are conducted in Spring. Many vulnerable native floral species are not detectable outside their flowering period, so spring surveys are important. Notwithstanding the DGRs for the project were received after Spring 2010, a specification and quotations for a flora and fauna assessment were prepared prior to their receipt. That resulted in Forest Fauna Surveys P/L being selected to undertake the assessment and they commenced the project on 13 September 2010. They are programmed to deliver a *Flora and Fauna Assessment of Awaba Landfill and Adjacent Land* in March 2011. That timing will allow incorporation of their results into the Project EA and the engineering design process for an extension that will be underway to coincide with the EA project.

Early indications from the flora assessment suggests offsets may be required for the threatened species *Tetratheca juncea*. The adjoining site to the east, which Council is examining as a potential site for the Waste Strategy processing technology may also provide suitable offset vegetation.

As part of the EA process Council officers have sought and received "owners consent" for the application from the Land and Property Management Authority (LPMA). Accompanying that consent the LPMA have flagged their desire to have Council acquire the landfill site. Currently the land is a reserve for waste management with Council as the Trust Manager. Council staff have commenced an

evaluation of the commercial and environmental risk implications of becoming the owner and a report on the LPMA's request will be provided in due course.

Awaba Site Extension: It is likely that Council's waste strategy, when adopted, will include the provision of new waste processing infrastructure. Both a two bin and three bin system require receival, pre-treatment, composting vessel, maturation, post treatment and storage facilities. Most of these facilities will need to be within structures that are serviced by odour control plant.

All waste management facilities require weighbridges in order to comply with approval and licensing provisions and ideally are remote from sensitive land uses. The existing Awaba landfill is well placed and well accepted by the community. It is serviced by a weighbridge and adjacent land-users generate very few complaints about it operations (one complaint only in the memory of the current site manager).

Given the above, securing a site adjacent to the existing waste management facility at Awaba represents an almost ideal site for any future waste processing facility. To this end, a licence to occupy has been obtained from the LPMA for the property immediately to the east of the existing Awaba Landfill site. The licence will allow Council to evaluate the site for the purpose of a waste processing facility. The first component of the evaluation is a flora and fauna assessment. The second phase is the development of a concept design for the use of the site so that the relationship between the processing facility and the existing Landfill can be understood and design features incorporated into the project plan approval that is being sought for the landfill extension. The authors of the concept design for the landfill extension, GHD, have been engaged to prepare the concept design.

While the licence to occupy the adjoining land will permit Council's ongoing assessment of the site, there is a high level of risk associated with timely acquisition of Crown Land should Council decide to acquire the site for waste processing infrastrucutre. As the property is also now likely to be desirable as an offset site for the landfill extension proposal, Council has sought to minimise timing risks by compulsorily acquiring the property. Council at its meeting of 13 December 2010 resolved to commence the compulsory acquisition process. At this time the acquisition notice has been prepared by Council's Property staff and forwarded to the LPMA for consideration. The processing time for an acquisition notice is extremely variable, though having started the process early, the potential for it to be concluded prior to Council needing an off set or waste processing site has been maximised.

Home Composting Trial

Under any waste strategy scenario, home composting remains a highly desirable activity for City residents. Accordingly, a home composting program has been prepared with a view to maximising participation in home composting in the City. The aim of the home composting program is to empower LMCC residents with the resources and training to manage household organic waste at home, effectively diverting these organics from landfill. The Home Composting Program will;

- Empower the community to take direct action to contribute to waste diversion and minimisation/consumption;
- Raise awareness of waste issues more broadly within the community; and

- Reduce exposure to carbon pollution reduction scheme liabilities from putrescibles wastes deposited in the Awaba landfill.

Specific targets of the LMCC Home Composting Program included a trial to engage and train 200 - 300 households on how to effectively manage organic waste at home by composting before November 2010.

The overall program is planned to build on the trial to;

- Engage and train 700 households across the LGA on how to effectively manage organic waste at home by composting before June 2011.
- Engage 7,000 households (10% Lake Macquarie population) on how to effectively manage organic waste at home by composting before June 2014.

The home composting trial has been completed and while considered successful for those that participated, a key weakness in the recruitment of participants has been identified. The original targets described above have no hope of being met unless alternative, more effective, recruitment methods are developed. A detailed review report is provided at Attachment 2. Key matters identified in the report include;

- 6,500 letterbox invitations to participate resulted in only 180 registrations and 135 participants;
- Council's audit contractor (EC Sustainable) audited 78 participant's garbage bins to determine pre-composting trial composition and found waste profiles reasonably typical for other audited properties in the City;
- Barriers to home composting primarily related to lack of expertise in home composting; and
- Participants were satisfied with the trial program and significantly increased their level of understanding of how to compost at home.

As a result of what was learnt from the trial, the following actions have been recommended;

a) Defer roll out of the full Home Composting Program, which aims to facilitate home composting by 10% of city households, pending the outcome of a further trial of methods to improve home composting participation rates.

b) Develop and implement a second household home composting trial that focuses on alternative methods to encourage residents to commence and maintain home composting.

c) Review audit results of the first trial to determine whether participation has led to a decrease in amount of organic waste in participants' general waste bin.

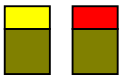
d) Design a communications plan for the Home Composting Program, should it proceed, that is consistent with Council's detailed City-wide waste strategy.

Analysis of Waste Processing Technology Options

The main purpose of the completed *Strategic Waste Options and Triple Bottom Line Analysis Part 2; MSW and Organics* Report (the Part 2 Report) was to describe and evaluate the most likely technology solutions for inclusion in the waste strategy.

The Report describes 10 potential technology solutions for the City's waste strategy. Those solutions being;

No.	Waste Treatment Option	Bin Configuration	Description
1	3 Bin Source Separated Green Waste – Windrow Composting		Green garden waste only (i.e. excluding food waste) collected in a third bin and composted in open windrows.
2	3 Bin Source Separated Organics - In-vessel Composting		Green and food waste collected in a third bin and composted in enclosed tunnels.
3	Phased 3 Bin Source Separated Organics – In-vessel Composting		Green and food waste collected in a third bin and composted in enclosed tunnels. Same end situation as option 2, but staged so that the third bin collection starts out with garden waste only, composted in open windrows (same as option 1). When Council chooses (+3 years used for analysis), food waste collection in the third bin commences and composting occurs in enclosed tunnels.
4	3 Bin Source Separated Organics – Anaerobic Digestion		Green and food waste collected in a third bin and composted without oxygen, anaerobic digestion. Methane produced, captured and burnt for energy.
5	2 Bin Landfill		Mixed waste collected (red lidded bin) and deposited directly in landfill. Same as current waste system.
6	2 Bin bioreactor		Mixed waste collected (red lidded bin) and deposited directly into a land fill specially designed to accelerate and maximise methane generation while maximising methane capture. Methane burnt for energy.

7	2 Bin In-vessel composting		Mixed waste collected (red lidded bin) and composted in enclosed tunnels.
8	2 Bin In-vessel composting (Port Stephens)		Mixed waste collected (red lidded bin), transferred to the Port Stephens composter at Raymond Terrace for processing in a drum composter followed by enclosed windrow composting.
9	2 Bin In-vessel composting (Port Stephens) plus Energy from Waste		Mixed waste collected (red lidded bin), transferred to the Port Stephens composter at Raymond Terrace for processing in a drum composter followed by enclosed windrow composting. Additionally, energy is generated from Biogas and/or reject material at the facility, hence energy from waste. The energy component is a proposed future addition to the Port Stephens facility.
10	2 Bin Anaerobic Digestion		Mixed waste collected (red lidded bin) and composted without oxygen, anaerobic digestion. Methane produced, captured and burnt for energy.
Key	Yellow Bin		In all options, yellow lidded, recyclables bin continues to be serviced by Hunter Resource Recovery.
Key	Red Bin		In options with three bins, the red lidded bin collection is taken to land fill. In the two bin options, the red lidded bin collection is processed (options 7, 8, 9, and 10) or landfilled (options 5 and 6).
Key	Green Bin		The options shown with a green bin are all three bin options and incorporate source separation of part, or all, household waste. Each description above describes the role the green bin takes in each individual circumstance.

These options were identified by examining Lake Macquarie's existing domestic waste stream to determine what fractions needed to be processed or recovered to achieve the NSW Domestic Waste Diversion target of 66%. Available technologies were then identified and their performance, particularly in Australia, determined. This list of available technologies was compared to the risk profile agreed by the Waste Advisory Committee (workshop of 19 November 2009). The most significant effect of analysing performance and risk was to remove options to burn waste (pyrolysis, mass burn, gasification and incineration), as a stand alone solution. These options are grouped as "thermal processing" options. One energy from waste (EfW) option was retained, option 9 above, but only as a longer term potential add-on to an existing proven facility, namely the Bedminster composter at Raymond Terrace.

The other key outcome of the risk and performance analysis was the identification of doubt around the performance of anaerobic digestion (AD) solutions for waste management. The consensus in Council's project team reflects the industry position that AD promises a very attractive waste management solution. It requires a small footprint, achieves very high diversion rates, maximises energy recovery, produces composts that are attractive for their carbon content, and produces virtually no amenity issues for adjoining land uses. The difficulty with the technology is that it is expensive, does not handle uncontrolled feedstock well, and until electricity prices warrant the investment, they are not commercially sound. In practice, AD promises a lot but under current conditions, delivers little.

Three large scale AD plants processing mixed waste have been commissioned in Australia and two have been mothballed (Atlas in Perth and UR3R in Sydney). A third plant (Arrowbio in Sydney) cost $50 million to develop and is still operating but it has required ongoing modification and additional plant has been retrofitted, increasing the initial investment. It does not yet perform according to plan.

A plant specialising in food waste treatment in Sydney using AD technology (Earthpower, Sydney) continues to operate but has also had a very troubled past. Costing an estimated $35 million to build, the plant has been continually modified, never performed as planned and was sold for $1 in 2007. It is understood the plant continues to make significant operating losses though the operators advise they are confident of achieving 'break even' in the near future.

A pilot AD plant has been developed in Shenton Park, Perth that promises to address many issues with past experiences. Client approval to bring the pilot into full scale production (55,000 tonnes per annum capacity) has recently been given. Shenton Park combines aerobic with anaerobic stages of processing within the one vessel and marries advanced system control technology to the process. The provider's claims, if achieved, would make the approach extremely desirable, however in the absence of a full scale, stable working model and LMCC's risk averse profile, that technology scores poorly in the multi-variate analysis. As an aside, Barwon Regional Council in Victoria (Geelong and surrounds) had selected the same (AnaeCo DiCOM) solution as part of its waste strategy in 2009. It has recently been announced that Barwon has terminated its agreement for the provision of an AD Processing Facility due to "timing" issues. Barwon have advised they will return to the market with a new tender shortly and have publicly advised that AnaeCo are encouraged to tender again.

With a list of 10 technologies described and with adequate information available for each to make a reasonable first pass analysis, the options were assessed against the triple bottom line weightings assigned by the Waste Advisory Committee. These weightings allowed Council's consultant to score each option against the values agreed by the Committee. The WAC weightings were;

Issue	***Priority (out of 10)***
Carbon footprint	9
Technology risk	9
Health and amenity	8
Service convenience	8
Empowered community	8
Local economic development	8
NSW waste targets	8
Market risk	8
Resource recovery	7
Financial cost	7
Local employment	7
Flexibility	7
Synergy with LMCC	6
Socially equitable	5
Pollution	5
Economic multiplier	5
Land contamination	4
Social cohesion & inter-action	2
Impact on tourism, mining	1

Using these weightings, the result was a set of scores for the options. The final scores are shown below;

Ranking	Option #	Option Description	Score
1	3	3 - Phased Source Separated G & Food Waste composted in Vessel	880
2	2	2 - Source Separated G & Food Waste composted in Vessel	824
3	7	7 - 2 Bin MSW enclosed composting (Awaba)	802
4	1	1 - Source Separated G/Waste - Open Windrow	796
5	9	9 - 2 Bin In Vessel Comp PS + EfW	792
6	8	8 - 2 Bin MSW enclosed composting (Pt Stephens AWT)	778
7	4	4 - 3 Bin Source Separated Green & Food to Anaerobic Digestion	763

8	10	10 - 2 Bin MSW Sort + Anaerobic Digestion	755
9	6	6 - Two Bin + Bio-Reactor Landfill	663
10	5	5 - Two Bin + Landfill (BAU)	658

Selected for more detailed analysis.

As previously reported to Council, the first ranked and third ranked options were selected for further, more detailed analysis. The second ranked option was considered a sub-set of the first ranked option, as discussed below. Within the Part 2 Report, each of the options has identified strengths and weaknesses, especially in relationship to each other.

Three Bin Phased Source Separated Garden & Food Waste Composted In-Vessel (Option 3)

The highest ranked and preferred option is the phased introduction of an organics processing service.

In Phase 1, garden (green) waste would be separated, at the home, and presented for kerbside collection in a third bin. The third bin would be collected fortnightly. The phasing would revolve around the introduction of food waste to the third bin. By only allowing green waste in the third bin in Phase 1, processing could occur through open (outdoors) windrow composting. Phase 1 has the advantages of;

- Being low capital intensive and low cost overall;
- Requiring limited infrastructure to undertake, it requires a relatively brief lead time for its commencement;
- Low risk in terms of the technology used and disposal of the outputs;
- Likely to enjoy a relatively brief approval process; and
- Relatively easy to communicate to users what can and cannot be presented for collection.

Green organic processing on its own has the disadvantage of not being able to achieve diversion targets, estimated to achieve only about 44%. Other organic streams need to be added if the 66% target is to be reached.

Phase 2 of the service would see the introduction of food waste to the third bin. At the time food is introduced, collection of the third bin would need to be done weekly to minimise amenity issues (odour, bin cleanliness) for users. Processing would also need to change to “in-vessel”, rather than in open windrows so as to facilitate odour control. The addition of food waste also improves the quality of the compost by introducing additional nutrients to the mix. In most applications of the final compost, with the exception of native plants, the additional nutrients are beneficial.

The second highest scoring option, Option 2 was not selected for the next stage of analysis. The reason being that analysis of the higher ranking phased option (Option 3) provided intelligence on Option 2, Source Separated Green & Food Waste Composted In-Vessel. Option 2 provides the same end-point as option 3 but does not include phasing. That is, from the outset, Option 2 would permit food as well as garden organics to be placed in the third bin to be collected weekly for processing in-vessel.

In effect, analysis of the phased three bin SSO system Option 3, also gives an analysis of the un-phased three bin SSO system Option 2.

Two Bin MSW Enclosed Composting at Awaba (Option 7)

The third highest ranked option and the main alternative publicised in the exhibition of the draft strategy is the retention of a two bin system, which is the same as the current collection system, however with the separation of organics being managed at the processing stage. That is, the mixed waste is collected as it is now and delivered to a processing plant, rather than the tip face at Awaba (similar to that proposed under the previous regional solution). The location of a processing plant at Awaba is subject to other approvals and may not be achievable. The Awaba label is used in describing option 7 to distinguish it from the Port Stephens options (options 8 and 9) and to provide a basis for modelling the collection task.

The processing system could have a number of variations but in principle the likely key stages would comprise preliminary sorting to remove recyclables and oversized items, mechanical mulching, initial composting in controlled conditions (i.e. in-vessel to manage odours), maturation composting potentially outdoors, and final refinement to remove a proportion of contaminants.

The two bin system has the advantages of;

- Generating a smaller carbon (greenhouse gas) footprint than three bin options;
- Achieving higher diversion rates than three bin options;
- Facilitating dry recyclables recovery from the waste stream;
- Reducing the education 'burden' of introducing a third bin;
- Reducing the extent of change management required in Council's own operations;
- Providing greater flexibility in future waste options, including a pathway to an energy from waste facility; and
- Reducing the extent of service dissatisfaction opportunities amongst multi-unit dwelling occupants.

The relative disadvantages of the two bin system are that it will likely be more costly than a three bin solution. That is because the third bin provision and collection fleet cost would be more than offset by the higher capital and operating costs of the mixed waste processing plant. The other disadvantage is that the compost product emanating from the process has limited application, due to the existence of contaminants within it, and it is subject to a regulatory regime that may be altered in the future.

Landfilling Options (Options 5 & 6)

Two options that warrant particular comment are those relating to landfilling. The analysis indicates these options are attractive in the short term based on cost but they perform poorly against environmental criteria.

The keys to not pursuing landfill options include the great uncertainty about obtaining an approval for a landfill extension, or new landfill, in the absence of Council having diversion strategies in place. The Infrastructure SEPP has been amended to include the following provisions;

> *(1) In determining a development application for development for the purpose of the construction, operation or maintenance of a landfill for the disposal of waste, including putrescible waste, the consent authority must take the following matters into consideration:*

> (a) *whether there is a suitable level of recovery of waste, such as by using alternative waste treatment or the composting of food and garden waste, so that the amount of waste is minimised before it is placed in the landfill,*
>
> (Underlining added)

The current capacity at Awaba means that delays to obtaining an approval for an extension, such as while an argument to set aside the quoted provisions noted above, place us at risk of not having a disposal option by the time Awaba's capacity is exhausted. On the other hand, the irony is by implementing a processing scheme, thereby reducing the need for landfill capacity, it increases our chances of getting an approval for an increase in capacity.

Proposal:

The proposal is that Council adopt a Phased Three Bin Source Separated Organics processing system as its preferred waste processing technology. The phasing to comprise;

1. Phase 1 - a fortnightly garden waste only collection coupled with processing by open windrow composting . Continue a weekly MSW collection.
2. Phase 2 – a weekly source separated organics (including food with the garden waste) coupled with in-vessel composting. Reduce to a fortnightly MSW collection.

The Phased Three Bin SSO system is the highest scoring option amongst the ten examined and assessed against Council's weighted evaluation criteria. The system has the following identified advantages (*Lloyd Consulting Part 4 Report*);

- *implementation can start sooner providing immediate rewards in the form of improved waste diversion (phased implementation);*
- *gate fees are lower therefore it is the cheapest solution;*
- *tunnel composting of SSO is well proven, tried and tested (lower risk);*
- *achieves the 66% WARR diversion target once fully operational;*
- *produced compost is clean and of high quality;*
- *unlimited market for clean compost (including in agriculture);*
- *very competitive market for tunnel composting;*
- *preferred by LMCC residents;*

The recommended option is considered the best available option. On balance the three Bin option is only slightly more favourable than the main two Bin option with the key determining features being;

- The avoidance of producing, and distributing into the wider environment, a compost material that presents potential legacy problems for future communities. While land treated with MSW composts in the future is likely to be severely degraded and will benefit from the application of the compost, in the very long term

future users may be faced with difficulty in utilising that land due to the existence of glass fines and chemical contaminants.

- The standards applicable to the compost products of the three bin system are relatively stable, compared to the two bin standard which is only certain to 2013. Even accounting for a mooted removal of the 2013 expiry of the Alternative Waste Treatment Derived Organic Rich Fraction (AWTDORF) standard, there is also proposed a replacement trial program to quantify the impacts of physical contaminants in AWT composts. The response to a negative trial result remains a risk to such systems.
- The Three Bin system maximises the personal responsibility of householders to participate in the management of the waste they generate. This creates an education burden for Council but it is also an opportunity to engage and increase higher order waste management messages such as to avoid, reduce, and reuse waste.

There are however some weaknesses in the three Bin system relative to a two Bin system. I have concluded that while they are important, they do not on balance outweigh the other features of the three bin system. It is important for the sake of transparency and to ensure Council has a balanced analysis before it to recognise those weaknesses. The consultation undertaken on the draft emphasises these weaknesses;

- The three Bin SSO system potentially diverts less material overall (in the long term) from landfill than the two Bin alternative, though this is dependant on the maintenance of a low threshold AWTDORF standard.
- The overall increase in kerbside waste removal capacity (240 litres per fortnight) may facilitate increases in the total domestic waste stream.
- Premises that generate limited organic waste or have bin storage problems will not be willing participants in the service.
- The introduction of a third collection fleet operating within the City will have road asset and fuel consumption impacts and will be subject to peak oil vulnerability.

The 2 Bin AWT system also has strengths of its own. These are documented in the Part 4 Report and are summarised as;

- *higher diversion rate, enough to bring council well above the WARR 66% target;*
- *no need to change bins or collection system;*
- *lower GHG emissions profile;*
- *maximum resource recovery - allows the recovery of dry recyclables from the waste stream; and*
- *close proximity to Hunter region mine sites could improve marketability of AWT compost.*

The two bin option is inferior based on objective criteria used in the multi-variate analysis but remains close enough for it to remain a viable alternative to the preferred solution. It is also less preferred by the community as evidenced in the community feedback from the exhibition and the community survey. It would be likely to generate fewer community service problems during implementation (ie. due to the management of change around new services, bin delivery and collection) and therefore may generate relatively higher

community satisfaction in the short term. On the basis of past community surveys, it is less likely to meet community expectations of environmental stewardship in the long term.

Consultation:

A detailed report outlining all consultation and feedback activities associated with the Waste Strategy Project has been provided as Appendix 3. Embedded within that report are the responses to the public exhibition of the preferred waste processing option and the results of a community survey undertaken in November 2010.

The clear message from the consultation is that the majority of the general community support a third bin. The key results being;

- 64% of submissions to the draft strategy exhibition prefer a third bin and 22% preferred two bins.
- 69% of survey respondents preferred three bins as the best option for their household, 18% preferred a two bin system and 9% would be satisfied with either.

The main reasons offered in exhibition submissions for preferring a third bin are;

- Satisfaction and support for Council in taking an environmentally sustainable direction with waste management.
- Preference for the high quality compost from the three bin system and the community involvement in taking responsibility for sorting their own waste.
- Additional space to dispose of green waste.
- Some residents are unable to home compost or had been unsuccessful in their attempts to home compost or could not use all the compost generated, and so the three bin system allowed them to participate in this practice.
- It is the cheaper of the two preferred options

The main reasons offered in the community survey for preferring a third bin are;

- Better for the environment
- Better management of green waste
- Better compost would be produced
- More cost effective/Cheaper
- We need the green bin as we have a lot of green waste
- Good/Great idea, would love it to go ahead
- Experienced with similar systems either at home or in other council areas
- Less waste going into landfill/Awaba tip
- More convenient way to recycle garden waste and food scraps
- Easier system, both for Council and residents

There were also reasons offered for not supporting a third bin system. From exhibition responses these included;

- Residents have no use for a third bin as they do not generate enough waste.
- Residents home compost and see no need for an organics bin. Many suggested Council introduce a user pays system as an incentive and reward for people that home compost.
- Residents have no room to store the third bin (most of these submission were from residents identified as living in multi-unit dwellings).
- A small number of submissions suggested the general public are too apathetic and lazy to use a three bin system properly.

From the community survey, the following reasons for opposing a third bin service were offered;

- Compost/already use our green waste
- The current two bin system is sufficient/works well
- Do not have use/need for the third bin
- Lack of space for a third bin

In consultation with staff during assessment of the Draft Strategy options, there was a clear distinction between the preferences of operational staff and sustainability staff. The full content of those preferences is recorded in the previous report to Council on processing options (10STRAT037, 1 November 2010) but can be summarised as operations staff preferring a two bin solution as it most closely resembles the existing service thus reducing implementation risks and logistical change management. Sustainability staff preferred the three bin solution due to the superior environmental performance and greater community engagement it engenders.

Implications:

Policy Implications:

The recommendation to this report, that a phased three bin SSO processing system be adopted as Council's preferred waste processing technology, would represent a policy position of Council if adopted. The next stages of the waste strategy project include tendering for a waste processing service, and while non-conforming options may be submitted, the analysis to this point transparently describes the weaknesses of alternative options.

The determination of the processing solution is a fundamental element of the overall strategy and its determination affects each component of the waste service, from the household through to the final application of waste derived products. In the context of the current strategy formulation, and due to the capital costs involved, the processing technology decision is a long-term decision. It affects most significantly;

- collection systems
- the extent of work required by each individual or household to access the waste service
- the cost of the system
- the environmental performance of the system, and

- the education effort required to support the system.

Due to the scale of the waste service and the fact its delivery touches almost every property in the City, the determination of a processing technology is one of the most significant policy determinations the Council will make.

Also relevant to Council's decision is the NSW Waste Avoidance and Resource Recovery Strategy. The Department of Environment, Climate Change and Water (DECCW) released for discussion a draft implementation plan for the period 2011-2015 in December 2010 (after Council adopted its draft processing technology). This implementation plan is especially important as it represents probably the last chance to adjust implementation activities ahead of the deadline for achieving the 66% diversion target (2014). Of particular relevance to LMCC is the proposition that DECCW will define a best practice model for household collection services. The best practice model being a three bin system. The full draft implementation plan is included as Appendix 4 to this report, and the reference to a best practice model is as follows;

> *1.1 Encouraging councils to adopt best practice models for household collection bins, with a minimum three-bin system with separate bins for (i) dry recyclables (glass, plastics, paper, and cardboard) to move towards a 75% best practice recovery rate; (ii) garden/food waste, where the waste does not go to alternative waste treatment plants; and (iii) residual waste……*

The Minister for the Environment, the Hon. Frank Sartor MP has also flagged a preference to mandate a three bin collection system, taking the identification of a best practice model a step further. These forecast policy directions of DECCW further endorse the recommended three bin option for Lake Macquarie.

Environmental Implications:

Waste management is a major element of our environmental stewardship responsibilities with landfill operations being significant greenhouse pollution risk and waste management overall a major element of our City's environmental impact.

Council's decisions around waste management have the potential to greatly affect the environmental footprint of the City as a whole. Resources consumed and preserved, local environmental impact, the generation of greenhouse gases, and influencing community knowledge and behaviour will all be affected by the City's waste strategy.

The recommendation is to endorse a waste processing technology that rates best against multi-variate criteria and is most favoured by the community. A waste strategy is an important element of our environmental management program and the selection of a processing technology is fundamental to the strategy.

Social Implications:

The selection of a waste strategy will have social implications. The cost of Council services, the relative convenience of the services we offer, the flexibility of services to meet individual needs, the generation of new employment opportunities, and the extent of education and community interaction are all elements of the service that can be characterised as social parameters to the final decision.

While analysis of the options weighted social issues slightly behind environmental issues, they still received relatively high priority in the multi-variate analysis. Combined with a clear distinction in community feedback favouring a three bin system, the recommendation appears to be the most socially supportable waste processing option.

Financial Implications:

The implementation of a waste strategy will represent one of the largest cost decisions a Council is ever likely to make. Due to the scale of the service alone, any decision on the waste strategy will represent a large, long-term commitment to the expenditure of funds. As waste services are separately funded by direct charge to the community, the financial implications of any waste strategy decisions have a direct influence on charges borne by service users, though they isolate that impact from other financial constraints on Council services.

In summary, the key financial metrics of the recommendation are;

	3 Bin Option (phased SSO)
Total cost 10 years	$329 million – aggregate
Total cost 30 years	$1,769 million – aggregate
Cost per household +10 years	$575 per year
Cost per household +30 years	$1,491 per year

Financial implications also scored relatively highly in the values workshop, though lower than the key environmental and social elements. Community workshops placed financial considerations mid-range. The fact the three bin system was likely to be the cheapest practical option available was an important consideration for a significant minority of residents as evidenced in both submissions to the exhibition and the community survey.

Risk and Insurance Implications:

There was a significant influence of risk on the rationalisation of feasible options in the *Strategic Waste Options and Triple Bottom Line Analysis Part 2; MSW and Organics* report. Council's risk profile excludes thermal treatments from further consideration and even amongst the remaining options, risk was a key factor in scoring anaerobic digestion alternatives relatively lowly.

The recommended processing technology has a relatively low likelihood of failure and low consequence of failure characteristics, giving the technology an overall low risk profile.

Options:

The Waste Strategy Project has refined the available processing technology options to a point where a single processing technology emerges. At this time thermal treatment options have been excluded due to their inherent risk, landfill only options have been ruled out through government policy barriers and the anaerobic digestion options have been discounted due to their lack of a record of success.

What remains are in-vessel composting solutions of either source separated organics or mixed solid waste. An assessment of those two options has resulted in a phased introduction of a three bin source separated organics system being preferred.

At this time all processing options remain open to Council to select. Ten different options have been examined in some detail in the Part 2 Report but there are also all the thermal options discarded early in the project that could be reconsidered. There is however a body of work now available that makes it clear that only in-vessel composting solutions have any real likelihood of addressing the key drivers of landfill capacity, rising landfill costs and environmental stewardship.

Between the two main variations of in-vessel composting, three bin SSO and two bin AWT, there is an advantage in the 3 bin system when compared against Council's weighted evaluation criteria and community consultation has led to a strong endorsement of a three bin system.

The strengths and weaknesses of all practical options have been extensively assessed. Endorsement of the recommended processing technology deliver a timely solution to the consumption of all available capacity at Council's only landfill site. Alternatives remain available to Council, however all represent more expensive alternatives and greater risks in achieving a solution within available time.

Conclusion:

The waste strategy project will continue to develop during 2011 potentially leading to the long term, most affordable and most environmentally responsible suite of services and facilities possible.

There has been extensive analysis and community consultation surrounding the processing technology that will be favoured within the strategy and a stage SSO (three bin) system has been preferred by both comparative assessment and community judgement.

Endorsement of the favoured technology will allow Council staff to continue to work towards a long term solution in time for the final consumption of Awaba's current, available capacity, in November 2015 at the very latest.

Director - City Strategy - Tony Farrell

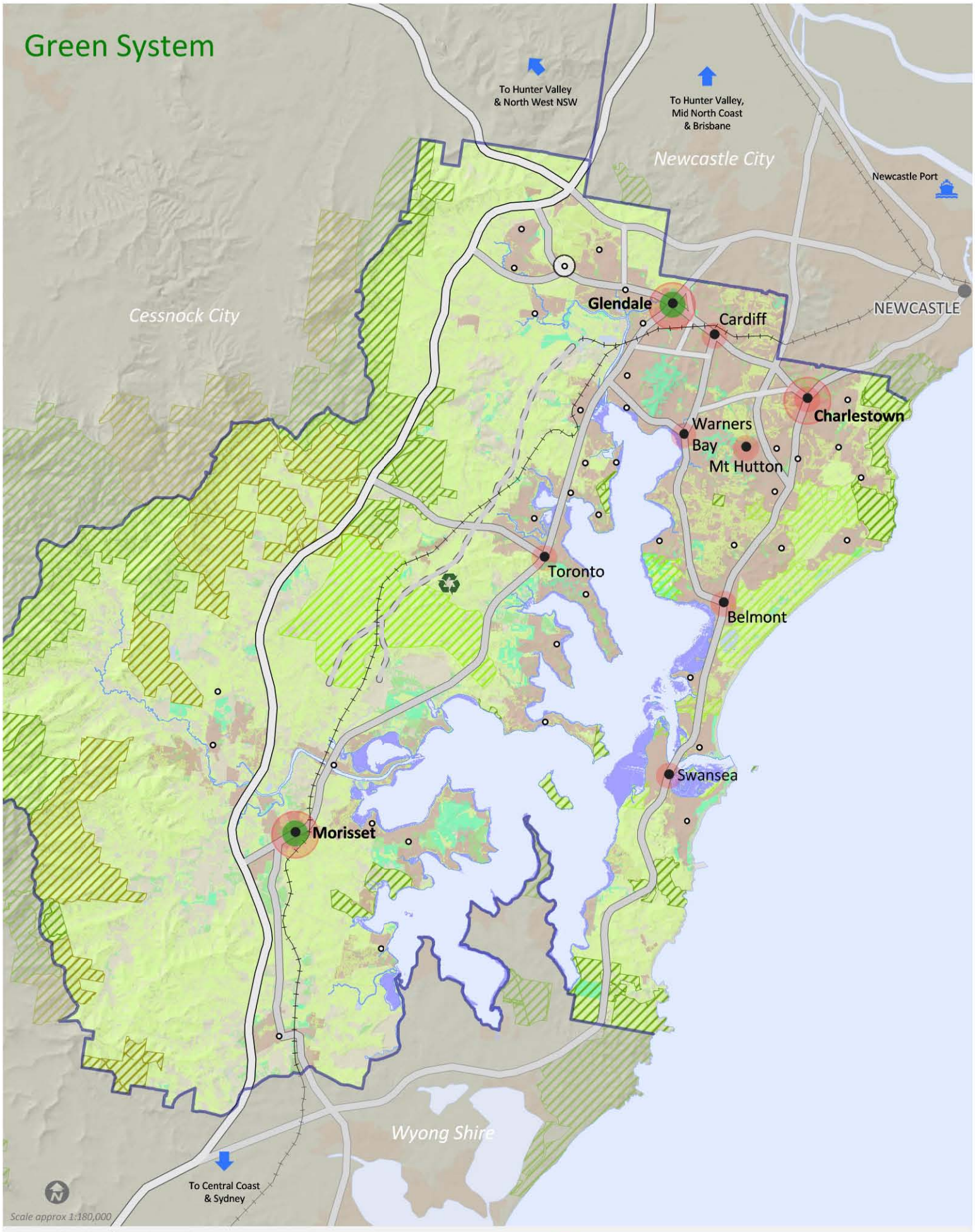
Attachments:

1.	Final Report - LMCC Community Waste Research - 2009		D01655670
2.	Home Composting Trial Report	Under separate cover	D02017112
3.	Community Consultation Report - Waste Strategy Project - Waste Processing Technology 2010	Under separate cover	D02027537
4.	NSW Waste Avoidance and Resource Recovery Strategy. Discussion Draft: Strategic Directions and Implementation Plan 2011-2015.		D02016982

Additions to Awaba Waste Management Facility

Appendix C
Map of 'Green Systems'

Lake Macquarie City Council



Terrestrial Habitats/Native Vegetation

- State Significant Vegetation & Habitat
- Regionally Significant Vegetation & Habitat
- Other Remnant Vegetation

Aquatic Habitats

- State Significant Waterways
- State Significant Aquatic Habitat

Conservation Areas

- National Park Estate
- State Forest
- Proposed Conservation Lands

Other

- Urban Area
- Rural Landscape

- Major Regional Centre
- Emerging Major Regional Centre
- Town Centre
- Emerging Town Centre
- Neighbourhood Centre
- Awaba Waste Management

Project: 2013/1971 24/01/2013

Additions to Awaba Waste Management Facility

Appendix D
Preliminary Hazard Analysis

Lake Macquarie City Council

Preliminary Hazard Analysis for Expansions to the AWMF

The Additions to the Awaba Waste Management Facility (AWMF) are classified as development for the purposes of a 'potentially hazardous industry' under *State Environmental Planning Policy No 33 – Hazardous and Offensive Development* (SEPP 33). Hence, in accordance with Director Generals Requirements (DGR's) and Clause 12 of SEPP 33 a Preliminary Hazard Analysis (PHA) has been prepared for the project.

According to the *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* (Applying SEPP 33) (DoP, 2011a) the purpose of the PHA is to:

- *Identify all potential hazards associated with the proposal;*
- *Analyse all hazards in terms of their consequences (effects) to people and the biophysical environment and their likelihood of occurrence;*
- *Quantify the analysis and estimate the resultant risks to surrounding land uses and the environment; and*
- *Assess the risks in terms of the location, land use planning implications and existing criteria and ensure that the proposed safeguards are adequate and thus demonstrate that the operation will not impose an unacceptable level of risk.*

This PHA has been completed in accordance with the objectives and guidelines provided in *Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis* (DoP, 2011b), and addresses the requirements of SEPP 33.

Risk Screening

An inventory of potentially hazardous materials used and proposed for use at the AWMF was obtained from Lake Macquarie City Council (LMCC). Potentially hazardous materials are defined in the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Australian Dangerous Good Code) (NTC, 2011), which may include storage, transport, use or production of hazardous materials associated with the project.

An inventory of the hazardous materials associated with the project is provided in **Table 1**. It should be noted that the same quantities and materials are used as part of the existing AWMF operations.

Table 1: Hazardous Materials Inventory and Risk Screening

Material	Location	Approx. Anticipated Use/Storage Capacity	Screening Threshold*
Fuel	Shipping container	A maximum of 50L, kept in gerry cans for maintenance equipment (lawn mowers, lawn trimmers, etc).	N/A
Fuel	No fuel for vehicles is stored or kept at the site	Re-fuelling tanker visits the site weekly to re-fuel on-site vehicles.	N/A
Car batteries and LPG gas bottles	Recycling shed	Minor quantities of car batteries are held within a bunded pallet (the batteries are collected and disposed off-site by a second party). Council does not accept LPG gas	5 tonne (packing group I) 25 tonne (packing group II) 50 tonne (packing group III)

Material	Location	Approx. Anticipated Use/Storage Capacity	Screening Threshold*
		bottles but sometimes finds them in the landfill. Council collects and holds them within a steel cage to work cover specifications at the recycling shed until they are collected and disposed off-site by a second party.	
Methane gas	Methane gas capture system	Various quantities captured but not stored at the site. The gas is either generated into electricity or flared.	10 tonne or $16m^3$ (if stored above ground)

*Applying SEPP 33 guidelines

Council does not store any LPG, liquids (other than fuel as mentioned) or hazardous materials on-site. Under its licence the AWMF cannot accept liquid wastes.

As indicated in **Table 1** the hazardous materials associated with the project do not exceed any screening thresholds in accordance with the Australian Dangerous Good Code and Applying SEPP 33 guidelines. Therefore the level of PHA required for the project is a Level 1 Assessment.

Potential hazards and risks associated with the existing AWMF site are well understood within the existing operation of the AWMF. The proposed expansion is not considered to significantly change the existing hazards and risks at the site, which have been largely discussed in Section 6.12 of the EA report by Cardno. The project would not introduce new potentially hazardous materials to the AWMF. Personnel at the AWMF are familiar with the potential hazards associated with these materials and operate under existing management plans and safeguards in accordance with work health and safety requirements.

Hazard Analysis

A Level 1 Assessment is an essentially qualitative approach based on comprehensive hazard identification to demonstrate that the activity does not pose a significant risk. The assessment basis for a Level 1 Assessment includes (DoP, 2011a):

- Thorough examination of all key potentially hazardous scenarios;
- Realistic estimates of risk;
- Relevant qualitative criteria met;
- Proposed measures appropriate and sufficient; and
- Compliance with all relevant codes and standards.

The EA report describes a series of potentially hazardous scenarios in Section 6.12 (Hazards and Risks) of the EA report. These, together with some additional hazardous scenarios identified have been considered in **Table 5** as part of the PHA for the project:

- Transportation and depositing of hazardous waste materials onto the site or other wastes not licensed to be accepted at the AWMF;
- Vandalism of the landfill site (e.g. vandalism of leachate holding ponds, deliberate fires);
- Natural hazards such as geological subsidence, flooding or bushfire (at the boundary of the site);
- Fire on site within landfilled waste or green waste;
- Fire within vehicles or buildings on site;

- Explosion on site caused by landfill gas;
- Generation of dust and/or odour from the AWMF;
- Generation of noise from the AWMF;
- Accidental fuel spill (i.e. during refuelling);
- Spill of leachate and/or stormwater from holding ponds;
- Spill or leakage of leachate from sewer pipeline or Rathmines No. 6 WWPS;
- Biological hazards (including spread by litter, vermin and pests);
- Disruption to services if utilities are damaged;
- Injury to public (i.e. when accessing unauthorised areas); and
- General Work Health and Safety incidents at the site (i.e. slips/falls, snakebite, etc).

Note that the majority of the above-listed hazards are present at the existing AWMF site and have been managed since the commencement of operations at the AWMF using appropriate procedures and systems as outlined in the LEMP for the facility, which will continue to be in place for the project.

A number of potentially hazardous scenarios have been reported and analysed in Table 7.4 of the EA report, as part of an environmental risk assessment. Hazardous scenarios such as litter straying due to high winds, soil instability during construction, generation of odour, landfill gas emissions (i.e. NO_2), dust and/or noise from the AWMF, are listed in Table 7.4 of the EA report.

For the analysis and estimates of risk, the same approach used in Section 7 of the EA report has been utilised. This is adapted from the AS/NZS Standard for Risk Management ISO 31000:2009 (Standards Australia, 2009). The risk scale adopted for the PHA is the same as that provided in Table 7.1 of the EA report and is reproduced in this document as **Table 2**. Those risks highlighted in red are considered major risks, those highlighted in orange are considered moderate risks, and those highlighted in green are considered low risks. The classifications of likelihood and consequence are provided in **Table 3** and **Table 4**, respectively, of this document.

Results of the hazard analysis for each of the potentially hazardous scenarios identified above are provided in **Table 5**.

Table 2: Environmental Risk Assessment Matrix

	L1	L2	L3	L4	L5
C1	Major	Major	Moderate	Moderate	Moderate
C2	Major	Moderate	Moderate	Moderate	Low
C3	Moderate	Moderate	Moderate	Low	Low
C4	Moderate	Moderate	Low	Low	Low
C5	Moderate	Low	Low	Low	Low

Table 3: Likelihood of Environmental Risk

Likelihood	Category	Description
L1	Nearly Certain	Expected to occur in most circumstances (i.e. annually)
L2	Likely	Will probably occur in most circumstances (i.e. once every 3 years)
L3	Possible	May occur at some time (i.e. once every 10 years)
L4	Unlikely	May occur at some time, but is considered unlikely (i.e. once every 30 years)
L5	Rare	Could occur in exceptional circumstances (i.e. once every 100 years)

Table 4: Consequence of Environmental Risk

Consequence	Category	Description
C1	Extreme	Major irreversible impact
C2	Major	Significant impact, long term, potentially irreversible
C3	Moderate	Medium impacts, potential to reverse
C4	Minor	Low impact, localised
C5	Negligible	Insignificant impact

Table 5: Hazard Analysis

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Transportation and depositing of hazardous waste materials onto the site or other wastes not licensed to be accepted at the AWMF	Unacceptable wastes at the AWMF include: - Industrial Waste - Hazardous Waste - Liquid waste	Risk to life and health of personnel due to toxic substances and/or fumes	L2	C5	Low	Refer to the LEMP for full details of measures. In summary: - Signage at the Wilton Road turn off to the site states prohibited wastes that are not accepted at the AWMF - Refusal of entry of unacceptable waste (if recognised) by the gatehouse operator - Video surveillance of all vehicles entering the centre - Adequate training and supervision at tip faces to ensure compliance - Metal detectors are used at the green waste area to ensure metals are not illegally dumped - Waste classification certification is requested prior to disposal for some waste types and is initiated from customer inquiries or through identification of suspect wastes at the waste site - Waste screening and sampling is undertaken in accordance with the Awaba Landfill Waste Screening Program - If any unauthorised hazardous waste material is found on site, the Newcastle Office of the EPA is notified as soon as practicable
Vandalism of the landfill site (e.g. vandalism of leachate holding ponds, deliberate fires)	Unauthorised access to the site	Damage to AWMF property and equipment	L3	C4	Low	A private security contractor operates at the site to ensure the security of the AWMF outside of operational hours. Security of the facility and equipment is achieved through maintenance of lockable gates, steel mesh fencing, video surveillance and sensor beams

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Geological subsidence	Mine subsidence due to nearby coal mines or settlement within the waste mass (expected to occur)	- Reduction in the structural integrity of the site - Risk to life and health of personnel and residents in the vicinity of the site	L1	C4	Moderate	Centennial Coal is currently preparing a comprehensive mine subsidence risk assessment in partnership with LMCC, the mine subsidence board, GSS Environmental (environmental consultants to Centennial Coal), GHD (landfill designers) and MSEC (subsidence engineers). Prior to construction, LMCC will consider the results of this assessment and undertake a design review to ensure that the final design considers the worst case mine subsidence parameters, and will accommodate the worst case ground movement identified without suffering structural failure or compromising environmental protection. The detailed design phase will consider both the expected settlement within the waste mass, and the mine subsidence parameters provided by the Mine Subsidence Board (MSB) in their response to the public exhibition of the EA (dated 6 November 2012), thereby ensuring that the final design is able to accommodate worst case levels of subsidence without compromising the ability to maintain effective environmental protection measures. The final landfill design will also be prepared to meet all of the 6 requirements identified by the MSB in their letter of 6 November 2012. It is understood that demonstrating that these requirements have been met will be a requirement for granting of a DA for the expansion of the AWMF.

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Natural hazards such as flooding and other emergencies	External natural causes	- Damage to AWMF property and equipment - Risk to life and health of personnel and residents in the vicinity of the site	L4	C4	Low	The AWMF has an Emergency Response Plan in place in the event of natural disasters, including flooding, at the site. The site is not located in a flood prone area; however in the event of heavy rainfall dewatering pumps may be required to remove water from low points at the site
Natural hazards such as bushfire (at the boundary of the site)	External natural causes	- Damage to surrounding bushland habitat and fauna - Risk to life and health of personnel and residents in the vicinity of the site	L2	C4	Moderate	A site-specific Fire Management Plan has been developed for the site. Bushfire buffer distances are proposed to be reduced to allow for the proposed additional facilities at the AWMF; however, the width of the perimeter access road will provide sufficient buffer distance (10m) in accordance with RFS guidelines (RFS, 2006). The following facilities exist on site for fire fighting purposes: - 12ML of stored water, connected to 2 standard fire fighting hydrants - Fire protection equipment in on site plant (breathing apparatus, fire extinguisher, fire suppressant) - Portable fire extinguishers in the gatehouse - On site plant (compactor, traxcavator) The following control measures are taken in the event of a fire: - Ensure the safety of all persons - Contact NSW Fire Brigades and/or Rural Fire Service - Contact Site Supervisor - Assist NSW Fire Brigades and/or Rural Fire Service, as required

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Fire on site within landfilled waste or green waste	Unintentional ignition or spontaneous combustion of flammable/combustible wastes	- Increased risk of spread of fire from the landfill which would act as a fuel source should it be ignited - Risk to life and health of personnel	L1	C4	Moderate	Measures in the Fire Management Plan as mentioned in the line item above to prevent and fight in the event of fire. In addition (refer to the LEMP for full details): - Compaction and covering of the landfilled waste using daily cover material to reduce it's exposure - Continual visual monitoring by site personnel - Training and awareness of site personnel
Fire within vehicles or buildings on site	Overheating or ignition of combustible/flammable material	- Damage to AWMF property and equipment and/or damage to residential properties located nearby if fire spreads off site - Risk to life and health of personnel	L3	C3	Moderate	Measures in the Fire Management Plan as mentioned in the two line items above to prevent and fight in the event of fire. In addition (refer to the LEMP for full details): - Appropriate maintenance of vehicles/plant - Regular cleaning and waste removal from buildings - Any spills of flammable material are to be contained and cleaned up immediately - Asset Protection zones exist and will be maintained around individual buildings on site
Explosion on site caused by landfill gas	Landfill gas build-up or leak and unintentional ignition	- Damage to AWMF property and equipment and/or damage to residential properties located nearby if fire spreads off site - Risk to life and health of personnel from fire	L3	C3	Moderate	Gas accumulation monitoring is conducted monthly and in accordance with the Awaba Landfill Gas Monitoring Program document. Monthly monitoring of the following is undertaken: - Methane (CH_4) - Carbon Monoxide (CO) - Oxygen (O2) - Hydrogen Sulphide (H_2S) Any methane reading which exceeds limits set by environmental guidelines for solid waste landfills are reported to the EPA. Reports on monthly methane concentrations are entered onto a database and are retained on Council's records for at least four years. In addition the proposed gas capture system has been designed with sufficient capacity for the anticipated waste with gas being combusted as soon as it is collected, negating the need for storage. In the event of a gas explosion and

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
						consequently fire the fire fighting measures as outlined in the relevant line items above would apply
Generation of dust from the AWMF	High winds occurring during operation of heavy machinery and equipment	Reduced air quality in the vicinity of the site	L2	C5	Low	Implementation of dust mitigation measures described in Section 6.6.4 of the EA report will help minimise dust emissions, such as designated traffic routes, water spraying for dust suppression, covering loads and limiting vegetation clearing. Implementation of both a surface and sub-surface gas monitoring program, covering/capping of waste and establishment of an odour complaints register will help mitigate odour impacts.
Generation of odour from the AWMF	Landfill gases/odours escaping the landfilled waste	Reduced air quality in the vicinity of the site	L2	C5	Low	Operational odour management measures are described in Section 6.6.4 of the EA report. These include the implementation of both a surface and sub-surface gas monitoring program, covering/capping of waste and establishment of an odour complaints register.

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Generation of noise from the AWMF	Generation of noise from construction and operation activities	Potentially increased noise levels at sensitive receivers	L2	C5	Low	Implementation of noise mitigation measures as described in Section 6.13.4 of the EA report will minimise impacts, such as: - Maintaining equipment/plant - Adhering to guideline hours of construction and existing hours of operation - Use of PPE including earplugs for site personnel if working with noisy equipment for long periods
Accidental fuel spill (i.e. during refuelling)	Containment issues i.e. a breach in bunding of stored fuel. Incorrectly administering fuel during refuelling or bunding the designated re-fuelling area	Environmental pollution by contamination of soil, surface water and/or ground water at and within close proximity to the AWMF site and possible fire if an ignition source is present	L3	C5	Low	- All refuelling is undertaken in appropriate designated areas - All fuels/oils must be stored within appropriately contained areas - Appropriate spill kits should be maintained on site - Appropriate flow diversion measures will be used to contain runoff that may be contaminated by a spill - The maximum inventory which could be lost is from a road tanker delivering fuel to site. All such vehicles comply with legislative requirements for fuel transport and delivery.
Spill of leachate and/or stormwater from holding ponds	Containment issues i.e. a breach in the banks, inlet or outlet of the ponds/system. The leachate collection system may fail during operation or the sewer system where leachate is being disposed of may become overloaded or fail	Environmental pollution by contamination of soil, surface water and/or ground water at and within close proximity to the AWMF site.	L3	C4	Low	The leachate management system has been designed in accordance with best practice and has been designed to have adequate capacity to manage expected leachate volumes based on leachate modelling undertaken. Surplus leachate is designed to be pumped off-site to the Rathmines No. 6 WWPS via the proposed sewer pipeline. If the WWPS or sewer system fails pumping of excess leachate off-site will cease. Excess leachate can be temporally trucked / tankered from the AWMF site to avoid the release of polluted water into the natural environment. Any spill of leachate or stormwater would be managed in accordance with measures outlined in the LEMP.

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
Spill or leakage of leachate from sewer pipeline or Rathmines No. 6 WWPS.	Containment issues i.e. a break in the sewer pipeline (due to poor structural integrity, vandalism etc) or a fault/system failure at the Rathmines No. 6 WWPS	Environmental pollution by contamination of soil, surface water and/or ground water at along the sewer pipeline or in close proximity to the WWPS site.	L3	C4	Low	If the sewer system or WWPS fails pumping of excess leachate off-site will cease and excess leachate can be temporally trucked / tankered from the AWMF site to avoid the release of polluted water into the natural environment. As the sewer pipe will be buried and the WWPS will be locked the risk of vandalism will be minimal.
Biological hazards (including spread by litter, vermin and pests)	Personnel exposed to pathogens in waste. Risk of infection from cuts (tetanus)	Risk to health and safety of personnel on site and potentially off site if a disease spread from the site	L3	C4	Low	- PPE for site personnel - Screening of incoming waste material - Controlling vermin and pests at the site in accordance with the LEMP - Applying daily cover material to reduce exposure of the waste
Disruption to services if utilities are damaged	Underground utilities could be damaged during excavations if not located properly. Overhead utilities could be damaged by tall machinery/equipment	Disruption to services (i.e. water, gas, electricity) at the site and in the local area	L2	C5	Low	Immediately prior to the commencement of construction works the Contractor should undertake an updated Dial Before You Dig search (plans obtained are generally only valid for a 14 day period). To limit disruption, all underground services and utilities in the vicinity of excavation works should be marked by a qualified marker and exposed by hand prior to excavation by machine. Any services that are accidentally damaged during the works must be repaired or reinstated by the Contractor as soon as possible
Injury to public (i.e. when accessing unauthorised areas)	Unauthorised access to the site, inadequate signage/warnings	Risk to life and health of injured individuals	L3	C4	Low	- Site security will be maintained - Appropriate signage and control will be in place to direct unauthorised personnel from specific areas of the site i.e. landfilling areas
General Work Health and Safety incidents at the site (i.e. slips/falls, snakebite, etc)	Working in proximity to machinery/equipment, operating a vehicle and working on an operational	Risk to life and health of site personnel	L2	C5	Low	- Implementation of a Work Health and Safety Plan for the site - Inductions for new personnel and continuous training and awareness - Adhering to operational procedures as specified in the LEMP

Event/Issue	Cause/Comments	Impact/Potential Consequences	L	C	Residual Risk	Mitigation/Management Measures
	landfill site					

Conclusions

The hazard analysis provided in **Table 5** does not identify any risks with a residual risk classified as Major, and does not identify any significant hazards or major off site consequences for the project. It is considered that the identified mitigation and management measures listed in **Table 5** will effectively control the hazards, such that the project would not result in a significant risk to human health, life or property or the biophysical environment.

References

DoP (2011a) *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33*. NSW Department of Planning, Sydney. January 2011.

DoP (2011b) *Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis*. NSW Department of Planning, Sydney. January 2011.

NTC (2011) *Australian Code for the Transport of Dangerous Goods by Road and Rail*. Australian National Transport Commission. Seventh edition, originally published in 2007 but republished electronically in 2011 incorporating Corrigendum 1. Available online at: www.ntc.gov.au.

RFS (2006) Planning for Bush Fire Protection. NSW Rural Fire Service in cooperation with the NSW Department of Planning.

Standards Australia (2009) *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*.

13 November 2012

Additions to Awaba Waste Management Facility

Appendix E
Groundwater Data

Lake Macquarie City Council

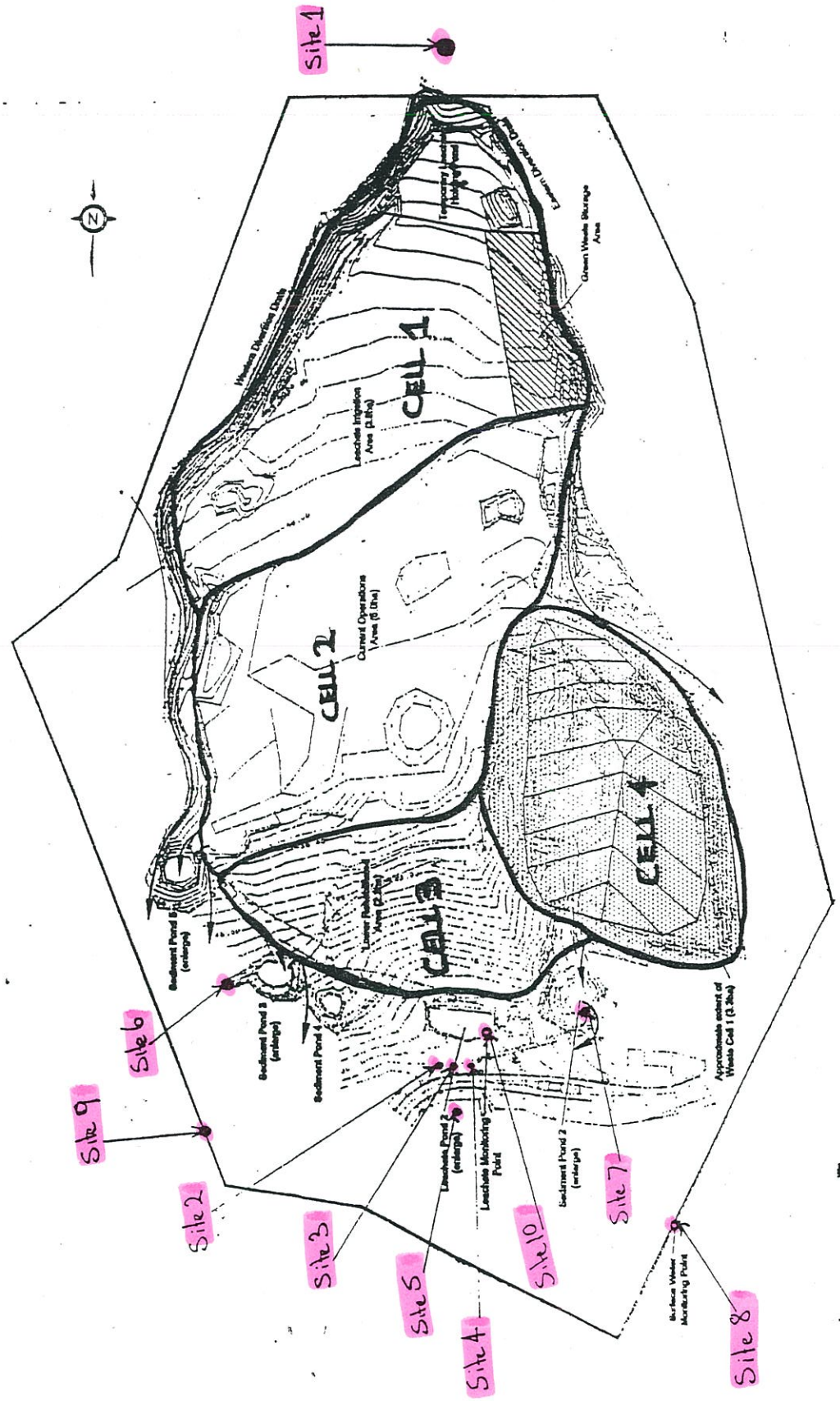


Figure 5: Location of water monitoring sites

29 November 2005

Licence Administration and Revenue Unit
Department of Environment and Conservation.
PO Box A290
Sydney South NSW 1232

Our Ref: F2004/00538
ABN 81 065 027 868

Dear Sir/Madam

SUBJECT: LICENCE 5873-ANNUAL RETURN

I refer to the above and your recent correspondence regarding the same.

Please find attached the completed annual return for the period 13 October 2004 to 13 October 2005.

Included is the payment of the Annual Licence fee of $4,180.00

Should you require further information, please contact me on 4921 0477.

Yours faithfully

RICK BRINDLEY
WASTE SITES COORDINATOR
WASTE, ENVIRONMENT & RANGERS

RECEIVED
12 DEC 2005
LAKE MACQUARIE CITY COUNCIL

INTERNAL

MEMO

CITY OF Lake Macquarie

TO: Manager- Waste Environment & Rangers-Robert Taylor

FROM: WASTE SITES COORDINATOR - RICK BRINDLEY EXT: 477

FILE: F2004/00538 **DATE:** 29 November 2005

RE: ANNUAL RETURN -LANDFILL LICENCE

I refer to the above and recent discussions regarding the same. Attached is the completed Annual Return, due 12 December 2005.

There were 2 non compliances with licence conditions, specifically in relation to water monitoring. These were,

1. Insufficient water volumes were available to collect samples on a number of occasions and
2. Insufficient water volumes were available to collect sufficient sample to allow analysis on a number of occasions.

The items mentioned above are unavoidable due to the reliance on rainfall for sufficient sample to be available.

The non compliance will have no adverse effect

RICK BRINDLEY
WASTE SITES COORDINATOR
WASTE, ENVIRONMENT & RANGERS

NSW EPA NEW SOUTH WALES ENVIRONMENT PROTECTION AUTHORITY

ANNUAL RETURN

LICENCE NO.	5873
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2004 to 12-Oct-2005

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

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

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2005

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

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

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

OR

- **prosecution.**

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

Licence Administration and Revenue Unit
NSW EPA
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 INIDIVIDUAL.

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

LAKE MACQUARIE CITY COUNCIL

NSW EPA NEW SOUTH WALES ENVIRONMENT PROTECTION AUTHORITY

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:	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 • if applicable, the load-based fee for the licence fee period covered by this Annual Return	

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

Licence Administration and Revenue Unit
NSW EPA
PO Box A290
SYDNEY SOUTH NSW 1232

NSW EPA NEW SOUTH WALES ENVIRONMENT PROTECTION AUTHORITY

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.environment.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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Type of Licence

Scheduled Activity - Premises Based

A3 Premises to which Licence Applies

common name *(if any)*	AWABA WASTE DISPOSAL FACILITY
premises	60 WILTON ROAD, AWABA, NSW

A4 Activities to which Licence Applies

Scheduled Activity

Composting and Related Reprocessing or Treatment

Waste Facilities - environmentally sensitive area landfilling

Waste Facilities - solid waste landfilling

A5 Other Activities (Not Applicable)

A6 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
Composting and Related Reprocessing or Treatment (29)	> 5000 - 50000	T received
Environmentally Sensitive or Inappropriate Landfilling (81)	> 0	All
Solid Waste Landfilling (79)	> 100000	T

A7 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 (as required by condition M4 of the licence). **If no complaints were received enter nil.**	NIL

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M2 and R1), complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by licence conditions M2 and R1, **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).

Monitoring Point 1

Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	mg/L	1	NIL	N/A	N/A	N/A
Ammonia	mg/L	4	NIL	N/A	N/A	N/A
Arsenic	mg/L	1	NIL	N/A	N/A	N/A
Barium	mg/L	1	NIL	N/A	N/A	N/A
Cadmium	mg/L	1	NIL	N/A	N/A	N/A
Calcium	mg/L	4	NIL	N/A	N/A	N/A
Chloride	mg/L	4	NIL	N/A	N/A	N/A
Cobalt	mg/L	1	NIL	N/A	N/A	N/A
Conductivity	uS/cm	4	NIL	N/A	N/A	N/A
Copper	mg/L	1	NIL	N/A	N/A	N/A
Ethyl benzene	mg/L	1	NIL	N/A	N/A	N/A
Iron	mg/L	4	NIL	N/A	N/A	N/A
Lead	mg/L	1	NIL	N/A	N/A	N/A
Magnesium	mg/L	4	NIL	N/A	N/A	N/A
Manganese	mg/L	4	NIL	N/A	N/A	N/A
Mercury	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	NIL	N/A	N/A	N/A
PCBs	mg/L	1	NIL	N/A	N/A	N/A
pH	pH	4	NIL	N/A	N/A	N/A
Sodium	mg/L	4	NIL	N/A	N/A	N/A
Sulfate	mg/L	4	NIL	N/A	N/A	N/A

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total dissolved solids	mg/L	1	NIL	N/A	N/A	N/A
Total organic carbon	mg/L	4	NIL	N/A	N/A	N/A
Zinc	mg/L	1	NIL	N/A	N/A	N/A
Benzene	mg/L	1	NIL	N/A	N/A	N/A
Total Phenolics	mg/L	4	NIL	N/A	N/A	N/A
BOD	mg/L	1	NIL	N/A	N/A	N/A
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	NIL	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	NIL	N/A	N/A	N/A
Fluoride	mg/L	4	NIL	N/A	N/A	N/A
Toluene	mg/L	1	NIL	N/A	N/A	N/A
Phosphate	mg/L	1	NIL	N/A	N/A	N/A
Potassium	mg/L	4	NIL	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	NIL	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Chromium (total)	mg/L	1	NIL	N/A	N/A	N/A

Monitoring Point 2

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	mg/L	1	1	<0.001	0	<0.001
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	1	<20	0	<20
Chlorinated volatile compounds	mg/L	1	1	<5	0	<5
Organochlorine pesticides	mg/L	4	1	<0.6	0	<0.6
Potassium	mg/L	4	3	26	28	30
Phosphate	mg/L	1	1	<0.01	<0.01	<0.01
Toluene	mg/L	1	1	<2	0	<2
Fluoride	mg/L	4	3	0.9	1.1	1.2
Chromium (hexavalent)	mg/L	1	1	<0.01	0	<0.01
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	25	53	80
BOD	mg/L	1	1	4	4	4
Total Phenolics	mg/L	4	2	<0.05	0	<0.05
Benzene	mg/L	1	1	<1	0	<1
Zinc	mg/L	1	1	0.146	0.146	0.146
Total organic carbon	mg/L	4	3	1	12	22
Total dissolved solids	mg/L	1	1	5680	5680	5680
Sulfate	mg/L	4	3	273	294	311

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Sodium	mg/L	4	2	1730	1805	1880
pH	pH	4	3	5.21	5.59	6-1
PCBs	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	3	<0.01	0.19	0-51
Mercury	mg/L	1	1	<0.0001	0	<0.0001
Manganese	mg/L	4	3	0.486	0.69	0.853
Magnesium	mg/L	4	3	155	184	213
Lead	mg/L	1	1	0.003	0.003	0.003
Iron	mg/L	4	3	1-31	1-61	1-81
Ethyl benzene	mg/L	1	1	<2	0	<2
Copper	mg/L	1	1	0.058	0.058	0.058
Conductivity	uS/cm	4	3	7540	8233	8800
Cobalt	mg/L	1	1	0.043	0.043	0.043
Chloride	mg/L	4	3	2660	3153	3520
Calcium	mg/L	4	3	23	31	37
Cadmium	mg/L	1	1	0.0002	0.0002	0.0002
Barium	mg/L	1	1	0.038	0.038	0.038
Arsenic	mg/L	1	1	0.002	0.002	0.002
Ammonia	mg/L	4	2	0.14	0.15	0.159
Aluminium	mg/L	1	1	1.25	1.25	1.25

Monitoring Point 3

Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	mg/L	1	1	1-04	1-04	1-04
Ammonia	mg/L	4	3	45.9	53.9	67.7
Arsenic	mg/L	1	1	0-009	0.009	0-009
Barium	mg/L	1	1	0-674	0-674	0-674
Cadmium	mg/L	1	1	0-0005	0-0005	0-0005
Calcium	mg/L	4	3	37	40	43
Chloride	mg/L	4	3	940	1057	1210
Cobalt	mg/L	1	1	0-004	0-004	0-004
Conductivity	uS/cm	4	3	3550	3 930	4250
Copper	mg/L	1	1	0-126	0-126	0-126
Ethyl benzene	mg/L	1	1	<2	0	<2
Iron	mg/L	4	3	120	134	145
Lead	mg/L	1	1	0-008	0-008	0-008
Magnesium	mg/L	4	3	95	98	102
Manganese	mg/L	4	3	0-636	0-73	0-8
Mercury	mg/L	1	1	<0-0001	0	<0-0001
Nitrate	mg/L	4	3	0-02	0-027	0-031
PCBs	mg/L	1	1	<1	0	<1
pH	pH	4	3	6-4	6-51	6-66
Sodium	mg/L	4	2	497	515	532
Sulfate	mg/L	4	3	<1	2-3	4

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total dissolved solids	mg/L	1	1	2220	2220	2220
Total organic carbon	mg/L	4	3	39	93	147
Zinc	mg/L	1	1	0.144	0.144	0.144
Benzene	mg/L	1	1	2	2	2
Total Phenolics	mg/L	4	2	<0.05	0	<0.05
BOD	mg/L	1	1	8	8	8
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	719	750	802
Chromium (hexavalent)	mg/L	1	1	<0.01	0	<0.01
Fluoride	mg/L	4	3	0.2	0.2	0.2
Toluene	mg/L	1	1	6	6	6
Phosphate	mg/L	1	1	<0.01	0	<0.01
Potassium	mg/L	4	3	63	64	64
Organochlorine pesticides	mg/L	4	3	<0.5	0	<2
Chlorinated volatile compounds	mg/L	1	1	<5	0	<5
Total petroleum hydrocarbons FRACTIONS	mg/L	1	1	<20	0	400
Polycyclic aromatic hydrocarbons	mg/L	1	1	1.4	1.4	1.4
Organophosphate pesticides	mg/L	1	1	<2	0	<2
Chromium (total)	mg/L	1	1	0.003	0.003	0.003

Monitoring Point 4

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	mg/L	1	1	<0.001	0	<0.001
Organophosphate pesticides	mg/L	1	1	<2	0	<2
Polycyclic aromatic hydrocarbons	mg/L	1	1	<1	0	<1
Total petroleum hydrocarbons EVALTIONS	mg/L	1	1	<20	0	<100
Chlorinated volatile compounds	mg/L	1	1	<5	0	<5
Organochlorine pesticides	mg/L	4	3	<0.5	0	<5
Potassium	mg/L	4	3	8	9	10
Phosphate	mg/L	1	1	<0.01	0	<0.01
Toluene	mg/L	1	1	4	4	4
Fluoride	mg/L	4	3	0.1	0.1	0.1
Chromium (hexavalent)	mg/L	1	1	<0.01	0	<0.01
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	69	105	166
BOD	mg/L	1	1	13	13	13
Total Phenolics	mg/L	4	3	<0.05	0	<0.5
Benzene	mg/L	1	1	1	1	1
Zinc	mg/L	1	1	0.05	0.05	0.05
Total organic carbon	mg/L	4	3	10	21	36
Total dissolved solids	mg/L	1	1	1280	1280	1280
Sulfate	mg/L	4	3	24	35	50

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Sodium	mg/L	4	3	95	136	192
pH	pH	4	3	5.93	6.1	6.25
PCBs	mg/L	1	1	<2	0	<2
Nitrate	mg/L	4	3	0.023	0.04	0.059
Mercury	mg/L	1	1	<0.0001	0	<0.0001
Manganese	mg/L	4	3	0.12	0.318	0.662
Magnesium	mg/L	4	3	18	30	37
Lead	mg/L	1	1	0.002	0.002	0.002
Iron	mg/L	4	3	31.9	54.9	70.7
Ethyl benzene	mg/L	1	1	<2	0	<2
Copper	mg/L	1	1	0.03	0.03	0.03
Conductivity	uS/cm	4	3	835	1405	1740
Cobalt	mg/L	1	1	<0.001	0	<0.001
Chloride	mg/L	4	3	160	381	539
Calcium	mg/L	4	3	5	17.7	41
Cadmium	mg/L	1	1	<0.0001	<0.0001	<0.0001
Barium	mg/L	1	1	0.164	0.164	0.164
Arsenic	mg/L	1	1	0.009	0.009	0.009
Ammonia	mg/L	4	3	0.25	0.333	0.488
Aluminium	mg/L	1	1	0.62	0.62	0.62

Monitoring Point 5

Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	mg/L	1	1	2.7	2.7	2.7
Ammonia	mg/L	4	4	0.193	0.24	0.36
Arsenic	mg/L	1	1	0.001	0.001	0.001
Barium	mg/L	1	1	0.034	0.034	0.034
Cadmium	mg/L	1	1	0.0001	0.0001	0.0001
Calcium	mg/L	4	4	34	35	36
Chloride	mg/L	4	4	2300	2580	2820
Cobalt	mg/L	1	1	0.001	0.001	0.001
Conductivity	uS/cm	4	4	6120	6715	7480
Copper	mg/L	1	1	0.146	0.146	0.146
Ethyl benzene	mg/L	1	1	<2	0	<2
Iron	mg/L	4	4	<0.05		
Lead	mg/L	1	1	0.004	0.004	0.004
Magnesium	mg/L	4	4	171	180	185
Manganese	mg/L	4	4	0.309	0.36	0.448
Mercury	mg/L	1	1	<0.0001	0	<0.0001
Nitrate	mg/L	4	4	<0.01	0.019	0.033
PCBs	mg/L	1	1	<1	0	<1
pH	pH	4	4	5.78	6.00	6.42
Sodium	mg/L	4	4	1280	1365	1520
Sulfate	mg/L	4	4	245	256	272

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total dissolved solids	mg/L	1	1	4630	4630	4630
Total organic carbon	mg/L	4	4	2	10	26
Zinc	mg/L	1	1	0.101	0.101	0.101
Benzene	mg/L	1	1	<1	0	<1
Total Phenolics	mg/L	4	4	<0.05	0	<0.5
BOD	mg/L	1	1	14	14	14
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	4	124	130	133
Chromium (hexavalent)	mg/L	1	1	<0.01	0	<0.01
Fluoride	mg/L	4	4	0.6	0.63	0.7
Toluene	mg/L	1	1	<2	0	<2
Phosphate	mg/L	1	1	<0.01	0	<0.01
Potassium	mg/L	4	4	25	25.5	26
Organochlorine pesticides	mg/L	4	4	<0.5	0	<2
Chlorinated volatile compounds	mg/L	1	1	<5	0	<5
Total petroleum hydrocarbons FRACTION	mg/L	1	1	<20	0	<100
Polycyclic aromatic hydrocarbons	mg/L	1	1	<1	0	<1
Organophosphate pesticides	mg/L	1	1	<2	0	<2
Chromium (total)	mg/L	1	1	0.002	0	0.002

Discharge & Monitoring Point 6

Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	mg/L	1	NIL	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	NIL	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	1	<0.6	0	<0.6
Potassium	mg/L	4	1	12	12	12
Phosphate	mg/L	1	NIL	N/A	N/A	N/A
Total suspended solids	mg/L	4	1	102	102	102
Toluene	mg/L	1	NIL	N/A	N/A	N/A
Fluoride	mg/L	4	1	0.2	0.2	0.2
Chromium (hexavalent)	mg/L	1	NIL	N/A	N/A	N/A
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	1	91	91	91
BOD	mg/L	1	NIL	N/A	N/A	N/A
Total Phenolics	mg/L	4	1	<0.05	0	<0.05
Benzene	mg/L	1	NIL	N/A	N/A	N/A
Zinc	mg/L	1	NIL	N/A	N/A	N/A
Total organic carbon	mg/L	4	1	25	25	25
Total dissolved solids	mg/L	1	NIL	N/A	N/A	N/A

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Sulfate	mg/L	4	1	23	23	23
Sodium	mg/L	4	1	47	47	47
pH	pH	4	1	7-18	7-18	7-18
PCBs	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	1	0-013	0-013	0-013
Mercury	mg/L	1	NIL	N/A	N/A	N/A
Manganese	mg/L	4	1	0-634	0-634	0-634
Magnesium	mg/L	4	1	10	10	10
Lead	mg/L	1	NIL	N/A	N/A	N/A
Iron	mg/L	4	1	4-84	4-84	4-84
Ethyl benzene	mg/L	1	NIL	N/A	N/A	N/A
Copper	mg/L	1	NIL	N/A	N/A	N/A
Conductivity	uS/cm	4	1	4-34	4-34	4-34
Cobalt	mg/L	1	NIL	N/A	N/A	N/A
Chloride	mg/L	4	1	65	65	65
Calcium	mg/L	4	1	24	24	24
Cadmium	mg/L	1	NIL	N/A	N/A	N/A
Barium	mg/L	1	NIL	N/A	N/A	N/A
Arsenic	mg/L	1	NIL	N/A	N/A	N/A
Ammonia	mg/L	4	1	3-88	3-88	3-88
Aluminium	mg/L	1	NIL	N/A	N/A	N/A

Discharge & Monitoring Point 7

Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	mg/L	1	NIL	N/A	N/A	N/A
Ammonia	mg/L	4	NIL	N/A	N/A	N/A
Arsenic	mg/L	1	NIL	N/A	N/A	N/A
Barium	mg/L	1	NIL	N/A	N/A	N/A
Cadmium	mg/L	1	NIL	N/A	N/A	N/A
Calcium	mg/L	4	NIL	N/A	N/A	N/A
Chloride	mg/L	4	NIL	N/A	N/A	N/A
Cobalt	mg/L	1	NIL	N/A	N/A	N/A
Conductivity	uS/cm	4	NIL	N/A	N/A	N/A
Copper	mg/L	1	NIL	N/A	N/A	N/A
Ethyl benzene	mg/L	1	NIL	N/A	N/A	N/A
Iron	mg/L	4	NIL	N/A	N/A	N/A
Lead	mg/L	1	NIL	N/A	N/A	N/A
Magnesium	mg/L	4	NIL	N/A	N/A	N/A
Manganese	mg/L	4	NIL	N/A	N/A	N/A
Mercury	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	NIL	N/A	N/A	N/A
PCBs	mg/L	1	NIL	N/A	N/A	N/A
pH	pH	4	NIL	N/A	N/A	N/A
Sodium	mg/L	4	NIL	N/A	N/A	N/A
Sulfate	mg/L	4	NIL	N/A	N/A	N/A

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total dissolved solids	mg/L	1	NIL	N/A	N/A	N/A
Total organic carbon	mg/L	4	NIL	N/A	N/A	N/A
Zinc	mg/L	1	NIL	N/A	N/A	N/A
Benzene	mg/L	1	NIL	N/A	N/A	N/A
Total Phenolics	mg/L	4	NIL	N/A	N/A	N/A
BOD	mg/L	1	NIL	N/A	N/A	N/A
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	NIL	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	NIL	N/A	N/A	N/A
Fluoride	mg/L	4	NIL	N/A	N/A	N/A
Toluene	mg/L	1	NIL	N/A	N/A	N/A
Total suspended solids	mg/L	4	NIL	N/A	N/A	N/A
Phosphate	mg/L	1	NIL	N/A	N/A	N/A
Potassium	mg/L	4	NIL	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	NIL	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Chromium (total)	mg/L	1	NIL	N/A	N/A	N/A

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Monitoring Point 8

Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	mg/L	1	NIL	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	NIL	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	NIL	N/A	N/A	N/A
Potassium	mg/L	4	NIL	N/A	N/A	N/A
Phosphate	mg/L	1	NIL	N/A	N/A	N/A
Total suspended solids	mg/L	4	NIL	N/A	N/A	N/A
Toluene	mg/L	1	NIL	N/A	N/A	N/A
Fluoride	mg/L	4	NIL	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	NIL	N/A	N/A	N/A
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	NIL	N/A	N/A	N/A
BOD	mg/L	1	NIL	N/A	N/A	N/A
Total Phenolics	mg/L	4	NIL	N/A	N/A	N/A
Benzene	mg/L	1	NIL	N/A	N/A	N/A
Zinc	mg/L	1	NIL	N/A	N/A	N/A
Total organic carbon	mg/L	4	NIL	N/A	N/A	N/A
Total dissolved solids	mg/L	1	NIL	N/A	N/A	N/A

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Sulfate	mg/L	4	NIL	N/A	N/A	N/A
Sodium	mg/L	4	NIL	N/A	N/A	N/A
pH	pH	4	NIL	N/A	N/A	N/A
PCBs	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	NIL	N/A	N/A	N/A
Mercury	mg/L	1	NIL	N/A	N/A	N/A
Manganese	mg/L	4	NIL	N/A	N/A	N/A
Magnesium	mg/L	4	NIL	N/A	N/A	N/A
Lead	mg/L	1	NIL	N/A	N/A	N/A
Iron	mg/L	4	NIL	N/A	N/A	N/A
Ethyl benzene	mg/L	1	NIL	N/A	N/A	N/A
Copper	mg/L	1	NIL	N/A	N/A	N/A
Conductivity	uS/cm	4	NIL	N/A	N/A	N/A
Cobalt	mg/L	1	NIL	N/A	N/A	N/A
Chloride	mg/L	4	NIL	N/A	N/A	N/A
Calcium	mg/L	4	NIL	N/A	N/A	N/A
Cadmium	mg/L	1	NIL	N/A	N/A	N/A
Barium	mg/L	1	NIL	N/A	N/A	N/A
Arsenic	mg/L	1	NIL	N/A	N/A	N/A
Ammonia	mg/L	4	NIL	N/A	N/A	N/A
Aluminium	mg/L	1	NIL	N/A	N/A	N/A

Monitoring Point 9

Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	mg/L	1	NIL	N/A	N/A	N/A
Ammonia	mg/L	4	NIL	N/A	N/A	N/A
Arsenic	mg/L	1	NIL	N/A	N/A	N/A
Barium	mg/L	1	NIL	N/A	N/A	N/A
Cadmium	mg/L	1	NIL	N/A	N/A	N/A
Calcium	mg/L	4	NIL	N/A	N/A	N/A
Chloride	mg/L	4	NIL	N/A	N/A	N/A
Cobalt	mg/L	1	NIL	N/A	N/A	N/A
Conductivity	uS/cm	4	NIL	N/A	N/A	N/A
Copper	mg/L	1	NIL	N/A	N/A	N/A
Ethyl benzene	mg/L	1	NIL	N/A	N/A	N/A
Iron	mg/L	4	NIL	N/A	N/A	N/A
Lead	mg/L	1	NIL	N/A	N/A	N/A
Magnesium	mg/L	4	NIL	N/A	N/A	N/A
Manganese	mg/L	4	NIL	N/A	N/A	N/A
Mercury	mg/L	1	NIL	N/A	N/A	N/A
Nitrate	mg/L	4	NIL	N/A	N/A	N/A
PCBs	mg/L	1	NIL	N/A	N/A	N/A
pH	pH	4	NIL	N/A	N/A	N/A
Sodium	mg/L	4	NIL	N/A	N/A	N/A
Sulfate	mg/L	4	NIL	N/A	N/A	N/A

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total dissolved solids	mg/L	1	NIL	N/A	N/A	N/A
Total organic carbon	mg/L	4	NIL	N/A	N/A	N/A
Zinc	mg/L	1	NIL	N/A	N/A	N/A
Benzene	mg/L	1	NIL	N/A	N/A	N/A
Total Phenolics	mg/L	4	NIL	N/A	N/A	N/A
BOD	mg/L	1	NIL	N/A	N/A	N/A
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	NIL	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	NIL	N/A	N/A	N/A
Fluoride	mg/L	4	NIL	N/A	N/A	N/A
Toluene	mg/L	1	NIL	N/A	N/A	N/A
Total suspended solids	mg/L	4	NIL	N/A	N/A	N/A
Phosphate	mg/L	1	NIL	N/A	N/A	N/A
Potassium	mg/L	4	NIL	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	NIL	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	NIL	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	NIL	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	NIL	N/A	N/A	N/A
Chromium (total)	mg/L	1	NIL	N/A	N/A	N/A

Monitoring Point 10

Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Organochlorine pesticides	mg/L	4	4	<0.5	0	<2
Potassium	mg/L	4	4	384	449	488
Total suspended solids	mg/L	4	4	96	111	130
Fluoride	mg/L	4	4	0.4	0.45	0.5
Alkalinity (as calcium carbonate)	mg/L	4	4	3330	3613	3970
BOD	mg/L	4	4	41	62	87
Total Phenolics	mg/L	4	4	<0.05	0.023	0.093
Total organic carbon	mg/L	4	4	137	315	361
Sulfate	mg/L	4	4	27	30	35
Sodium	mg/L	4	4	964	1101	1270
pH	pH	4	4	7.11	7.28	7.55
Nitrate	mg/L	4	4	0.015	0.044	0.072
Manganese	mg/L	4	4	0.6	0.706	0.872
Magnesium	mg/L	4	4	100	113	124
Iron	mg/L	4	4	23.7	25.7	29.1
Chloride	mg/L	4	4	1530	1967	2630
Calcium	mg/L	4	4	140	152	164
Ammonia	mg/L	4	4	414	583	769

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M6 and R1), complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by licence conditions M6 and R1, **no tables** will appear below.

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

C Statement of Compliance – Licence Conditions

C1 Compliance with Licence Conditions

(✓ the boxes)

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

(✓ a box)

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

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

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

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

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

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

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

e) What were the registration 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 E of this Annual Return

3

C2 Details of Non-Compliance with Licence

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

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are **not** required to monitor assessable pollutants by your licence (see **A8** on this **Annual Return**), **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.

A load-based licensing online fee calculator is available on the EPA's website at www.environment.nsw.gov.au

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)

NSW EPA NEW SOUTH WALES ENVIRONMENT PROTECTION AUTHORITY

E 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 and D 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 13-Oct-2004 to 12-Oct-2005 **or** ____/____/____ to ____/____/____

* SIGNATURE: [signature] SIGNATURE:_____

NAME: (printed) TONY FARRELL NAME: (printed)_____

POSITION: ACTING GENERAL MANAGER POSITION:_____

DATE: 7 / 12 / 05 DATE:____/____/____

SEAL(if signing under seal)

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

APPENDIX A

Licence condition number not complied with:

Condition M2.1. Monitoring Concentration of Pollutants.

Summary of particulars of Non-Compliance

Some water samples were unable to be collected due to insufficient volume being available in either the watercourse or groundwater monitoring wells. Sample locations are detailed in the landfill licence 5873. Locations 1-5 are groundwater monitoring sites. Locations 6-9 are surface water sample locations.

Dates when the non-compliance occurred:

Table 1 shows the dates and where sites possessed an insufficient volume for any sample to be collected.

Table 1: Dates and sites of non-compliance

Date	Sites
13/01/2005	1, 6, 7, 8, 9.
04/03/2005	1, 7, 8, 9.
24/06/2005	1, 2, 3, 4, 6, 7, 8, 9.
25/10/2005	1, 6, 7, 8, 9.

Cause of the non-compliance:

No sample volume available.

Action taken to mitigate the effects of the non-compliance:

The non-compliance will have no adverse effect.

Action taken to prevent a recurrence of the non-compliance:

The non-compliance is unavoidable due to reliance on rainfall for sufficient sample to be available.

Licence condition number not complied with:

Condition M2.1. Monitoring Concentration of Pollutants.

Summary of particulars of Non-Compliance

Some water samples were collected however, the sites didn't possess a sufficient sample in order to collect the required amount of water needed to analyse all requested parameters being available in either the watercourse or groundwater monitoring wells. Sample locations are detailed in the landfill licence 5873. Locations 1-5 are groundwater monitoring sites. Locations 6-9 are surface water sample locations.

Dates when the non-compliance occurred:

Table 2 shows the dates and where sites possessed an insufficient volume for the complete sample to be collected.

Table 2: Dates and sites of non-compliance

Date	Sites
13/01/2005	2, 3.
25/10/2005	2.

Cause of the non-compliance:

Insufficient sample volume available.

Action taken to mitigate the effects of the non-compliance:

The non-compliance will have no adverse effect.

Action taken to prevent a recurrence of the non-compliance:

The non-compliance is unavoidable due to reliance on rainfall for sufficient sample to be available.

APPENDIX B

Condition 011.2 – Compaction rates for waste

According to condition O11.2 of the licence, the licensee must ensure that the achieved compaction rate of landfilled waste (excluding cover material) is stated in the annual return for the waste premises submitted to the EPA.

Material imported between January 2005 to June 2005: **56,442m^3** (Source: LMC^2 Volumetric Survey of Awaba Landfill for the period 1 January 2005 to 31 June 2005).

VENM/Clean fill imported and used between January 2005 and June 2005: **11,206.84t**

Waste Imported between January 2005 and June 2005: **59454.78t**

According to Councils soils laboratory assessment of the density of clean fill, the density after application to the landfill is 2.0 tonnes per cubic metre.

Therefore, the cover material occupies:

11,206.84 / 2.0t/m^3 = 5603.42m^3

Therefore, the remaining void for garbage is:

56,442m^3 – 5603.42m^3 = 50,838.58m^3.

Therefore, the compaction rate of garbage imported between January 2005 and June 2005 was:

59,454.78 / 50,838.58m^3 = 1.16t/m^3.

Protection of the Environment Operations Act 1997

Annual Return

LAKE MACQUARIE CITY COUNCIL

Department of **Environment & Climate Change** NSW

ANNUAL RETURN

LICENCE NO.	5873
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2007 to 12-Oct-2008

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 13 / 10 / 07 **to** 12 / 10 / 08

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2008

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

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

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

OR

- **prosecution.**

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

Licence Administration and Revenue Unit
Department of Environment and Climate Change
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

LAKE MACQUARIE CITY COUNCIL

Department of **Environment & Climate Change** NSW

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:	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 • if applicable, the load-based fee for the licence fee period covered by this Annual Return	

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

Licence Administration and Revenue Unit
Department of Environment and Climate Change
PO Box A290
SYDNEY SOUTH NSW 1232

A Statement of Compliance – Licence Details

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

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

Licence variation and transfer application forms are available on the EPA website at: http://www.environment.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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Type of Licence

Scheduled Activity - Premises Based

A3 Premises to which Licence Applies

common name *(if any)*	AWABA WASTE DISPOSAL FACILITY
premises	60 WILTON ROAD, AWABA, NSW

A4 Activities to which Licence Applies

Scheduled Activity

Composting

Waste disposal (application to land)

Waste Facilities - solid waste landfilling

A5 Other Activities (Not Applicable)

A6 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
Composting	> 5000 - 50000	T received

Solid Waste Landfilling (79)	> 100000	T
Waste disposal (application to land)	> 0	All

A7 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 (as required by condition M4 of the licence). **If no complaints were received enter nil.**	NIL

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M2 and R1), complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by licence conditions M2 and R1, **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).

Monitoring Point 1

Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	0.37	0.37	0.37
Ammonia	milligrams per litre	4	0	—	—	—
Arsenic	milligrams per litre	1	1	0.0005	0.0005	0.0005
Barium	milligrams per litre	1	1	0.046	0.046	0.046
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	0	—	—	—
Chloride	milligrams per litre	4	0	—	—	—
Cobalt	milligrams per litre	1	0	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	4	0	—	—	—
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams per litre	1	0	—	—	—
Iron	milligrams per litre	4	0	—	—	—
Lead	milligrams per litre	1	1	0.0005	0.0005	0.0005
Magnesium	milligrams per litre	4	0	—	—	—
Manganese	milligrams per litre	4	0	—	—	—
Mercury	milligrams per litre	1	0	0.00005	0.00005	0.00005

Please Note: For all monitoring sites, where contaminant concentrations were below the level of reporting (LOR) on one or more events, Summary values (min, max, mean) have been calculated using 50% of LOR.

Annual Return

LAKE MACQUARIE CITY COUNCIL

Department of Environment & Climate Change NSW

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0	–	–	–
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	0	–	–	–
Sodium	milligrams per litre	4	1	30	30	30
Sulfate	milligrams per litre	4	0	–	–	–
Total dissolved solids	milligrams per litre	1	1	151	151	151
Total organic carbon	milligrams per litre	4	0	–	–	–
Zinc	milligrams per litre	1	1	0.022	0.022	0.022
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	0	–	–	–
BOD	milligrams per litre	1	1	1.0	1.0	1.0
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	0	–	–	–
Toluene	milligrams per litre	1	1	0.003	0.0025	0.0025
Phosphate	milligrams per litre	1	0	–	–	–
Potassium	milligrams per	4	0	–	–	–

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	1	0.223	0.223	0.223
Total petroleum hydrocarbons	milligrams per litre	1	1	0.11	0.11	0.11
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Organophosphate pesticides	milligrams per litre	1	1	0.008	0.008	0.008
Chromium (total)	milligrams per litre	1	1	0.0005	0.0005	0.0005

Monitoring Point 2

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.0005	0.0005	0.0005
Organophosphate pesticides	milligrams per litre	1	1	0.016	0.016	0.016
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Total petroleum hydrocarbons	milligrams per litre	1	1	0.11	0.11	0.11
Chlorinated volatile compounds	milligrams per litre	1	1	0.23	0.23	0.23
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00032	0.001
Potassium	milligrams per litre	4	4	7	9	10
Phosphate	milligrams per litre	1	1	0.01	0.01	0.01
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Fluoride	milligrams per litre	4	4	0.2	0.3	0.4
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	5	7	9
BOD	milligrams per litre	1	1	1	1	1
Total Phenolics	milligrams per litre	4	4	0.025	0.084	0.26
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.049	0.049	0.049
Total organic carbon	milligrams per litre	4	4	8	19.75	52
Total dissolved solids	milligrams per litre	1	1	1490	1490	1490
Sulfate	milligrams per litre	4	4	230	280.3	360
Sodium	milligrams per litre	5	5	463	637.5	778
pH	pH	4	4	4.8	5.24	5.7
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
Nitrate	milligrams per litre	4	4	0.015	0.1	0.24
Mercury	milligrams per litre	1	0	0.0001	0.0001	0.0001
Manganese	milligrams per litre	4	4	0.08	0.12	0.15
Magnesium	milligrams per litre	4	4	23	37.3	44
Lead	milligrams per litre	1	1	0.008	0.008	0.008
Iron	milligrams per litre	4	4	0.025	1.28	3.3
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Copper	milligrams per litre	1	1	0.007	0.007	0.007
Conductivity	microsiemens per centimetre	4	4	2420	3122.5	3700
Cobalt	milligrams per litre	1	1	0.003	0.003	0.003

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Department of Environment & Climate Change NSW

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	651	919.3	1080
Calcium	milligrams per litre	4	4	3	5	6
Cadmium	milligrams per litre	1	1	0.00005	0.00005	0.00005
Barium	milligrams per litre	1	1	0.028	0.028	0.028
Arsenic	milligrams per litre	1	1	0.004	0.004	0.004
Ammonia	milligrams per litre	4	4	0.029	0281	0.959
Aluminium	milligrams per litre	1	1	1.46	1.46	1.46

Monitoring Point 3

Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	5.14	5.14	5.14
Ammonia	milligrams per litre	4	4	7.69	23.67	46.9
Arsenic	milligrams per litre	1	1	0.01	0.01	0.01
Barium	milligrams per litre	1	1	1.54	1.54	1.54
Cadmium	milligrams per litre	1	1	0.00005	0.00005	0.00005
Calcium	milligrams per litre	4	4	5	18.75	29
Chloride	milligrams per litre	4	4	568	881.25	1090
Cobalt	milligrams per litre	1	1	0.003	0.003	0.003
Conductivity	microsiemens per centimetre	4	4	2480	3252.5	3710
Copper	milligrams per litre	1	1	0.001	0.001	0.001
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	4	0.28	82.1	188
Lead	milligrams per litre	1	1	0.042	0.042	0.042
Magnesium	milligrams per litre	4	4	40	64.5	81
Manganese	milligrams per litre	4	4	0.11	1.046	1.94
Mercury	milligrams per litre	1	1	0.0002	0.0002	0.0002

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.018	0.08	0.2
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	4	4.75	5.91	6.44
Sodium	milligrams per litre	4	4	370	560	773
Sulfate	milligrams per litre	4	4	4	62.5	229
Total dissolved solids	milligrams per litre	1	1	1840	1840	1840
Total organic carbon	milligrams per litre	4	4	43	48.25	59
Zinc	milligrams per litre	1	1	0.055	0.055	0.055
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	4	0.025	0.04	0.083
BOD	milligrams per litre	1	1	10	10	10
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	5	386	535
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	4	0.1	0.2	0.4
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Phosphate	milligrams per litre	1	1	0.005	0.005	0.005
Potassium	milligrams per	4	4	10	30.3	55

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	0.25	0.36	1
Chlorinated volatile compounds	milligrams per litre	1	1	0.23	0.23	0.23
Total petroleum hydrocarbons	milligrams per litre	1	1	1.22	1.22	1.22
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Organophosphate pesticides	milligrams per litre	1	1	0.007	0.007	0.007
Chromium (total)	milligrams per litre	1	1	0.004	0.004	0.004

Monitoring Point 4

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.002	0.002	0.002
Organophosphate pesticides	milligrams per litre	1	1	0.008	0.008	0.008
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Total petroleum hydrocarbons	milligrams per litre	1	1	0.16	0.16	0.16
Chlorinated volatile compounds	milligrams per litre	1	1	0.23	0.23	0.23
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00032	0.001
Potassium	milligrams per litre	4	4	8	8	8
Phosphate	milligrams per litre	1	1	0.005	0.005	0.005
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Fluoride	milligrams per litre	4	4	0.1	0.13	0.2
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	90	210	260
BOD	milligrams per litre	1	1	1.0	1.0	1.0
Total Phenolics	milligrams per litre	4	4	0.025	0.025	0.025
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected, and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.082	0.082	0.082
Total organic carbon	milligrams per litre	4	4	13	16.5	20
Total dissolved solids	milligrams per litre	1	1	680	680	680
Sulfate	milligrams per litre	4	4	9	17	28
Sodium	milligrams per litre	4	5	149	182	215
pH	pH	4	4	5.59	6	6.29
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
Nitrate	milligrams per litre	4	4	0.005	0.04	0.083
Mercury	milligrams per litre	1	1	0.0004	0.0004	0.0004
Manganese	milligrams per litre	4	4	0.371	0.746	0.956
Magnesium	milligrams per litre	4	4	32	34	38
Lead	milligrams per litre	1	1	0.103	0.103	0.103
Iron	milligrams per litre	4	4	15.8	35.1	51.9
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Conductivity	microsiemens per centimetre	4	4	1290	1417.5	1500
Cobalt	milligrams per litre	1	1	0.0005	0.0005	0.0005

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	300	326.3	367
Calcium	milligrams per litre	4	4	22	39.5	50
Cadmium	milligrams per litre	1	1	0.0003	0.0003	0.0003
Barium	milligrams per litre	1	1	0.646	0.646	0.646
Arsenic	milligrams per litre	1	1	0.022	0.022	0.022
Ammonia	milligrams per litre	4	4	0.274	1.173	2.4
Aluminium	milligrams per litre	1	1	2.71	2.71	2.71

Monitoring Point 5

Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	1.06	1.06	1.06
Ammonia	milligrams per litre	4	4	0.108	0.197	0.366
Arsenic	milligrams per litre	1	1	0.011	0.011	0.011
Barium	milligrams per litre	1	1	0.043	0.043	0.043
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	4	29	35.5	41
Chloride	milligrams per litre	4	4	2240	2682.5	3030
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	4	4	6640	7995	8930
Copper	milligrams per litre	1	1	0.028	0.028	0.028
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	4	0.025	4.59	9.24
Lead	milligrams per litre	1	1	0.033	0.033	0.033
Magnesium	milligrams per litre	4	4	154	184.5	206
Manganese	milligrams per litre	4	4	0.39	0.48	0.58
Mercury	milligrams per litre	1	1	0.0002	0.0002	0.0002

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.01	0.04	0.08
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	4	5.52	5.9	6.22
Sodium	milligrams per litre	4	5	1240	1400	1560
Sulfate	milligrams per litre	4	4	227	258.75	280
Total dissolved solids	milligrams per litre	1	1	4290	4290	4290
Total organic carbon	milligrams per litre	4	4	4	5	7
Zinc	milligrams per litre	1	1	0.068	0.068	0.068
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	4	0.025	0.025	0.025
BOD	milligrams per litre	1	1	1	1	1
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	134	137	139
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	4	0.5	0.575	0.6
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Phosphate	milligrams per litre	1	1	0.005	0.005	0.005
Potassium	milligrams per	4	4	19	23.75	27

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00032	0.001
Chlorinated volatile compounds	milligrams per litre	1	1	0.23	0.23	0.23
Total petroleum hydrocarbons	milligrams per litre	1	1	0.11	0.11	0.11
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Organophosphate pesticides	milligrams per litre	1	1	0.007	0.007	0.007
Chromium (total)	milligrams per litre	1	1	0.0005	0.0005	0.0005

Discharge & Monitoring Point 6

Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Organochlorine pesticides	milligrams per litre	4	2	0.00025	0.00032	0.001
Potassium	milligrams per litre	4	2	30	56.5	83
Phosphate	milligrams per litre	1	0	–	–	–
Total suspended solids	milligrams per litre	4	2	18	27	36
Toluene	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	2	0.3	0.35	0.4
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	2	274	445	616
BOD	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	2	0.025	0025	0.025

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	0	—	—	—
Zinc	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	2	36	44.5	53
Total dissolved solids	milligrams per litre	1	0	—	—	—
Sulfate	milligrams per litre	4	2	1.4	16.5	1.9
Sodium	milligrams per litre	4	2	120	176	232
pH	pH	4	2	7.37	7.88	8.39
PCBs	milligrams per litre	1	0	—	—	—
Nitrate	milligrams per litre	4	2	0.868	2.0	3.13
Mercury	milligrams per litre	1	0	—	—	—
Manganese	milligrams per litre	4	2	0077	0.3945	0.712
Magnesium	milligrams per litre	4	2	25	33	41
Lead	milligrams per litre	1	0	—	—	—
Iron	milligrams per litre	4	2	0.76	0.98	1.2
Ethyl benzene	milligrams per litre	1	0	—	—	—
Copper	milligrams per litre	1	0	—	—	—
Conductivity	microsiemens per centimetre	4	2	997	1574	2150

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	0	—	—	—
Chloride	milligrams per litre	4	2	127	227	327
Calcium	milligrams per litre	4	2	35	40.5	46
Cadmium	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Arsenic	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	2	0.73	17.52	34.3
Aluminium	milligrams per litre	1	0	—	—	—

Discharge & Monitoring Point 7

Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	2.82	2.82	2.82
Ammonia	milligrams per litre	4	4	5.41	15.67	27
Arsenic	milligrams per litre	1	1	0.009	0.009	0.009
Barium	milligrams per litre	1	1	0.118	0.118	0.118
Cadmium	milligrams per litre	1	1	0.0003	0.0003	0.0003
Calcium	milligrams per litre	4	4	50	83.5	119
Chloride	milligrams per litre	4	4	174	342.25	736
Cobalt	milligrams per litre	1	1	0.007	0.007	0.007
Conductivity	microsiemens per centimetre	4	4	1180	2120	3910
Copper	milligrams per litre	1	1	0.017	0.017	0.017
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	4	0.025	11.66	29.9
Lead	milligrams per litre	1	1	0.015	0.015	0.015
Magnesium	milligrams per litre	4	4	29	63.75	143
Manganese	milligrams per litre	4	4	0.507	1.579	2.92
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.05	0.28	0.88
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	4	6.35	7.06	7.77
Sodium	milligrams per litre	4	5	117	224.2	519
Sulfate	milligrams per litre	4	4	16	51	139
Total dissolved solids	milligrams per litre	1	1	940	940	940
Total organic carbon	milligrams per litre	4	4	40	182	335
Zinc	milligrams per litre	1	1	0.098	0.098	0.098
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	4	0.025	0.159	0.366
BOD	milligrams per litre	1	1	38	38	38
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	228	497	932
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	4	0.200	0.325	0.4
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Total suspended solids	milligrams per litre	4	4	66	667.5	2020
Phosphate	milligrams per	1	1	0.005	0.005	0.005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	4	26	53	88
Organochlorine pesticides	milligrams per litre	4	4	0.0025	0.0033	0.001
Chlorinated volatile compounds	milligrams per litre	1	1	0.23	0.23	0.23
Total petroleum hydrocarbons	milligrams per litre	1	1	1.8	1.8	1.8
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.008	0.008	0.008
Organophosphate pesticides	milligrams per litre	1	1	0.007	0.007	0.007
Chromium (total)	milligrams per litre	1	1	0.006	0.006	0.006

Monitoring Point 8

Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	0	—	—	—
Organophosphate pesticides	milligrams per litre	1	0	—	—	—
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	—	—	—
Total petroleum hydrocarbons	milligrams per litre	1	0	—	—	—
Chlorinated volatile compounds	milligrams per litre	1	0	—	—	—
Organochlorine pesticides	milligrams per litre	4	1	0.00075	0.00075	0.00075
Potassium	milligrams per litre	4	1	11	11	11
Phosphate	milligrams per litre	1	0	—	—	—
Total suspended solids	milligrams per litre	4	1	6	6	6
Toluene	milligrams per litre	1	0	—	—	—
Fluoride	milligrams per litre	4	1	0.1	0.1	0.1
Chromium (hexavalent)	milligrams per litre	1	0	—	—	—
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	1	48	48	48
BOD	milligrams per litre	1	0	—	—	—
Total Phenolics	milligrams per litre	4	1	0.025	0.025	0.025

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	0	—	—	—
Zinc	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	1	18	18	18
Total dissolved solids	milligrams per litre	1	0	—	—	—
Sulfate	milligrams per litre	4	1	19	19	19
Sodium	milligrams per litre	4	1	56	56	56
pH	pH	4	1	6.8	6.8	6.8
PCBs	milligrams per litre	1	0	—	—	—
Nitrate	milligrams per litre	4	1	0.077	0.077	0.077
Mercury	milligrams per litre	1	0	—	—	—
Manganese	milligrams per litre	4	1	0.05	0.05	0.05
Magnesium	milligrams per litre	4	1	7	7	7
Lead	milligrams per litre	1	0	—	—	—
Iron	milligrams per litre	4	1	1.55	1.55	1.55
Ethyl benzene	milligrams per litre	1	0	—	—	—
Copper	milligrams per litre	1	0	—	—	—
Conductivity	microsiemens per centimetre	4	1	437	437	437

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	0	—	—	—
Chloride	milligrams per litre	4	1	80	80	80
Calcium	milligrams per litre	4	1	7	7	7
Cadmium	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Arsenic	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	1	0.036	0.036	0.036
Aluminium	milligrams per litre	1	0	—	—	—

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NOT SAMPLED

Monitoring Point 9

Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	0			
Ammonia	milligrams per litre	4	0			
Arsenic	milligrams per litre	1	0			
Barium	milligrams per litre	1	0			
Cadmium	milligrams per litre	1	0			
Calcium	milligrams per litre	4	0			
Chloride	milligrams per litre	4	0			
Cobalt	milligrams per litre	1	0			
Conductivity	microsiemens per centimetre	4	0			
Copper	milligrams per litre	1	0			
Ethyl benzene	milligrams per litre	1	0			
Iron	milligrams per litre	4	0			
Lead	milligrams per litre	1	0			
Magnesium	milligrams per litre	4	0			
Manganese	milligrams per litre	4	0			
Mercury	milligrams per litre	1	0			

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0			
PCBs	milligrams per litre	1	0			
pH	pH	4	0			
Sodium	milligrams per litre	4	0			
Sulfate	milligrams per litre	4	0			
Total dissolved solids	milligrams per litre	1	0			
Total organic carbon	milligrams per litre	4	0			
Zinc	milligrams per litre	1	0			
Benzene	milligrams per litre	1	0			
Total Phenolics	milligrams per litre	4	0			
BOD	milligrams per litre	1	0			
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0			
Chromium (hexavalent)	milligrams per litre	1	0			
Fluoride	milligrams per litre	4	0			
Toluene	milligrams per litre	1	0			
Total suspended solids	milligrams per litre	4	0			
Phosphate	milligrams per	1	0			

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	0			
Organochlorine pesticides	milligrams per litre	4	0			
Chlorinated volatile compounds	milligrams per litre	1	0			
Total petroleum hydrocarbons	milligrams per litre	1	0			
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0			
Organophosphate pesticides	milligrams per litre	1	0			
Chromium (total)	milligrams per litre	1	0			

Monitoring Point 10

Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00033	0.001
Potassium	milligrams per litre	4	4	260	288	328
Total suspended solids	milligrams per litre	4	4	50	124.75	168
Fluoride	milligrams per litre	4	4	0.4	0.475	0.6
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	2050	2533	2650
BOD	milligrams per litre	4	4	26	213	591
Total Phenolics	milligrams per litre	4	4	0.11	0.2107	0.295
Total organic carbon	milligrams per litre	4	4	216	356.5	2650
Sulfate	milligrams per litre	4	4	24	26.33	30
Sodium	milligrams per litre	4	4	649	690.25	760
pH	pH	4	4	7.55	7.86	8.1
Nitrate	milligrams per litre	4	4	0.005	0.145	0.5
Manganese	milligrams per litre	4	4	0.545	1.18	2
Magnesium	milligrams per litre	4	4	94	104.5	113
Iron	milligrams per litre	4	4	4.09	5.88	7.7
Chloride	milligrams per litre	4	4	969	1127.3	1440

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Calcium	milligrams per litre	4	4	87	134	177
Ammonia	milligrams per litre	4	3	218	313	457

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M6 and R1), complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by licence conditions M6 and R1, **no tables** will appear below.

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

C Statement of Compliance – Licence Conditions

C1 Compliance with Licence Conditions

(✓ the boxes)

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

(✓ a box)

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

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

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

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

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

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

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

e) What were the registration 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 E of this Annual Return

2

C2 Details of Non-Compliance with Licence

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

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are **not** required to monitor assessable pollutants by your licence (see **A7** on this **Annual Return**), **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.

A load-based licensing online fee calculator is available on the EPA's website at www.environment.nsw.gov.au

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

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

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

E 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 and D 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 13-Oct-2007 to 12-Oct-2008 **or** ____/____/____ to ____/____/____

SIGNATURE: [signature] SIGNATURE:_____

NAME: (printed) TONY FARRELL NAME: (printed)_____

POSITION: ACTING GENERAL MANAGER POSITION:_____

DATE: 2 / 12 / '08 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

APPENDIX A

Licence condition number not complied with:

Condition M2.1 monitoring concentration of pollutants.

Summary of particulars of non-compliance

Some water samples were unable to be collected due to insufficient volume being available in the watercourse. Sample locations are detailed in the landfill Licence 5873. Locations 1-5 are groundwater sites. Locations 6-9 are surface water sample locations.

Dates when the non-compliance occurred:

Table 1 shows the dates and sites where insufficient volume for any sample to be taken

Table 1

Date	Sites
12/02/2008	1,9
7/05/2008	1,8,9
17/07/2008	1,6,8,9
29/09/2008	6,8,9
20/10/2008	1,6,8,9

Cause of the non-compliance:

No sample volume available

Action taken to mitigate the effects of the non-compliance

The non-compliance will have no adverse effect.

Action taken to prevent a recurrence of the non-compliance:

The non-compliance is unavoidable due to reliance on rainfall for sufficient sample to be available.

2.12.08

APPENDIX B

Condition 011.2- Compaction rates for waste:

According to condition 011.2 of the licence, the licensee must ensure that the achieved compaction rate of land filled waste (excluding cover material) is stated in the Annual Return for the waste premises submitted to the EPA.

Table 2

Total waste land filled	134,714 tonnes
Change in void space	119,449m3
Compaction rate	119,449 m3 ÷ 134,714 tonnes = 0.88 tonnes/m3

2.12.08

Lake Macquarie
City Council

8 December 2009

Licence Administration and Revenue Unit
Department of Environment and Climate Change
PO Box A290
Sydney South NSW 1232

Dear Sir/Madam

Subject: Licence 5873 Annual Return

I refer to the above and your recent correspondence regarding the same.

Please find attached the completed Annual Return for the period 13th October 2008 to 12th October 2009.

Annual Licence administration fee will be sent electronically.

Should you require further information, please contact me on 49210477.

Yours faithfully

Rick Brindley

Waste Sites Co coordinator

Waste Environment & Rangers

Our Ref: F2004/00538
ABN 81 065 027 868
D01020173 Cover letter for annual return 06 07.DOC

Department of Environment & Climate Change NSW

ANNUAL RETURN

LICENCE NO.	5873
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2008 to 12-Oct-2009

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

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

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2009

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

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

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

  OR

- **prosecution.**

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

Licence Administration and Revenue Unit
Department of Environment and Climate Change
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

LAKE MACQUARIE CITY COUNCIL

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:	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 • if applicable, the load-based fee for the licence fee period covered by this Annual Return	

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

Licence Administration and Revenue Unit
Department of Environment and Climate Change
PO Box A290
SYDNEY SOUTH NSW 1232

Protection of the Environment Operations Act 1997

Annual Return

LAKE MACQUARIE CITY COUNCIL

Department of Environment & Climate Change NSW

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.environment.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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Type of Licence

Scheduled Activity - Premises Based

A3 Premises to which Licence Applies

common name *(if any)*	AWABA WASTE DISPOSAL FACILITY
premises	60 WILTON ROAD, AWABA, NSW

A4 Activities to which Licence Applies

Scheduled Activity

Composting

Waste disposal (application to land)

A5 Other Activities (Not Applicable)

A6 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
Composting	> 5000 - 50000	T received
Waste disposal (application to land)	> 0	All

A7 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 (as required by condition M4 of the licence). **If no complaints were received enter nil.**	NIL

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M2 and R1), complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by licence conditions M2 and R1, **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).

Monitoring Point 1

Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	0	-	-	-
Ammonia	milligrams per litre	4	0	-	-	-
Arsenic	milligrams per litre	1	0	-	-	-
Barium	milligrams per litre	1	0	-	-	-
Cadmium	milligrams per litre	1	0	-	-	-
Calcium	milligrams per litre	4	0	-	-	-
Chloride	milligrams per litre	4	0	-	-	-
Cobalt	milligrams per litre	1	0	-	-	-
Conductivity	microsiemens per centimetre	4	0	-	-	-
Copper	milligrams per litre	1	0	-	-	-
Ethyl benzene	milligrams per litre	1	0	-	-	-
Iron	milligrams per litre	4	0	-	-	-
Lead	milligrams per litre	1	0	-	-	-
Magnesium	milligrams per litre	4	0	-	-	-
Manganese	milligrams per litre	4	0	-	-	-
Mercury	milligrams per litre	1	0	-	-	-

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0	-	-	-
PCBs	milligrams per litre	1	0	-	-	-
pH	pH	4	0	-	-	-
Sodium	milligrams per litre	4	0	-	-	-
Sulfate	milligrams per litre	4	0	-	-	-
Total dissolved solids	milligrams per litre	1	0	-	-	-
Total organic carbon	milligrams per litre	4	0	-	-	-
Zinc	milligrams per litre	1	0	-	-	-
Benzene	milligrams per litre	1	0	-	-	-
Total Phenolics	milligrams per litre	4	0	-	-	-
BOD	milligrams per litre	1	0	-	-	-
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	-	-	-
Chromium (hexavalent)	milligrams per litre	1	0	-	-	-
Fluoride	milligrams per litre	4	0	-	-	-
Toluene	milligrams per litre	1	0	-	-	-
Phosphate	milligrams per litre	1	0	-	-	-
Potassium	milligrams per	4	0	-	-	-

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
Chromium (total)	milligrams per litre	1	0	–	–	–

Site 1 was dry for all sampling events in 2009.

Monitoring Point 2

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.116	0.116	0.116
Organophosphate pesticides	milligrams per litre	1	1	0.00025	0.00025	0.00025
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total petroleum hydrocarbons	milligrams per litre	1	1	0.010	0.010	0.010
Chlorinated volatile compounds	milligrams per litre	1	1	0.025	0.025	0.025
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00062	0.025
Potassium	milligrams per litre	4	4	8.0	14.25	20
Phosphate	milligrams per litre	1	1	0.010	0.010	0.010
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Fluoride	milligrams per litre	4	4	0.010	0.538	1.140
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	4	20	38
BOD	milligrams per litre	1	1	154	154	154
Total Phenolics	milligrams per litre	4	4	0.0025	0.1468	0.3600
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.041	0.041	0.041
Total organic carbon	milligrams per litre	4	4	5.0	20.25	50
Total dissolved solids	milligrams per litre	1	1	8050	8050	8050
Sulfate	milligrams per litre	4	4	242	371.5	736
Sodium	milligrams per litre	4	4	513	1009.5	1500
pH	pH	4	4	5.18	5.34	5.6
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
Nitrate	milligrams per litre	4	4	0.005	0.02	0.030
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005
Manganese	milligrams per litre	4	5	0.107	0.497	0.934
Magnesium	milligrams per litre	4	4	30	92.50	161
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Iron	milligrams per litre	4	5	0.025	51.67	258
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Copper	milligrams per litre	1	1	0.049	0.049	0.049
Conductivity	microsiemens per centimetre	4	4	2640	5207.50	7606
Cobalt	milligrams per litre	1	1	0.0005	0.0005	0.0005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	800	1572.50	2420
Calcium	milligrams per litre	4	4	4.0	14.50	25
Cadmium	milligrams per litre	1	1	0.0005	0.0005	0.0005
Barium	milligrams per litre	1	1	0.298	0.298	0.298
Arsenic	milligrams per litre	1	1	0.096	0.096	0.096
Ammonia	milligrams per litre	4	4	0.005	0.0525	0.12
Aluminium	milligrams per litre	1	1	173	173	173

Monitoring Point 3

Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	0.026	0.026	0.026
Ammonia	milligrams per litre	4	4	49.2	62.125	72.2
Arsenic	milligrams per litre	1	1	1.94	1.94	1.94
Barium	milligrams per litre	1	1	0.0016	0.0016	0.0016
Cadmium	milligrams per litre	1	1	0.087	0.087	0.087
Calcium	milligrams per litre	4	4	24	31.75	36
Chloride	milligrams per litre	4	4	723	914.75	1070
Cobalt	milligrams per litre	1	1	0.0080	0.0080	0.0080
Conductivity	microsiemens per centimetre	4	4	3400	4087.5	4430
Copper	milligrams per litre	1	1	0.032	0.032	0.032
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	5	10.2	53	203
Lead	milligrams per litre	1	1	0.115	0.115	0.115
Magnesium	milligrams per litre	4	4	62	84.75	95
Manganese	milligrams per litre	4	5	0.187	0.6084	1.07
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.005	0.01	0.02
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	4	6.32	6.38	6.44
Sodium	milligrams per litre	4	4	501	555.75	589
Sulfate	milligrams per litre	4	4	0.82	4.28	10
Total dissolved solids	milligrams per litre	1	1	2110	2110	2110
Total organic carbon	milligrams per litre	4	4	75	149	325
Zinc	milligrams per litre	1	1	0.072	0.072	0.072
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	4	0.025	0.1437	0.2500
BOD	milligrams per litre	1	1	590	590	590
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	518	712	806
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	4	0.010	0.180	0.410
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Phosphate	milligrams per litre	1	1	0.005	0.005	0.005
Potassium	milligrams per	4	4	47	59.5	67

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00032	0.001
Chlorinated volatile compounds	milligrams per litre	1	1	0.025	0.025	0.025
Total petroleum hydrocarbons	milligrams per litre	1	1	0.22	0.22	0.22
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.0005	0.0005	0.0005
Organophosphate pesticides	milligrams per litre	1	1	0.00025	0.00025	0.00025
Chromium (total)	milligrams per litre	1	1	0.005	0.005	0.005

Monitoring Point 4

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	1	0.00025	0.00025	0.00025
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	1	0.025	0.025	0.025
Organochlorine pesticides	milligrams per litre	4	3	0.00025	0.00032	0.0010
Potassium	milligrams per litre	4	3	7	7.67	8.00
Phosphate	milligrams per litre	1	1	0.01	0.01	0.01
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Fluoride	milligrams per litre	4	3	0.10	0.121	0.162
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	3	65	131	244
BOD	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	3	0.025	0.1517	0.3600
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.054	0.054	0.054
Total organic carbon	milligrams per litre	4	3	25	68.3	150
Total dissolved solids	milligrams per litre	1	1	890	890	890
Sulfate	milligrams per litre	4	3	28.6	40.53	48
Sodium	milligrams per litre	4	3	160	203.67	227
pH	pH	4	3	5.94	5.99	6.04
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
Nitrate	milligrams per litre	4	3	0.04	0.06	0.09
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005
Manganese	milligrams per litre	4	4	0.286	0.412	0.63
Magnesium	milligrams per litre	4	3	32	33.33	34
Lead	milligrams per litre	1	1	0.066	0.066	0.066
Iron	milligrams per litre	4	4	9.55	31.70	47.5
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Copper	milligrams per litre	1	1	0.011	0.011	0.011
Conductivity	microsiemens per centimetre	4	3	1320	1486.6	1570
Cobalt	milligrams per litre	1	1	0.003	0.003	0.003

Protection of the Environment Operations Act 1997

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Department of Environment & Climate Change NSW

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	3	252	364·3	469
Calcium	milligrams per litre	4	3	14	24	36
Cadmium	milligrams per litre	1	0	–	–	-
Barium	milligrams per litre	1	0	–	–	-
Arsenic	milligrams per litre	1	0	–	–	-
Ammonia	milligrams per litre	4	3	0·76	1·45	2·31
Aluminium	milligrams per litre	1	0	–	–	-

Site 4 - No annual sampling undertaken due to site being dry on 30.9.2009

Monitoring Point 5

Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	0.015	0.015	0.015
Ammonia	milligrams per litre	4	4	0.01	0.1125	0.22
Arsenic	milligrams per litre	1	1	0.08	0.08	0.08
Barium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Cadmium	milligrams per litre	1	1	0.031	0.031	0.031
Calcium	milligrams per litre	4	4	35	39.75	43
Chloride	milligrams per litre	4	4	2360	2675	3000
Cobalt	milligrams per litre	1	1	0.006	0.006	0.006
Conductivity	microsiemens per centimetre	4	4	7480	8357.5	9050
Copper	milligrams per litre	1	1	0.008	0.008	0.008
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	5	0.025	5.66	27.5
Lead	milligrams per litre	1	1	0.05	0.05	0.05
Magnesium	milligrams per litre	4	4	178	198.75	212
Manganese	milligrams per litre	4	5	0.477	0.5444	0.586
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.005	0.02	0.04
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	4	5.91	5.99	6.03
Sodium	milligrams per litre	4	4	1380	1505	1570
Sulfate	milligrams per litre	4	4	184	333	607
Total dissolved solids	milligrams per litre	1	1	5090	5090	5090
Total organic carbon	milligrams per litre	4	4	5.0	6.5	8
Zinc	milligrams per litre	1	1	0.05	0.05	0.05
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	4	0.025	0.0562	0.150
BOD	milligrams per litre	1	1	119	119	119
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	140	148	160
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	4	0.010	0.5143	0.800
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Phosphate	milligrams per litre	1	1	0.005	0.005	0.005
Potassium	milligrams per	4	4	22	24.75	27

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00032	0.0010
Chlorinated volatile compounds	milligrams per litre	1	1	0.025	0.025	0.025
Total petroleum hydrocarbons	milligrams per litre	1	1	0.010	0.010	0.010
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.0005	0.0005	0.0005
Organophosphate pesticides	milligrams per litre	1	1	0.0003	0.0003	0.0003
Chromium (total)	milligrams per litre	1	1	0.002	0.002	0.002

Discharge & Monitoring Point 6

Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Organochlorine pesticides	milligrams per litre	4	3	0.00025	0.00032	0.0010
Potassium	milligrams per litre	4	3	54.0	90.0	156.0
Phosphate	milligrams per litre	1	0	–	–	–
Total suspended solids	milligrams per litre	4	1	404	404	404
Toluene	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	3	0.334	0.411	0.50
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	3	274	416	635
BOD	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	1	1.11	1.11	1.11

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	0	–	–	–
Zinc	milligrams per litre	1	0	–	–	–
Total organic carbon	milligrams per litre	4	1	21·0	21·0	21·0
Total dissolved solids	milligrams per litre	1	0	–	–	–
Sulfate	milligrams per litre	4	1	32	32	32
Sodium	milligrams per litre	4	0	–	–	–
pH	pH	4	3	7·72	8·01	8·51
PCBs	milligrams per litre	1	0	–	–	–
Nitrate	milligrams per litre	4	3	2·06	6·32	14·1
Mercury	milligrams per litre	1	0	–	–	–
Manganese	milligrams per litre	4	3	0·093	0·1773	0·22
Magnesium	milligrams per litre	4	3	31	47·67	75
Lead	milligrams per litre	1	0	–	–	–
Iron	milligrams per litre	4	3	0·41	1·62	4·02
Ethyl benzene	milligrams per litre	1	0	–	–	–
Copper	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	3	1530	2446·6	3990

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	0	–	–	–
Chloride	milligrams per litre	4	3	253	527.33	976
Calcium	milligrams per litre	4	3	38	55.67	81
Cadmium	milligrams per litre	1	0	–	–	–
Barium	milligrams per litre	1	0	–	–	–
Arsenic	milligrams per litre	1	0	–	–	–
Ammonia	milligrams per litre	4	3	0.04	6.43	14.2
Aluminium	milligrams per litre	1	0	–	–	–

No annual sampling undertaken 30.9.09 due to site being dry.

Discharge & Monitoring Point 7

Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	3.49	3.49	3.49
Ammonia	milligrams per litre	4	3	6.07	7.56	9.53
Arsenic	milligrams per litre	1	1	0.014	0.014	0.014
Barium	milligrams per litre	1	1	0.114	0.114	0.114
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	3	57	71	79
Chloride	milligrams per litre	4	3	167	253	313
Cobalt	milligrams per litre	1	1	0.005	0.005	0.005
Conductivity	microsiemens per centimetre	4	3	1380	1583.3	1810
Copper	milligrams per litre	1	1	0.012	0.012	0.012
Ethyl benzene	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	4	0.08	1.73	4.75
Lead	milligrams per litre	1	1	0.026	0.026	0.026
Magnesium	milligrams per litre	4	3	35	40.33	50
Manganese	milligrams per litre	4	4	0.146	0.4515	0.729
Mercury	milligrams per litre	1	1	0.00005	0.00005	0.00005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	3	0.005	0.72	2.14
PCBs	milligrams per litre	1	1	0.0005	0.0005	0.0005
pH	pH	4	3	7.6	8.05	8.67
Sodium	milligrams per litre	4	1	218	218	218
Sulfate	milligrams per litre	4	2	241	248	255
Total dissolved solids	milligrams per litre	1	1	1020	1020	1020
Total organic carbon	milligrams per litre	4	1	30	30	30
Zinc	milligrams per litre	1	1	0.083	0.083	0.083
Benzene	milligrams per litre	1	1	0.0005	0.0005	0.0005
Total Phenolics	milligrams per litre	4	1	0.24	0.24	0.24
BOD	milligrams per litre	1	1	114	114	114
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	3	240	261	290
Chromium (hexavalent)	milligrams per litre	1	1	0.005	0.005	0.005
Fluoride	milligrams per litre	4	3	0.010	0.184	0.30
Toluene	milligrams per litre	1	1	0.0025	0.0025	0.0025
Total suspended solids	milligrams per litre	4	1	1020	1020	1020
Phosphate	milligrams per	1	1	0.005	0.005	0.005

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	3	30.0	35.33	45.0
Organochlorine pesticides	milligrams per litre	4	3	0.00025	0.00032	0.001
Chlorinated volatile compounds	milligrams per litre	1	1	0.183	0.183	0.183
Total petroleum hydrocarbons	milligrams per litre	1	1	3.58	3.58	3.58
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	0.010	0.010	0.010
Organophosphate pesticides	milligrams per litre	1	1	0.007	0.007	0.007
Chromium (total)	milligrams per litre	1	1	0.006	0.006	0.006

No sample taken on the 24.2.2009

Monitoring Point 8

Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Organochlorine pesticides	milligrams per litre	4	0	–	–	–
Potassium	milligrams per litre	4	0	–	–	–
Phosphate	milligrams per litre	1	0	–	–	–
Total suspended solids	milligrams per litre	4	0	–	–	–
Toluene	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	–	–	–
BOD	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	0	–	–	–

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	0	–	–	–
Zinc	milligrams per litre	1	0	–	–	–
Total organic carbon	milligrams per litre	4	0	–	–	–
Total dissolved solids	milligrams per litre	1	0	–	–	–
Sulfate	milligrams per litre	4	0	–	–	–
Sodium	milligrams per litre	4	0	–	–	–
pH	pH	4	0	–	–	–
PCBs	milligrams per litre	1	0	–	–	–
Nitrate	milligrams per litre	4	0	–	–	–
Mercury	milligrams per litre	1	0	–	–	–
Manganese	milligrams per litre	4	0	–	–	–
Magnesium	milligrams per litre	4	0	–	–	–
Lead	milligrams per litre	1	0	–	–	–
Iron	milligrams per litre	4	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Copper	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	0	–	–	–

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	0	-	-	-
Chloride	milligrams per litre	4	0	-	-	-
Calcium	milligrams per litre	4	0	-	-	-
Cadmium	milligrams per litre	1	0	-	-	-
Barium	milligrams per litre	1	0	-	-	-
Arsenic	milligrams per litre	1	0	-	-	-
Ammonia	milligrams per litre	4	0	-	-	-
Aluminium	milligrams per litre	1	0	-	-	-

No samples collected for 2009 as site 8 was dry

Monitoring Point 9

Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	0	–	–	–
Ammonia	milligrams per litre	4	0	–	–	–
Arsenic	milligrams per litre	1	0	–	–	–
Barium	milligrams per litre	1	0	–	–	–
Cadmium	milligrams per litre	1	0	–	–	–
Calcium	milligrams per litre	4	0	–	–	–
Chloride	milligrams per litre	4	0	–	–	–
Cobalt	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	0	–	–	–
Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Iron	milligrams per litre	4	0	–	–	–
Lead	milligrams per litre	1	0	–	–	–
Magnesium	milligrams per litre	4	0	–	–	–
Manganese	milligrams per litre	4	0	–	–	–
Mercury	milligrams per litre	1	0	–	–	–

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0	–	–	–
PCBs	milligrams per litre	1	0	–	–	–
pH	pH	4	0	–	–	–
Sodium	milligrams per litre	4	0	–	–	–
Sulfate	milligrams per litre	4	0	–	–	–
Total dissolved solids	milligrams per litre	1	0	–	–	–
Total organic carbon	milligrams per litre	4	0	–	–	–
Zinc	milligrams per litre	1	0	–	–	–
Benzene	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	0	–	–	–
BOD	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	0	–	–	–
Toluene	milligrams per litre	1	0	–	–	–
Total suspended solids	milligrams per litre	4	0	–	–	–
Phosphate	milligrams per	1	0	–	–	–

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	0	–	–	–
Organochlorine pesticides	milligrams per litre	4	0	–	–	–
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Total petroleum hydrocarbons	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
Chromium (total)	milligrams per litre	1	0	–	–	–

No samples collected during 2009 as Site 9 was dry

Monitoring Point 10

Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total petroleum hydrocarbons	milligrams per litre	4	1	230	230	230
Organochlorine pesticides	milligrams per litre	4	4	0.00025	0.00025	0.00025
Potassium	milligrams per litre	4	4	403	424	455
Total suspended solids	milligrams per litre	4	0	-	-	-
Fluoride	milligrams per litre	4	4	0.280	0.760	1.4
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	4180	4400	4750
BOD	milligrams per litre	4	4	69	135	271
Total Phenolics	milligrams per litre	4	4	0.025	0.208	0.54
Total organic carbon	milligrams per litre	4	4	220	397.75	520
Sulfate	milligrams per litre	4	0	-	-	-
Sodium	milligrams per litre	4	4	1030	1052.5	1080
pH	pH	4	0	-	-	-
Nitrate	milligrams per litre	4	4	0.02	0.042	0.05
Manganese	milligrams per litre	4	4	1.03	1.47	2.45
Magnesium	milligrams per litre	4	0	-	-	-
Iron	milligrams per litre	4	3	2.48	4.80	7.27

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	1350	1515	1780
Calcium	milligrams per litre	4	0	–	–	-
Ammonia	milligrams per litre	4	4	484	557.75	670.

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M6 and R1), complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by licence conditions M6 and R1, **no tables** will appear below.

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

C Statement of Compliance – Licence Conditions

C1 Compliance with Licence Conditions

(✓ the boxes)

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

(✓ a box)

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

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

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

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

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

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

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

e) What were the registration 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 E of this Annual Return

2

C2 Details of Non-Compliance with Licence

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

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are **not** required to monitor assessable pollutants by your licence (see **A7** on this **Annual Return**), **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.

A load-based licensing online fee calculator is available on the EPA's website at www.environment.nsw.gov.au

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

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

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

E 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 and D 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:

For the reporting period 13-Oct-2008 to 12-Oct-2009 **or** __/__/__ to __/__/__

* SIGNATURE: Brian Bell

NAME: (printed) BRIAN BELL

POSITION: GENERAL MANAGER

DATE: 3/12/2009

SIGNATURE:

NAME: (printed) RICHARD BRINDLEY

POSITION: COORDINATOR WASTE SITES

DATE: 1/12/09

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

APPENDIX A

Licence condition number not complied with:

Condition M2.1 monitoring concentrations of pollutants.

Summary of particulars of non-compliance.

Some water samples were unable to be collected due to insufficient volume being available in the watercourse. Sample locations are detailed in the Licence 5873. Locations 1-5 are groundwater sites. Locations 6-9 are surface water sample locations.

Dates when the non-compliance occurred:

Table 1

Site	Date
1	24/02/09, 13/05/09, 29/07/09, 30/09/09
4	30/09/09
6	30/09/09
7	24/02/09
8	24/02/09, 13/05/09, 29/07/09, 30/09/09.
9	24/02/09, 13/05/09, 29/07/09, 30/09/09

Cause of noncompliance.

No sample volume available

Action taken to mitigate the effects of the non-compliance.

The non- compliance will have no adverse effect. Samples to be taken during periods of rain.

Action taken to prevent a recurrence of the non-compliance.

The non-compliance is unavoidable due to reliance on rainfall for sufficient samples to be taken.

* Brian Bell

APPENDIX B

Condition 011.2 Compaction rates for waste.

According to condition 011.2 of Licence 5873, the Licensee must ensure that the achieved compaction rate of land filled waste (excluding cover material)stated in the Annual Return for the waste premises submitted to the EPA.

Table 2.

Total waste land filled	125,657.19 tonnes
Change in void space	108,400m3
Compaction rate	125,657.19 ÷ 108,400 tonnes = 0.86 tonnes/m3

Brian Beel

NSW GOVERNMENT | Environment, Climate Change & Water

ANNUAL RETURN

LICENCE NO.	5873
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2009 to 12-Oct-2010

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

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

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2010

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

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

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

  OR

- **prosecution.**

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

Regulatory and Compliance Support Unit
Department of Environment, Climate Change and Water
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

LAKE MACQUARIE CITY COUNCIL

NSW GOVERNMENT | Environment, Climate Change & Water

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:	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
Department of Environment, Climate Change and Water
PO Box A290
SYDNEY SOUTH NSW 1232

Annual Return

LAKE MACQUARIE CITY COUNCIL

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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.environment.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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Type of Licence

Scheduled Activity - Premises Based

A3 Premises to which Licence Applies

common name *(if any)*	AWABA WASTE DISPOSAL FACILITY
premises	60 WILTON ROAD, AWABA, NSW

A4 Activities to which Licence Applies

Scheduled Activity

Composting

Waste disposal (application to land)

A5 Other Activities (Not Applicable)

A6 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
Composting	> 5000 - 50000	T received
Waste disposal (application to land)	> 0	All

A7 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 (as required by condition M4 of the licence). **If no complaints were received enter nil.**	NIL

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M2 and R1), complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by licence conditions M2 and R1, **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).

Monitoring Point 1

Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	0	–	–	–
Ammonia	milligrams per litre	4	0	–	–	–
Arsenic	milligrams per litre	1	0	–	–	–
Barium	milligrams per litre	1	0	–	–	–
Cadmium	milligrams per litre	1	0	–	–	–
Calcium	milligrams per litre	4	0	–	–	–
Chloride	milligrams per litre	4	0	–	–	–
Cobalt	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	0	–	–	–
Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Iron	milligrams per litre	4	0	–	–	–
Lead	milligrams per litre	1	0	–	–	–
Magnesium	milligrams per litre	4	0	–	–	–
Manganese	milligrams per litre	4	0	–	–	–
Mercury	milligrams per litre	1	0	–	–	–

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0	–	–	–
PCBs	milligrams per litre	1	0	–	–	–
pH	pH	4	0	–	–	–
Sodium	milligrams per litre	4	0	–	–	–
Sulfate	milligrams per litre	4	0	–	–	–
Total dissolved solids	milligrams per litre	1	0	–	–	–
Total organic carbon	milligrams per litre	4	0	–	–	–
Zinc	milligrams per litre	1	0	–	–	–
Benzene	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	0	–	–	–
BOD	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	0	–	–	–
Toluene	milligrams per litre	1	0	–	–	–
Phosphate	milligrams per litre	1	0	–	–	–
Potassium	milligrams per	4	0	–	–	–

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LAKE MACQUARIE CITY COUNCIL

NSW GOVERNMENT Environment, Climate Change & Water

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	0	-	-	-
Chlorinated volatile compounds	milligrams per litre	1	0	-	-	-
Total petroleum hydrocarbons	milligrams per litre	1	0	-	-	-
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	-	-	-
Organophosphate pesticides	milligrams per litre	1	0	-	-	-
Chromium (total)	milligrams per litre	1	0	-	-	-

No samples collected at Site 1 in 2010 as Site was dry

Monitoring Point 2

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.009	0.009	0.009
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Potassium	milligrams per litre	4	4	8	15.75	25
Phosphate	milligrams per litre	1	1	<LOR	NC	<LOR
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	4	0.19	0.38	0.7
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	10	29.25	42
BOD	milligrams per litre	1	1	<LOR	NC	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.37
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.148	0.148	0.148
Total organic carbon	milligrams per litre	4	4	<LOR	NC	10
Total dissolved solids	milligrams per litre	1	1	5410	5410	5410
Sulfate	milligrams per litre	4	4	239	356.8	573
Sodium	milligrams per litre	4	4	570	12825	1690
pH	pH	4	4	5.23	5.30	5.38
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
Nitrate	milligrams per litre	4	4	<LOR	NC	0.06
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR
Manganese	milligrams per litre	4	4	0.128	0.53	0.748
Magnesium	milligrams per litre	4	4	33	122.75	170
Lead	milligrams per litre	1	1	0.019	0.019	0.019
Iron	milligrams per litre	4	4	<LOR	NC	0.15
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Copper	milligrams per litre	1	1	0.011	0.011	0.011
Conductivity	microsiemens per centimetre	4	4	2460	64425	8680
Cobalt	milligrams per litre	1	1	0.048	0.048	0.048

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	730	2117.5	3000
Calcium	milligrams per litre	4	4	4	20.5	28
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Barium	milligrams per litre	1	1	0.12	0.12	0.12
Arsenic	milligrams per litre	1	1	0.012	0.012	0.012
Ammonia	milligrams per litre	4	4	<LOR	NC	0.64
Aluminium	milligrams per litre	1	1	15	15	15

Monitoring Point 3

Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	4.83	4.83	4.83
Ammonia	milligrams per litre	4	4	44.2	67.78	84.9
Arsenic	milligrams per litre	1	1	0.01	0.01	0.01
Barium	milligrams per litre	1	1	1.07	1.07	1.07
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Calcium	milligrams per litre	4	4	34	37.25	40
Chloride	milligrams per litre	4	4	975	1052.5	1180
Cobalt	milligrams per litre	1	1	0.003	0.003	0.003
Conductivity	microsiemens per centimetre	4	4	4050	4315	4580
Copper	milligrams per litre	1	1	0.006	0.006	0.006
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Iron	milligrams per litre	4	4	4.02	19.79	54
Lead	milligrams per litre	1	1	0.038	0.038	0.038
Magnesium	milligrams per litre	4	4	87	95.25	103
Manganese	milligrams per litre	4	4	0.546	0.64	0.695
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.01	0.048	0.12
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
pH	pH	4	4	6.45	6.49	6.53
Sodium	milligrams per litre	4	4	614	660	762
Sulfate	milligrams per litre	4	4	0.64	51.22	190
Total dissolved solids	milligrams per litre	1	1	2410	2410	2410
Total organic carbon	milligrams per litre	4	4	50	65.75	90
Zinc	milligrams per litre	1	1	0.022	0.022	0.022
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.11
BOD	milligrams per litre	1	1	3	3	3
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	634	678.25	724
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	4	<LOR	NC	0.37
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Phosphate	milligrams per litre	1	1	<LOR	NC	<LOR
Potassium	milligrams per	4	4	61	67.5	74

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	1	190	190	190
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Chromium (total)	milligrams per litre	1	1	0·002	0·002	0·002

Monitoring Point 4

Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.003	0.003	0.003
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Potassium	milligrams per litre	4	4	8	8	8
Phosphate	milligrams per litre	1	1	<LOR	NC	<LOR
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	4	<LOR	NC	0.12
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	48	111.5	194
BOD	milligrams per litre	1	1	4	4	4
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.25
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Zinc	milligrams per litre	1	1	0.015	0.015	0.015
Total organic carbon	milligrams per litre	4	4	<LOR	NC	17
Total dissolved solids	milligrams per litre	1	1	1020	1020	1020
Sulfate	milligrams per litre	4	4	16.2	63.58	182
Sodium	milligrams per litre	4	4	215	246.5	265
pH	pH	4	4	5.91	6.10	6.28
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
Nitrate	milligrams per litre	4	4	0.02	0.04	0.09
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR
Manganese	milligrams per litre	4	4	0.211	0.40	0.715
Magnesium	milligrams per litre	4	4	33	37.75	42
Lead	milligrams per litre	1	1	0.019	0.019	0.019
Iron	milligrams per litre	4	4	22.4	38.33	567
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Copper	milligrams per litre	1	1	0.003	0.003	0.003
Conductivity	microsiemens per centimetre	4	4	1330	1672.5	1930
Cobalt	milligrams per litre	1	1	<LOR	NC	<LOR

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LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	299	441.5	512
Calcium	milligrams per litre	4	4	8	18.25	35
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Barium	milligrams per litre	1	1	0.238	0.238	0.238
Arsenic	milligrams per litre	1	1	0.009	0.009	0.009
Ammonia	milligrams per litre	4	4	0.43	2.02	3.6
Aluminium	milligrams per litre	1	1	4.58	4.58	4.58

Monitoring Point 5

Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	2.2	2.2	2.2
Ammonia	milligrams per litre	4	4	<LOR	NC	0.36
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.033	0.033	0.033
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Calcium	milligrams per litre	4	4	35	39.75	45
Chloride	milligrams per litre	4	4	2420	2735	2890
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	7300	8025	9200
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Iron	milligrams per litre	4	4	0.34	1.71	3.08
Lead	milligrams per litre	1	1	0.006	0.006	0.006
Magnesium	milligrams per litre	4	4	176	193.25	215
Manganese	milligrams per litre	4	4	0.453	0.51	0.55
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	<LOR	NC	0.07
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
pH	pH	4	4	5.89	6.00	6.25
Sodium	milligrams per litre	4	4	1420	1627.5	1770
Sulfate	milligrams per litre	4	4	235	572.5	1430
Total dissolved solids	milligrams per litre	1	1	4860	4860	4860
Total organic carbon	milligrams per litre	4	4	<LOR	NC	5
Zinc	milligrams per litre	1	1	0.026	0.026	0.026
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	NC	<LOR
BOD	milligrams per litre	1	1	<LOR	NC	<LOR
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	119	134	145
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	4	0.22	0.595	0.86
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Phosphate	milligrams per litre	1	1	<LOR	NC	<LOR
Potassium	milligrams per	4	4	21	25.75	29

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LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Chromium (total)	milligrams per litre	1	1	<LOR	NC	<LOR.

Discharge & Monitoring Point 6

Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.003	0.003	0.003
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	3	<LOR	NC	240
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Organochlorine pesticides	milligrams per litre	4	3	<LOR	NC	<LOR
Potassium	milligrams per litre	4	3	52	65.33	85
Phosphate	milligrams per litre	1	1	<LOR	NC	<LOR
Total suspended solids	milligrams per litre	4	3	5	14.33	19
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	3	0.24	0.313	0.4
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	3	181	237	280
BOD	milligrams per litre	1	1	7	7	7
Total Phenolics	milligrams per litre	4	3	<LOR	NC	0.57

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Zinc	milligrams per litre	1	1	0.031	0.031	0.031
Total organic carbon	milligrams per litre	4	3	26	30.33	35
Total dissolved solids	milligrams per litre	1	1	1250	1250	1250
Sulfate	milligrams per litre	4	3	17	47.53	84.6
Sodium	milligrams per litre	4	3	183	238.67	285
pH	pH	4	3	8.07	8.53	8.94
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
Nitrate	milligrams per litre	4	3	0.29	8.647	21.7
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR
Manganese	milligrams per litre	4	3	0.004	0.02	0.039
Magnesium	milligrams per litre	4	3	22	31.67	40
Lead	milligrams per litre	1	1	0.001	0.001	0.001
Iron	milligrams per litre	4	3	0.11	0.33	0.45
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Copper	milligrams per litre	1	1	0.013	0.013	0.013
Conductivity	microsiemens per centimetre	4	3	1260	1590	1980

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	1	0.005	0.005	0.005
Chloride	milligrams per litre	4	3	269	318.33	378
Calcium	milligrams per litre	4	3	28	39.67	48
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Barium	milligrams per litre	1	1	0.138	0.138	0.138
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Ammonia	milligrams per litre	4	3	0.21	0.453	0.79
Aluminium	milligrams per litre	1	1	0.69	0.69	0.69

NO sample from Site 6 on 19.5.2010 as site was dry

Discharge & Monitoring Point 7

Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	1	1	1.45	1.45	1.45
Ammonia	milligrams per litre	4	4	0.93	2.195	3.72
Arsenic	milligrams per litre	1	1	0.003	0.003	0.003
Barium	milligrams per litre	1	1	0 061	0.061	0.061
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Calcium	milligrams per litre	4	4	44	51.75	59
Chloride	milligrams per litre	4	4	126	214.75	317
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	904	1191	1410
Copper	milligrams per litre	1	1	0.007	0.007	0.007
Ethyl benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Iron	milligrams per litre	4	4	<LOR	NC	0.14
Lead	milligrams per litre	1	1	0.003	0.003	0.003
Magnesium	milligrams per litre	4	4	23	26.50	29
Manganese	milligrams per litre	4	4	0.059	0 18	0.318
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	4	0.06	0.895	1.43
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
pH	pH	4	4	7.59	7.95	8.15
Sodium	milligrams per litre	4	4	93	133	183
Sulfate	milligrams per litre	4	4	60	89.63	112
Total dissolved solids	milligrams per litre	1	1	582	582	582
Total organic carbon	milligrams per litre	4	4	12	16.5	21
Zinc	milligrams per litre	1	1	0.014	0.014	0.014
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.11
BOD	milligrams per litre	1	1	5	5	5
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	93	141.50	202
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	4	0.2	0.225	0.3
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Total suspended solids	milligrams per litre	4	4	3	12	26
Phosphate	milligrams per	1	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	4	15	19.25	26
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	4	<LOR	NC	400
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Chromium (total)	milligrams per litre	1	1	0.002	0.002	0.002

Monitoring Point 8

Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chromium (total)	milligrams per litre	1	1	0.004	0.004	0.004
Organophosphate pesticides	milligrams per litre	1	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	NC	<LOR
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NC	<LOR
Organochlorine pesticides	milligrams per litre	4	1	<LOR	NC	<LOR
Potassium	milligrams per litre	4	1	14	14	14
Phosphate	milligrams per litre	1	1	0.01	0.01	0.01
Total suspended solids	milligrams per litre	4	1	168	168	168
Toluene	milligrams per litre	1	1	<LOR	NC	<LOR
Fluoride	milligrams per litre	4	1	0.3	0.3	0.3
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NC	<LOR
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	1	57	57	57
BOD	milligrams per litre	1	1	5	5	5
Total Phenolics	milligrams per litre	4	1	<LOR	NC	<LOR

Annual Return

LAKE MACQUARIE CITY COUNCIL

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Benzene	milligrams per litre	1	1	<LOR	NC	<LOR
Zinc	milligrams per litre	1	1	0.118	0.118	0.118
Total organic carbon	milligrams per litre	4	1	11	11	11
Total dissolved solids	milligrams per litre	1	1	490	490	490
Sulfate	milligrams per litre	4	1	33	33	33
Sodium	milligrams per litre	4	1	53	53	53
pH	pH	4	1	7.19	7.19	7.19
PCBs	milligrams per litre	1	1	<LOR	NC	<LOR
Nitrate	milligrams per litre	4	1	5.75	5.75	5.75
Mercury	milligrams per litre	1	1	<LOR	NC	<LOR
Manganese	milligrams per litre	4	1	0.045	0.045	0.045
Magnesium	milligrams per litre	4	1	10	10	10
Lead	milligrams per litre	1	1	0.03	0.03	0.03
Iron	milligrams per litre	4	1	0.15	0.15	0.15
Ethyl benzene	milligrams per litre	1	1	1	1	1
Copper	milligrams per litre	1	1	0.17	0.17	0.17
Conductivity	microsiemens per centimetre	4	1	523	523	523

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Chloride	milligrams per litre	4	1	87	87	87
Calcium	milligrams per litre	4	1	19	19	19
Cadmium	milligrams per litre	1	1	<LOR	NC	<LOR
Barium	milligrams per litre	1	1	0.083	0.083	0.083
Arsenic	milligrams per litre	1	1	0.004	0.004	0.004
Ammonia	milligrams per litre	4	1	0.96	0.96	0.96
Aluminium	milligrams per litre	1	1	5.2	5.2	5.2

Samples not collected on 11.2.2010, 19.5.2010 and 7.7.2010 due to site being dry

Monitoring Point 9

Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Aluminium	milligrams per litre	4	0	–	–	–
Ammonia	milligrams per litre	4	0	–	–	–
Arsenic	milligrams per litre	1	0	–	–	–
Barium	milligrams per litre	1	0	–	–	–
Cadmium	milligrams per litre	1	0	–	–	–
Calcium	milligrams per litre	4	0	–	–	–
Chloride	milligrams per litre	4	0	–	–	–
Cobalt	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	0	–	–	–
Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Iron	milligrams per litre	4	0	–	–	–
Lead	milligrams per litre	1	0	–	–	–
Magnesium	milligrams per litre	4	0	–	–	–
Manganese	milligrams per litre	4	0	–	–	–
Mercury	milligrams per litre	1	0	–	–	–

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Nitrate	milligrams per litre	4	0	–	–	–
PCBs	milligrams per litre	1	0	–	–	–
pH	pH	4	0	–	–	–
Sodium	milligrams per litre	4	0	–	–	–
Sulfate	milligrams per litre	4	0	–	–	–
Total dissolved solids	milligrams per litre	1	0	–	–	–
Total organic carbon	milligrams per litre	4	0	–	–	–
Zinc	milligrams per litre	1	0	–	–	–
Benzene	milligrams per litre	1	0	–	–	–
Total Phenolics	milligrams per litre	4	0	–	–	–
BOD	milligrams per litre	1	0	–	–	–
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	0	–	–	–
Toluene	milligrams per litre	1	0	–	–	–
Total suspended solids	milligrams per litre	4	0	–	–	–
Phosphate	milligrams per	1	0	–	–	–

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
	litre					
Potassium	milligrams per litre	4	0	-	-	-
Organochlorine pesticides	milligrams per litre	4	0	-	-	-
Chlorinated volatile compounds	milligrams per litre	1	0	-	-	-
Total petroleum hydrocarbons	milligrams per litre	1	0	-	-	-
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	-	-	-
Organophosphate pesticides	milligrams per litre	1	0	-	-	-
Chromium (total)	milligrams per litre	1	0	-	-	-

No samples were collected in 2010 at Site 9 as Site was dry.

Monitoring Point 10

Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Total petroleum hydrocarbons	milligrams per litre	4	4	1420	5070	6960
Organochlorine pesticides	milligrams per litre	4	4	<LOR	NC	<LOR
Potassium	milligrams per litre	4	4	418	477.75	588
Total suspended solids	milligrams per litre	4	4	<LOR	NC	54
Fluoride	milligrams per litre	4	4	0.42	0.97	2.04
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	2680	4015	4850
BOD	milligrams per litre	4	4	44	61.25	83
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.11
Total organic carbon	milligrams per litre	4	4	29	290.75	459
Sulfate	milligrams per litre	4	4	<LOR	NC	16.8
Sodium	milligrams per litre	4	4	963	1165.75	1460
pH	pH	4	4	7.44	7.85	8.56
Nitrate	milligrams per litre	4	4	<LOR	NC	0.06
Manganese	milligrams per litre	4	4	0.015	0.53	0.836
Magnesium	milligrams per litre	4	4	96	157.75	192
Iron	milligrams per litre	4	4	0.14	3.34	5.43

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Chloride	milligrams per litre	4	4	1330	1670	1950
Calcium	milligrams per litre	4	4	110	160	179
Ammonia	milligrams per litre	4	4	460	545.25	782

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M6 and R1), complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by licence conditions M6 and R1, **no tables** will appear below.

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

C Statement of Compliance – Licence Conditions

C1 Compliance with Licence Conditions

(✓ the boxes)

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

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 registration 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 E of this Annual Return

2

E 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 and D 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:

For the reporting period 13-Oct-2009 to 12-Oct-2010 **or** ____/____/____ to ____/____/____

SIGNATURE: Brian Bell

NAME: (printed) BRIAN BELL

POSITION: GENERAL MANAGER

DATE: 24 / 11 / 2010

SIGNATURE: _____

NAME: (printed) _____

POSITION: _____

DATE: ____/____/____

SEAL(if signing under seal)

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

APPENDIX A

Licence condition number not complied with:

Condition M2.1 monitoring concentrations of pollutants.

Summary of particulars of non compliance.

Some water samples were unable to be collected due to insufficient volume being available in the water course. Sample locations are detailed in the licence 5873. Locations 1-5 are groundwater sites. Locations 6-9 are surface water sample locations.

Dates when the non compliance occurred:

Table 1.

Site	Date
1.	11/02/2010, 19/05/2010, 7/07/2010, 6/10/2010
6.	19/05/2010.
8.	11/02/2010, 19/05/2010, 7/07/2010.
9.	11/02/2010, 19/05/2010, 7/07/2010, 6/10/2010

Cause of non compliance.

No sample volume available.

Action taken to mitigate the effects of the non compliance.

The non-compliance will have no adverse effect. Samples to be taken during periods of rain.

Action taken to prevent a recurrence of the non compliance.

The non compliance is unavoidable due to reliance on rainfall for sufficient samples to be taken.

Brian Bell

GENERAL MANAGER.

APPENDIX B.

Condition 011.2 Compaction rates for waste.

According to condition 011.2 of Licence 5873, the Licensee must ensure that the achieved compaction rate of land filled waste (excluding cover material) stated in the Annual Return for the waste premises submitted to the EPA.

Table 2.

Total waste landfilled	97,333 tonnes
Change in void space.	105,112.7m3
Compaction rate.	97,333 ÷ 105,112.7 m3 = **0.91tonnes/m3**

Brian Beel

GENERAL MANAGER.

NSW GOVERNMENT | Office of Environment & Heritage

Our Reference: Licence No. 5873

LAKE MACQUARIE CITY COUNCIL

PO BOX 1906

HUNTER REGION MAIL CENTRE NSW 2310

RECEIVED
18 OCT 2011
LAKE MACQUARIE CITY COUNCIL

13-Oct-2011

LICENCE ANNIVERSARY NOTICE

I refer to Environment Protection Licence No. 5873, issued to LAKE MACQUARIE CITY COUNCIL by the Environment Protection Authority (EPA), under the *Protection of the Environment Operations Act 1997*.

This letter is to remind you of the annual licensing obligations, in particular the requirement to submit an Annual Return and annual licence fees.

Please find attached a customised Annual Return form that covers the period 13-Oct-2010 to 12-Oct-2011. The Annual Return is a declaration where you advise the EPA whether you complied or did not comply with the requirements of your licence. Where monitoring is required by your licence, you must enter a summary of the results in the Annual Return, using the table(s) provided. Please refer to http://www.environment.nsw.gov.au/licensing for guidance on completing annual returns.

The completed Annual Return must be submitted to the EPA by 12-Dec-2011

If an Annual Licence Tax Invoice/Statement indicating the licence administrative fee is attached, please note that this fee must be submitted to the EPA by 12-Dec-2011. The licence administrative fee is based on the highest applicable administrative fee relevant to your Activity Type(s) minus any relevant credits that may be in your account. If your activity type or scale has changed you must apply for a variation of your licence using the form located at http://www.environment.nsw.gov.au/licensing/licenceforms.htm.

If the activities authorised by the licence are subject to Load-Based Licensing (LBL), payment of a load-based fee may also be required. Section A in the Annual Return will indicate whether the licensed activities have assessable pollutants. If this is the case, LBL applies to the licence. The load-based fees are calculated using the worksheets found in section D of the Annual Return. We do not need to see the load calculation workings, only the final load figures. However, you are required to keep records of the load calculations for auditing by the EPA.

If your licence is subject to load-based licence fees, there is an LBL Load Calculation Protocol that sets out the methods that may be used to calculate your emissions of assessable pollutants. The LBL Load Calculation Protocol is located at http://www.environment.nsw.gov.au/licensing/lblprotocol/index.htm.

PO Box A290 Sydney South NSSW 1232
59-61 Goulburn St Sydney NSW 2000
Telphone (02) 9995 5700
Facsimile (02) 9995 5922
ABN 30 841 387 2711232
www.environment.nsw.gov.au

NSW GOVERNMENT | Office of Environment & Heritage

It is important to note that the load based fee must not be paid at this time. A separate invoice for the load based fee will be issued once the EPA receives the Annual Return and load data. This load based fee must be submitted to the EPA **90 days after 12-Oct-2011.**

You are reminded that it is a condition of Licence No. 5873 that the Annual Return is submitted by the due date. It is an offence to:

- fail to complete the Annual Return;
- fail to return the Annual Return by the due date;
- provide false or misleading information in the Annual Return; or
- fail to provide monitoring data if required by a condition of your licence.

Failure to return your Annual Return by 12-Dec-2011 may result in the issue of a Penalty Notice with a penalty payable of $750 (individual) or $1500 (corporation), or prosecution.

If the licence fee is not paid by 12-Dec-2011, a penalty will be imposed in accordance with section 57 (4) of the *Protection of the Environment Operations Act 1997.* The penalty is 5% of the outstanding amount and will continue to accrue at the rate of 5% simple interest every two weeks until the outstanding amount and penalty is paid in full. In accordance with section 79 of the *Protection of the Environment Operations Act 1997* the EPA may suspend or revoke the licence if the outstanding licence fee is not paid in full by the due date.

The Annual Return and fees must be sent to the following address:

Regulatory and Compliance Support Unit
Office of Environment and Heritage
PO Box A290
SYDNEY SOUTH NSW 1232

We are committed to assisting the licensed community to meet its obligations under the *Protection of the Environment Operations Act 1997.* If you have any questions relating to payment and calculation of fees or the submission of the Annual Return, please contact the Office of Environment and Heritage on 02 9995 5700.

Yours sincerely

CHRISTOPHER KELLY
Head Regulatory and Compliance Support Unit
Environment Protection and Regulation Group
Office of Environment and Heritage (NSW)

Please note that the Office of Environment and Heritage exercises certain statutory functions and powers in the name of the Environment Protection Authority (EPA).

TAX INVOICE / STATEMENT

The fees on this statement are exempt from GST by the Treasurer's determination under Division 81 of A New Tax System Act, 1999

NSW GOVERNMENT | Environment, Climate Change & Water

(incorporating Environment Protection Authority)

ABN 43 692 285 758

For all invoice/statement enquiries phone (02) 9995 5700

LAKE MACQUARIE CITY COUNCIL
PO BOX 1906
HUNTER REGION MAIL CENTRE NSW 2310

Statement Date

13.10.2011

Customer No: 300189 **Licence/Notice No:** 5873

Description	Date	Reference No.	Debit	Credit	Balance	Due Date
Carried Forward			0.00		0.00	
Admin Fee (Anniv)	13.10.2010	0390047883	3,456.00		3,456.00	12.12.2010
ISEMS-Direct Deposit LK	12.11.2010	0399636597		3,456.00	0.00	
Admin Fee (Anniv)	13.10.2011	0390100769	3,520.00		3,520.00	12.12.2011

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Total Amount Owing **$ 3,520.00**

Remittance Advice

Customer
LAKE MACQUARIE CITY COUNCIL

Customer Number
300189

Licence/Notice No.
5873

Page 1 of 2

Total Amount Owing **$ 3,520.00**

The fees on this statement are exempt from GST by the Treasurer's determination under Division 81 of A New Tax System Act, 1999.

PAYMENT METHODS ARE LISTED ON THE LAST PAGE OF THIS INVOICE

Cheque or Money Order

If making payment by cheque or money order, please make cheques payable to the **Environment Protection Authority** and post your payment, with the **Remittance Advice**, to:

Regulatory and Compliance Support Unit
Department of Environment, Climate Change and Water
PO Box A290
SYDNEY SOUTH NSW 1232

Electronic Funds Transfer (EFT)

Payments made by EFT must be deposited to the following account:

Bank:	**Westpac Banking Corporation**
Account Name:	**EPA Remit Account**
BSB:	**032 001**
Account No:	**205 469**

If you make payment(s) by EFT you **MUST** provide the following details to the Department on the day that payment is made, either by

Fax	(02) 9995 5922
Email	poeo.licensing@environment.nsw.gov.au
Licence Holder:	LAKE MACQUARIE CITY COUNCIL
Licence/Notice No:	5873
Customer No:	300189
Amount Paid:	_____
Date of Payment:	_____
Contact Person:	_____
Telephone No:	_____

PLEASE NOTE

If you do not submit this information when payment is made, the payment will not be receipted to your account and PENALTY INTEREST may accrue.

The Department of Environment, Climate Change and Water DOES NOT accept payment of Environment Protection Licence fees by credit card.

FOR ALL INVOICE/STATEMENT ENQUIRIES PHONE (02) 9995 5700

Annual Return

LAKE MACQUARIE CITY COUNCIL

NSW GOVERNMENT | Office of Environment & Heritage

ANNUAL RETURN

LICENCE NO	**5873**
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2010 to 12-Oct-2011

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

REVISED REPORTING PERIOD ____ / ____ / ____ **to** ____ / ____ / ____

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2011

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

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

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

OR

- **prosecution.**

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

Regulatory and Compliance Support Unit
Office of Environment and Heritage
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.

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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:	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
Office of Environment and Heritage
PO Box A290
SYDNEY SOUTH NSW 1232

Annual Return

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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.environment.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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	AWABA WASTE DISPOSAL FACILITY
Premises	367 WILTON ROAD AWABA NSW 2283

A3 Activities to which Licence Applies

Composting
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
Composting	> 5,000.00 - 50,000.00	T of organics received
Waste disposal by application to land		annual capacity

A6 Assessable Pollutants (Not Applicable)

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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).

Monitoring Point 1

Groundwater quality monitoring, Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	1	2	2	2

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Aluminium	milligrams per litre	1	0	–	–	–
Ammonia	milligrams per litre	4	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	0	–	–	–
Barium	milligrams per litre	1	0	–	–	–
Benzene	milligrams per litre	1	0	–	–	–
BOD	milligrams per litre	1	0	–	–	–
Cadmium	milligrams per litre	1	0	–	–	–
Calcium	milligrams per litre	4	1	2	2	2
Chloride	milligrams per litre	4	1	38	38	38
Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Chromium (total)	milligrams per litre	1	0	–	–	–
Cobalt	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	1	191	191	191
Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–

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Fluoride	milligrams per litre	4	1	0.1	0.1	0.1
Iron	milligrams per litre	4	1	0.24	0.24	0.24
Lead	milligrams per litre	1	0	-	-	-
Magnesium	milligrams per litre	4	1	4	4	4
Manganese	milligrams per litre	4	1	0.041	0.041	0.041
Mercury	milligrams per litre	1	0	-	-	-
Nitrate	milligrams per litre	4	1	0.22	0.22	0.22
Organochlorine pesticides	milligrams per litre	4	1	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	0	-	-	-
PCBs	milligrams per litre	1	0	-	-	-
pH	pH	4	1	5.42	5.42	5.42
Phosphate	milligrams per litre	1	0	-	-	-
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	-	-	-
Potassium	milligrams per litre	4	1	2	2	2
Sodium	milligrams per litre	4	1	22	22	22
Sulfate	milligrams per litre	4	1	15	15	15

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Toluene	milligrams per litre	1	0	-	-	-
Total dissolved solids	milligrams per litre	1	0	-	-	-
Total organic carbon	milligrams per litre	4	1	9	9	9
Total petroleum hydrocarbons	milligrams per litre	1	0	-	-	-
Total Phenolics	milligrams per litre	4	1	<LOR	<LOR	<LOR
Zinc	milligrams per litre	1	0	-	-	-

No samples collected on 9 December 2010, 23 March 2011 and 28 September 2011 due to site being dry.

Monitoring Point 2

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	14	30.25	56
Aluminium	milligrams per litre	1	1	15.6	15.6	15.6
Ammonia	milligrams per litre	4	4	0.06	0.09	0.1
Arsenic	milligrams per litre	1	1	0.015	0.015	0.015
Barium	milligrams per litre	1	1	0.0123	0.0123	0.0123
Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	<LOR	<LOR	<LOR

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Cadmium	milligrams per litre	1	1	<LOR	<LOR	<LOR
Calcium	milligrams per litre	4	4	7	20.75	33
Chloride	milligrams per litre	4	4	849	2084.75	3120
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (total)	milligrams per litre	1	1	0.014	0.014	0.014
Cobalt	milligrams per litre	1	1	0.034	0.034	0.034
Conductivity	microsiemens per centimetre	4	4	3060	66350	9590
Copper	milligrams per litre	1	1	0.011	0.011	0.011
Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	0.3	0.58	0.8
Iron	milligrams per litre	4	4	<LOR	NC	0.66
Lead	milligrams per litre	1	1	0.021	0.021	0.021
Magnesium	milligrams per litre	4	4	46	133.75	208
Manganese	milligrams per litre	4	4	0.171	0.53	0.825
Mercury	milligrams per litre	1	1	<LOR	<LOR	<LOR

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Nitrate	milligrams per litre	4	4	<LOR	NC	0.09
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR
PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	5.02	5.32	5.86
Phosphate	milligrams per litre	1	1	<LOR	<LOR	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Potassium	milligrams per litre	4	4	7	18.5	28
Sodium	milligrams per litre	4	4	614	1238.5	1720
Sulfate	milligrams per litre	4	4	206	262.25	323
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	4540	4540	4540
Total organic carbon	milligrams per litre	4	4	6	10	20
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.06
Zinc	milligrams per litre	1	1	0.13	0.13	0.13

NC = Non calculable

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Monitoring Point 3

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	510	601.75	702
Aluminium	milligrams per litre	1	1	7.41	7.41	7.41
Ammonia	milligrams per litre	4	4	15.6	52.43	78.3
Arsenic	milligrams per litre	1	1	0.011	0.011	0.011
Barium	milligrams per litre	1	1	1.27	1.27	1.27
Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	<LOR	<LOR	<LOR
Cadmium	milligrams per litre	1	1	<LOR	<LOR	<LOR
Calcium	milligrams per litre	4	4	21	29	38
Chloride	milligrams per litre	4	4	687	877.25	1120
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
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

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Conductivity	microsiemens per centimetre	4	4	2810	3685	4460
Copper	milligrams per litre	1	1	0.012	0.012	0.012
Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	0.2	0.23	0.3
Iron	milligrams per litre	4	4	28.1	64.03	119
Lead	milligrams per litre	1	1	0.044	0.044	0044
Magnesium	milligrams per litre	4	4	70	82	90
Manganese	milligrams per litre	4	4	0.584	1.16	1.9
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	4	4	0.02	0.03	0.04
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR
PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	6.37	6.49	6.60
Phosphate	milligrams per litre	1	1	<LOR	<LOR	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR

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Potassium	milligrams per litre	4	4	24	52.5	82
Sodium	milligrams per litre	4	4	448	541.25	608
Sulfate	milligrams per litre	4	4	<LOR	NC	9
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	2390	2390	2390
Total organic carbon	milligrams per litre	4	4	59	74.25	101
Total petroleum hydrocarbons	milligrams per litre	1	1	0.5	0.5	0.5
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.21
Zinc	milligrams per litre	1	1	0.023	0.023	0.023

NC = Non calculable

Monitoring Point 4

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	6	101.5	165
Aluminium	milligrams per litre	1	1	11.8	11.8	11.8
Ammonia	milligrams per litre	4	4	2.03	2.94	3.72
Arsenic	milligrams per litre	1	1	0.008	0.008	0.008

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Barium	milligrams per litre	1	1	0.33	0.33	0.33
Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	<LOR	<LOR	<LOR
Cadmium	milligrams per litre	1	1	<LOR	<LOR	<LOR
Calcium	milligrams per litre	4	4	6	17.75	24
Chloride	milligrams per litre	4	4	386	547.00	658
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (total)	milligrams per litre	1	1	0.011	0.011	0.011
Cobalt	milligrams per litre	1	1	<LOR	<LOR	<LOR
Conductivity	microsiemens per centimetre	4	4	1530	1762.5	1910
Copper	milligrams per litre	1	1	0.005	0.005	0.005
Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	<LOR	NC	0.1
Iron	milligrams per litre	4	4	30	61.10	90.8
Lead	milligrams per litre	1	1	0.033	0.033	0.033

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Magnesium	milligrams per litre	4	4	33	40.5	44
Manganese	milligrams per litre	4	4	0.159	0.43	0.656
Mercury	milligrams per litre	1	1	<LOR	<LOR	<LOR
Nitrate	milligrams per litre	4	4	<LOR	NC	0.05
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR
PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	5.97	6.14	6.26
Phosphate	milligrams per litre	1	1	<LOR	<LOR	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Potassium	milligrams per litre	4	4	6	8	9
Sodium	milligrams per litre	4	4	208	255.75	291
Sulfate	milligrams per litre	4	4	<LOR	NC	44
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	1310	1310	1310
Total organic carbon	milligrams per litre	4	4	15	21	33

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Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	<LOR	<LOR
Zinc	milligrams per litre	1	1	0.015	0.015	0.015

Monitoring Point 5

Groundwater quality monitoring, Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	124	131	143
Aluminium	milligrams per litre	1	1	2.12	2.12	2.12
Ammonia	milligrams per litre	4	4	<LOR	NC	0.61
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.03	0.03	003
Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	<LOR	<LOR	<LOR
Cadmium	milligrams per litre	1	1	<LOR	<LOR	<LOR
Calcium	milligrams per litre	4	4	28	35	39
Chloride	milligrams per litre	4	4	1970	2292.5	2670

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Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (total)	milligrams per litre	1	1	0004	0.004	0.004
Cobalt	milligrams per litre	1	1	<LOR	<LOR	<LOR
Conductivity	microsiemens per centimetre	4	4	6660	76425	8360
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	0.6	0.65	0.7
Iron	milligrams per litre	4	4	0.64	5.16	11.5
Lead	milligrams per litre	1	1	0.003	0.003	0.003
Magnesium	milligrams per litre	4	4	153	17925	196
Manganese	milligrams per litre	4	4	0.372	0.44	0.476
Mercury	milligrams per litre	1	1	<LOR	<LOR	<LOR
Nitrate	milligrams per litre	4	4	<LOR	NC	0.04
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR

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PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	5.79	5.86	5.93
Phosphate	milligrams per litre	1	1	<LOR	<LOR	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Potassium	milligrams per litre	4	4	19	21.5	27
Sodium	milligrams per litre	4	4	1210	1352.5	1510
Sulfate	milligrams per litre	4	4	194	217.75	245
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	3970	3970	3970
Total organic carbon	milligrams per litre	4	4	5	9.25	15
Total petroleum hydrocarbons	milligrams per litre	1	1	0.1	0.1	0.1
Total Phenolics	milligrams per litre	4	4	<LOR	<LOR	<LOR
Zinc	milligrams per litre	1	1	0.022	0022	0.022

Discharge & Monitoring Point 6

Wet weather discharge
Surface water quality monitoring, Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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

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Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	229	308	361
Aluminium	milligrams per litre	1	1	0·34	0·34	0·34
Ammonia	milligrams per litre	4	4	0·16	4·15	10·6
Arsenic	milligrams per litre	1	1	0·005	0·005	0·005
Barium	milligrams per litre	1	1	0·146	0·146	0·146
Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	21	21	21
Cadmium	milligrams per litre	1	1	0·0001	0·0001	0·0001
Calcium	milligrams per litre	4	4	27	44·5	59
Chloride	milligrams per litre	4	4	167	511·75	951
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (total)	milligrams per litre	1	1	0·011	0·011	0·011
Cobalt	milligrams per litre	1	1	0·006	0·006	0·006
Conductivity	microsiemens per centimetre	4	4	1050	2217·5	3580
Copper	milligrams per litre	1	1	0·016	0·016	0·016

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Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	0.3	0.38	0.5
Iron	milligrams per litre	4	4	0.12	0.30	0.49
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	17	37.5	55
Manganese	milligrams per litre	4	4	0.006	0.02	0.033
Mercury	milligrams per litre	1	1	<LOR	<LOR	<LOR
Nitrate	milligrams per litre	4	4	1.33	25.44	69.3
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR
PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	7.91	8.25	8.87
Phosphate	milligrams per litre	1	1	0.01	0.01	0.01
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Potassium	milligrams per litre	4	4	40	106.75	188
Sodium	milligrams per litre	4	4	136	342.5	587

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Sulfate	milligrams per litre	4	4	32	41.5	56
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	1540	1540	1540
Total organic carbon	milligrams per litre	4	4	32	59.25	102
Total petroleum hydrocarbons	milligrams per litre	4	4	<LOR	NC	210
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.25
Total suspended solids	milligrams per litre	4	4	8	33.25	70
Zinc	milligrams per litre	1	1	0.048	0.048	0.048

Discharge & Monitoring Point 7

Wet weather discharge
Surface water quality monitoring, Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	4	193	331	585
Aluminium	milligrams per litre	1	1	1.76	1.76	1.76
Ammonia	milligrams per litre	4	4	1.94	12.81	26.3
Arsenic	milligrams per litre	1	1	0.01	0.01	001
Barium	milligrams per litre	1	1	0.098	0.098	0.098

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Benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
BOD	milligrams per litre	1	1	9	9	9
Cadmium	milligrams per litre	1	1	<LOR	<LOR	<LOR
Calcium	milligrams per litre	4	4	30	53.25	84
Chloride	milligrams per litre	4	4	123	164.25	215
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (total)	milligrams per litre	1	1	0007	0.007	0.007
Cobalt	milligrams per litre	1	1	0.004	0.004	0.004
Conductivity	microsiemens per centimetre	4	4	791	1219.75	1800
Copper	milligrams per litre	1	1	0011	0.011	0.011
Ethyl benzene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Fluoride	milligrams per litre	4	4	0.3	0.33	0.4
Iron	milligrams per litre	4	4	<LOR	NC	0.33
Lead	milligrams per litre	1	1	0012	0.012	0.012
Magnesium	milligrams per litre	4	4	20	31	50

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Manganese	milligrams per litre	4	4	0.005	0.38	0.96
Mercury	milligrams per litre	1	1	<LOR	<LOR	<LOR
Nitrate	milligrams per litre	4	4	002	0.37	0.99
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	<LOR	<LOR
PCBs	milligrams per litre	1	1	<LOR	<LOR	<LOR
pH	pH	4	4	7.89	8.15	8.63
Phosphate	milligrams per litre	1	1	<LOR	<LOR	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Potassium	milligrams per litre	4	4	20	33.75	46
Sodium	milligrams per litre	4	4	97	133	192
Sulfate	milligrams per litre	4	4	38	52.5	72
Toluene	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total dissolved solids	milligrams per litre	1	1	772	772	772
Total organic carbon	milligrams per litre	4	4	23	42.5	86
Total petroleum hydrocarbons	milligrams per litre	1	4	<LOR	NC	1.810

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Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.28
Total suspended solids	milligrams per litre	4	4	35	585	2090
Zinc	milligrams per litre	1	1	0.049	0.049	0.049

Monitoring Point 8

Surface water quality monitoring, Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	1	1	71	71	71
Aluminium	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	1	1.31	1.31	1.31
Arsenic	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Benzene	milligrams per litre	1	0	—	—	—
BOD	milligrams per litre	1	0	—	—	—
Cadmium	milligrams per litre	1	0	—	—	—
Calcium	milligrams per litre	4	1	9	9	9
Chloride	milligrams per litre	4	1	73	73	73

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Chlorinated volatile compounds	milligrams per litre	1	0	–	–	–
Chromium (hexavalent)	milligrams per litre	1	0	–	–	–
Chromium (total)	milligrams per litre	1	0	–	–	–
Cobalt	milligrams per litre	1	0	–	–	–
Conductivity	microsiemens per centimetre	4	1	441	441	441
Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	1	0·1	0·1	0·1
Iron	milligrams per litre	4	1	0·54	0·54	0·54
Lead	milligrams per litre	1	0	–	–	–
Magnesium	milligrams per litre	1	0	8	8	8
Manganese	milligrams per litre	4	1	0·011	0·011	0·011
Mercury	milligrams per litre	1	0	–	–	–
Nitrate	milligrams per litre	4	1	0·39	0·39	0·39
Organochlorine pesticides	milligrams per litre	4	1	LOR	LOR	LOR
Organophosphate pesticides	milligrams per litre	1	0	–	–	–

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PCBs	milligrams per litre	1	0	—	—	—
pH	pH	4	1	7.53	7.53	7.53
Phosphate	milligrams per litre	1	0	—	—	—
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	—	—	—
Potassium	milligrams per litre	4	1	13	13	13
Sodium	milligrams per litre	4	1	54	54	54
Sulfate	milligrams per litre	4	1	20	20	20
Toluene	milligrams per litre	1	0	—	—	—
Total dissolved solids	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	1	20	20	20
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	<LOR	<LOR
Total Phenolics	milligrams per litre	4	1	<LOR	<LOR	<LOR
Total suspended solids	milligrams per litre	1	1	10	10	10
Zinc	milligrams per litre	1	0	—	—	—

No samples collected on 9 December 2010, 23 March 2011 and 28 September 2011 due to site being dr

Monitoring Point 9

Surface water quality monitoring, Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams of calcium carbonate per litre	4	0	-	-	-
Aluminium	milligrams per litre	1	0	-	-	-
Ammonia	milligrams per litre	4	0	-	-	-
Arsenic	milligrams per litre	1	0	-	-	-
Barium	milligrams per litre	1	0	-	-	-
Benzene	milligrams per litre	1	0	-	-	-
BOD	milligrams per litre	1	0	-	-	-
Cadmium	milligrams per litre	1	0	-	-	-
Calcium	milligrams per litre	4	0	-	-	-
Chloride	milligrams per litre	4	0	-	-	-
Chlorinated volatile compounds	milligrams per litre	1	0	-	-	-
Chromium (hexavalent)	milligrams per litre	1	0	-	-	-
Chromium (total)	milligrams per litre	1	0	-	-	-
Cobalt	milligrams per litre	1	0	-	-	-
Conductivity	microsiemens per centimetre	4	0	-	-	-

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Copper	milligrams per litre	1	0	–	–	–
Ethyl benzene	milligrams per litre	1	0	–	–	–
Fluoride	milligrams per litre	4	0	–	–	–
Iron	milligrams per litre	4	0	–	–	–
Lead	milligrams per litre	1	0	–	–	–
Magnesium	milligrams per litre	4	0	–	–	–
Manganese	milligrams per litre	4	0	–	–	–
Mercury	milligrams per litre	1	0	–	–	–
Nitrate	milligrams per litre	4	0	–	–	–
Organochlorine pesticides	milligrams per litre	4	0	–	–	–
Organophosphate pesticides	milligrams per litre	1	0	–	–	–
PCBs	milligrams per litre	1	0	–	–	–
pH	pH	4	0	–	–	–
Phosphate	milligrams per litre	1	0	–	–	–
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	–	–	–
Potassium	milligrams per litre	4	0	–	–	–

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Sodium	milligrams per litre	4	0	-	-	-
Sulfate	milligrams per litre	4	0	-	-	-
Toluene	milligrams per litre	1	0	-	-	-
Total dissolved solids	milligrams per litre	1	0	-	-	-
Total organic carbon	milligrams per litre	4	0	-	-	-
Total petroleum hydrocarbons	milligrams per litre	1	0	-	-	-
Total Phenolics	milligrams per litre	4	0	-	-	-
Total suspended solids	milligrams per litre	1	0	-	-	-
Zinc	milligrams per litre	1	0	-	-	-

No samples collected in 2011 due to site being dry

Monitoring Point 10

Leachate quality monitoring, Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

Pollutant	Unit of measure	No. of samples required by	No. of samples you collected and	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	2990	4280	5750
Ammonia	milligrams per litre	4	4	429	764.5	1160
BOD	milligrams per litre	4	4	103	161.25	199
Calcium	milligrams per litre	4	4	116	128.75	142

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Chloride	milligrams per litre	4	4	1500	1785	2320
Fluoride	milligrams per litre	4	4	0.6	073	0.9
Iron	milligrams per litre	4	4	1.46	395	5.36
Magnesium	milligrams per litre	4	4	100	137.75	192
Manganese	milligrams per litre	4	4	0.192	0.50	0.657
Nitrate	milligrams per litre	4	4	<LOR	NC	0.05
Organochlorine pesticides	milligrams per litre	4	4	<LOR	<LOR	<LOR
pH	pH	4	4	7.5	7.83	8.2
Potassium	milligrams per litre	4	4	440	572.25	771
Sodium	milligrams per litre	4	4	984	1166	1470
Sulfate	milligrams per litre	4	4	<LOR	NC	4
Total organic carbon	milligrams per litre	4	4	4	240.25	517
Total petroleum hydrocarbons	milligrams per litre	4	4	1.660	9.00	12.9
Total Phenolics	milligrams per litre	4	4	<LOR	NC	0.2
Total suspended solids	milligrams per litre	4	4	29	81.25	224

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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).

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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 registration 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 E of this Annual Return

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C2 Details of Non-Compliance with Licence

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

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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 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 and D 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 13-Oct-2010 to 12-Oct-2011 or ____/____/____ to ____/____/____

SIGNATURE:_____ SIGNATURE:_____

NAME:
(printed)_____ NAME:
(printed)_____

POSITION:_____ POSITION:_____

DATE:_____/_____/_____ 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

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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	5873
Licence Holder	LAKE MACQUARIE CITY COUNCIL
Trading Name *(if applicable)*	
ABN	81 065 027 868

A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	AWABA WASTE DISPOSAL FACILITY
Premises	367 WILTON ROAD AWABA NSW 2283

A3 Activities to which Licence Applies

Composting
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
Composting	> 5,000.00 - 50,000.00	T of organics received
Waste disposal by application to land		annual capacity

A6 Assessable Pollutants (Not Applicable)

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LICENCE NO	**5873**
LICENCE HOLDER	LAKE MACQUARIE CITY COUNCIL
REPORTING PERIOD	13-Oct-2011 to 12-Oct-2012

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

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

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 12-Dec-2012

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

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

- **the issue of a Penalty Notice for $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.*

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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:	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

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	NIL
Water	NIL
Noise	NIL
Waste	NIL
Other - Odour	31

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).

Monitoring Point 1

Groundwater quality monitoring, Groundwater quality monitoring bore located north of landfill cell 1 labelled as 'Site 1' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	2	<LOR	N/C	<LOR

Aluminium	milligrams per litre	1	1	0·13	0·13	0·13
Ammonia	milligrams per litre	4	2	0·05	0·11	0·17
Arsenic	milligrams per litre	1	1	<LOR	NIL	<LOR
Barium	milligrams per litre	1	1	0·164	0·164	0·164
Benzene	milligrams per litre	1	1	<LOR	NIL	<LOR
BOD	milligrams per litre	1	1	<LOR	NIL	<LOR
Cadmium	milligrams per litre	1	1	0·001	0·001	0·001
Calcium	milligrams per litre	4	2	15	16·50	18
Chloride	milligrams per litre	4	2	375	409·5	444
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	<LOR	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NIL	<LOR
Chromium (total)	milligrams per litre	1	1	<LOR	NIL	<LOR
Cobalt	milligrams per litre	1	1	0·034	0·034	0·034
Conductivity	microsiemens per centimetre	4	2	1290	1370	1450
Copper	milligrams per litre	1	1	0·007	0·007	0·007
Ethyl benzene	milligrams per litre	1	1	<LOR	NIL	<LOR

Fluoride	milligrams per litre	4	2	0.30	0.30	0.30
Iron (Dissolved)	milligrams per litre	4	1	<LOR	N/C	<LOR
Lead	milligrams per litre	1	1	0.021	0.021	0.021
Magnesium	milligrams per litre	4	2	41	44.50	48
Manganese (DISSOLVED)	milligrams per litre	4	1	2.83	2.83	2.83
Mercury	milligrams per litre	1	1	<LOR	N/C	<LOR
Nitrate	milligrams per litre	4	2	0.03	0.07	0.11
Organochlorine pesticides	milligrams per litre	4	2	<LOR	N/C	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	2	6.24	6.30	6.35
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	2	12	12	12
Sodium	milligrams per litre	4	2	168	183.50	199
Sulfate	milligrams per litre	4	2	26	30.50	35

Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR
Total dissolved solids	milligrams per litre	1	1	616	616	616
Total organic carbon	milligrams per litre	4	2	<LOR	N/C	2
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	2	<LOR	N/C	<LOR
Zinc	milligrams per litre	1	1	0.123	0.123	0.123

Monitoring Point 2

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 2' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	4	<LOR	N/C	<LOR
Aluminium	milligrams per litre	1	1	33.10	33.10	33.10
Ammonia	milligrams per litre	4	4	<LOR	N/C	0.17
Arsenic	milligrams per litre	1	1	0.032	0.032	0.032
Barium	milligrams per litre	1	1	0.09	0.09	0.09
Benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
BOD	milligrams per litre	1	1	<LOR	N/C	<LOR

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Cadmium	milligrams per litre	1	1	<LOR	NIL	<LOR
Calcium	milligrams per litre	4	4	21	24.75	29
Chloride	milligrams per litre	4	4	2410	2707.50	3220
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	NIL	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	NIL	<LOR
Chromium (total)	milligrams per litre	1	1	0.024	0.024	0.024
Cobalt	milligrams per litre	1	1	0.063	0.063	0.063
Conductivity	microsiemens per centimetre	4	4	7190	7865	9030
Copper	milligrams per litre	1	1	0.015	0.015	0.015
Ethyl benzene	milligrams per litre	1	1	<LOR	NIL	<LOR
Fluoride	milligrams per litre	4	4	0.8	0.95	1.2
Iron	milligrams per litre	4	3	<LOR	NIL	<LOR
Lead	milligrams per litre	1	1	0.028	0.028	0.028
Magnesium	milligrams per litre	4	4	146	170.50	206
Manganese	milligrams per litre	4	3	0.661	0.690	0.718
Mercury	milligrams per litre	1	1	<LOR	NIL	<LOR

Nitrate	milligrams per litre	4	4	0.02	0.038	0.06
Organochlorine pesticides	milligrams per litre	4	4	<LOR	N/C	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	4	5.44	5.59	5.71
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	4	21	23	26
Sodium	milligrams per litre	4	4	1250	1410	1640
Sulfate	milligrams per litre	4	4	239	268	309
Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR
Total dissolved solids	milligrams per litre	1	1	5580	5580	5580
Total organic carbon	milligrams per litre	4	4	<LOR	N/C	427
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	N/C	<LOR
Zinc	milligrams per litre	1	1	0.245	0.245	0.245

Monitoring Point 3

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled 'Site 3' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	4	<LOR	N/C	<LOR
Aluminium	milligrams per litre	1	1	31.10	31.10	31.10
Ammonia	milligrams per litre	4	4	13	42.23	69.70
Arsenic	milligrams per litre	1	1	0.014	0.014	0.014
Barium	milligrams per litre	1	1	1.08	1.08	1.08
Benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
BOD	milligrams per litre	1	1	<LOR	N/C	<LOR
Cadmium	milligrams per litre	1	1	<LOR	N/C	<LOR
Calcium	milligrams per litre	4	4	13	23.50	33
Chloride	milligrams per litre	4	4	516	771.75	1020
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (total)	milligrams per litre	1	1	0.03	0.03	0.03

Cobalt	milligrams per litre	1	1	0.008	0.008	0.008
Conductivity	microsiemens per centimetre	4	4	2380	3327.5	4320
Copper	milligrams per litre	1	1	0.027	0027	0.027
Ethyl benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
Fluoride	milligrams per litre	4	4	0.1	0.175	0.20
Iron	milligrams per litre	4	3	1.3	53.8	104
Lead	milligrams per litre	1	1	0.066	0.066	0.066
Magnesium	milligrams per litre	4	4	59	75	93
Manganese	milligrams per litre	4	3	0.903	1.257	1.50
Mercury	milligrams per litre	1	1	<LOR	N/C	<LOR
Nitrate	milligrams per litre	4	4	<LOR	N/C	0.02
Organochlorine pesticides	milligrams per litre	4	4	<LOR	N/C	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	4	6.73	6.755	6.79
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR

Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	4	12	37	63
Sodium	milligrams per litre	4	4	362	483.5	599
Sulfate	milligrams per litre	4	4	<LOR	N/C	28
Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR
Total dissolved solids	milligrams per litre	1	1	1960	1960	1960
Total organic carbon	milligrams per litre	4	4	42	86.75	186
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	N/C	<LOR
Zinc	milligrams per litre	1	1	0.073	0.073	0.073

Monitoring Point 4

Groundwater quality monitoring, Groundwater quality monitoring bore located south of landfill cell 3 labelled as 'Site 4' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	4	<LOR	N/C	<LOR
Aluminium	milligrams per litre	1	1	13.5	13.5	13.5
Ammonia	milligrams per litre	4	4	3.47	3.59	3.78

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NSW EPA

Arsenic	milligrams per litre	1	1	0.006	0.006	0.006
Barium	milligrams per litre	1	1	0.273	0.273	0.273
Benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
BOD	milligrams per litre	1	1	3	3	3
Cadmium	milligrams per litre	1	1	<LOR	N/C	<LOR
Calcium	milligrams per litre	4	4	12	14.75	17
Chloride	milligrams per litre	4	4	559	602.75	665
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (total)	milligrams per litre	1	1	0.012	0.012	0.012
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	1880	1980	2110
Copper	milligrams per litre	1	1	0.009	0.009	0.009
Ethyl benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
Fluoride	milligrams per litre	4	4	<LOR	N/C	0.20
Iron	milligrams per litre	4	3	31.9	48.97	62.8

Lead	milligrams per litre	1	1	0.028	0.028	0.028
Magnesium	milligrams per litre	4	4	44	46.75	50
Manganese	milligrams per litre	4	3	0.297	0.34	0.407
Mercury	milligrams per litre	1	1	<LOR	N/C	<LOR
Nitrate	milligrams per litre	4	4	<LOR	N/C	0.04
Organochlorine pesticides	milligrams per litre	4	4	<LOR	N/C	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	4	6.34	6.42	6.50
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	4	8	8.75	9
Sodium	milligrams per litre	4	4	252	289	322
Sulfate	milligrams per litre	4	4	6	8	10
Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR
Total dissolved solids	milligrams per litre	1	1	1230	1230	1230

Total organic carbon	milligrams per litre	4	4	10	13	16
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	N/C	<LOR
Zinc	milligrams per litre	1	1	0.031	0.031	0.031

Monitoring Point 5

Groundwater quality monitoring, Groundwater quality monitoring bore located south of cell 3 labelled as 'Site 5' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	4	<LOR	N/C	<LOR
Aluminium	milligrams per litre	1	1	6.71	6.71	6.71
Ammonia	milligrams per litre	4	4	0.38	0.63	0.87
Arsenic	milligrams per litre	1	1	0.003	0.003	0.003
Barium	milligrams per litre	1	1	0.04	0.04	0.04
Benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
BOD	milligrams per litre	1	1	<LOR	N/C	<LOR
Cadmium	milligrams per litre	1	1	<LOR	N/C	<LOR
Calcium	milligrams per litre	4	4	27	28.75	31

Chloride	milligrams per litre	4	4	1930	2120	2530
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (total)	milligrams per litre	1	1	0.006	0.006	0.006
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	4	4	6430	6700	7240
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
Fluoride	milligrams per litre	4	4	0.6	0.625	0.7
Iron	milligrams per litre	4	3	<LOR	N/C	4.13
Lead	milligrams per litre	1	1	0.006	0.006	0.006
Magnesium	milligrams per litre	4	4	134	146.5	160
Manganese	milligrams per litre	4	3	0.396	0.427	0.452
Mercury	milligrams per litre	1	1	<LOR	N/C	<LOR
Nitrate	milligrams per litre	4	4	<LOR	N/C	0.06
Organochlorine pesticides	milligrams per litre	4	4	<LOR	N/C	<LOR

Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	4	6.19	6.268	6.36
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	4	19	20.75	23
Sodium	milligrams per litre	4	4	1030	1152.5	1350
Sulfate	milligrams per litre	4	4	190	212	262
Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR
Total dissolved solids	milligrams per litre	1	1	3900	3900	3900
Total organic carbon	milligrams per litre	4	4	9	10.75	13
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	4	<LOR	N/C	<LOR
Zinc	milligrams per litre	1	1	0.033	0.033	0.033

Discharge & Monitoring Point 6

Wet weather discharge
Surface water quality monitoring, Surface water quality monitoring point located downstream of overflow point on sediment pond 3 labelled as 'Site 6' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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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 of calcium carbonate per litre	4	3	<LOR	N/C	16
Aluminium	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	3	4.72	39.01	74.3
Arsenic	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Benzene	milligrams per litre	1	0	—	—	—
BOD	milligrams per litre	1	0	—	—	—
Cadmium	milligrams per litre	1	0	—	—	—
Calcium	milligrams per litre	4	3	56	87	109
Chloride	milligrams per litre	4	3	929	1099.67	1260
Chlorinated volatile compounds	milligrams per litre	1	0	—	—	—
Chromium (hexavalent)	milligrams per litre	1	0	—	—	—
Chromium (total)	milligrams per litre	1	0	—	—	—
Cobalt	milligrams per litre	1	0	—	—	—

Conductivity	microsiemens per centimetre	4	3	4120	5163.33	6230
Copper	milligrams per litre	1	0	—	—	—
Ethyl benzene	milligrams per litre	1	0	—	—	—
Fluoride	milligrams per litre	4	3	0.50	0.53	0.60
Iron	milligrams per litre	4	3	0.38	17.89	52.3
Lead	milligrams per litre	1	0	—	—	—
Magnesium	milligrams per litre	4	3	56	74.33	87
Manganese	milligrams per litre	4	3	0.02	2.82	8.09
Mercury	milligrams per litre	1	0	—	—	—
Nitrate	milligrams per litre	4	3	3.9	40.77	85.9
Organochlorine pesticides	milligrams per litre	4	3	<LOR	N.C.	<LOR
Organophosphate pesticides	milligrams per litre	1	0	—	—	—
PCBs	milligrams per litre	1	0	—	—	—
pH	pH	4	3	8.03	8.13	8.31
Phosphate	milligrams per litre	1	0	—	—	—
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	—	—	—

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Potassium	milligrams per litre	4	3	227	266.67	294
Sodium	milligrams per litre	4	3	597	666.33	702
Sulfate	milligrams per litre	4	3	<LOR	N/C	24
Toluene	milligrams per litre	1	0	—	—	—
Total dissolved solids	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	3	41	113	206
Total petroleum hydrocarbons	milligrams per litre	1	3	530	1773.33	4080
Total Phenolics	milligrams per litre	4	3	<LOR	N/C	<LOR
Total suspended solids	milligrams per litre	4	3	8	23.33	41.
Zinc	milligrams per litre	1	0	—	—	—

* No annual sampling undertaken 3/10/12 due to site being DRY.

Discharge & Monitoring Point 7

Wet weather discharge

Surface water quality monitoring, Surface water quality monitoring point located at overflow point on sediment pond 2 labelled as 'Site 7' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	3	<LOR	N/C	<LOR
Aluminium	milligrams per litre	1	1	0.5	0.5	0.5

Ammonia	milligrams per litre	4	3	0.14	0.9	1.55
Arsenic	milligrams per litre	1	1	0.005	0.005	0.005
Barium	milligrams per litre	1	1	0.08	0.08	0.08
Benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
BOD	milligrams per litre	1	1	<LOR	N/C	<LOR
Cadmium	milligrams per litre	1	1	<LOR	N/C	<LOR
Calcium	milligrams per litre	4	3	36	47	54
Chloride	milligrams per litre	4	3	62	92	131
Chlorinated volatile compounds	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (hexavalent)	milligrams per litre	1	1	<LOR	N/C	<LOR
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	3	627	784	933
Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	milligrams per litre	1	1	<LOR	N/C	<LOR
Fluoride	milligrams per litre	4	3	0.3	0.33	0.4

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Iron	milligrams per litre	4	2	<LOR	N/C	0.07
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	3	16	22	26
Manganese	milligrams per litre	4	2	0.128	0.23	0.337
Mercury	milligrams per litre	1	1	0.55	0.55	0.55
Nitrate	milligrams per litre	4	3	0.05	0.46	0.94
Organochlorine pesticides	milligrams per litre	4	3	<LOR	N/C	<LOR
Organophosphate pesticides	milligrams per litre	1	1	<LOR	N/C	<LOR
PCBs	milligrams per litre	1	1	<LOR	N/C	<LOR
pH	pH	4	3	7.95	8.07	8.15
Phosphate	milligrams per litre	1	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Potassium	milligrams per litre	4	3	14	16.33	19
Sodium	milligrams per litre	4	3	54	66.67	82
Sulfate	milligrams per litre	4	3	<LOR	N/C	46
Toluene	milligrams per litre	1	1	<LOR	N/C	<LOR

Total dissolved solids	milligrams per litre	1	1	578	578	578
Total organic carbon	milligrams per litre	4	3	14	17	19
Total petroleum hydrocarbons	milligrams per litre	1	1	<LOR	N/C	<LOR
Total Phenolics	milligrams per litre	4	3	<LOR	N/C	<LOR
Total suspended solids	milligrams per litre	4	3	22	71.33	116
Zinc	milligrams per litre	1	1	0.084	0.084	0.084

* No quarterly sampling was undertaken 9/5/12 due to site DRY.

Monitoring Point 8

Surface water quality monitoring, Surface water quality monitoring point located in a natural watercourse south of landfill cell 4 labelled as 'Site 8' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	0	—	—	—
Aluminium	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	0	—	—	—
Arsenic	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Benzene	milligrams per litre	1	0	—	—	—

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BOD	milligrams per litre	1	0	—	—	—
Cadmium	milligrams per litre	1	0	—	—	—
Calcium	milligrams per litre	4	0	—	—	—
Chloride	milligrams per litre	4	0	—	—	—
Chlorinated volatile compounds	milligrams per litre	1	0	—	—	—
Chromium (hexavalent)	milligrams per litre	1	0	—	—	—
Chromium (total)	milligrams per litre	1	0	—	—	—
Cobalt	milligrams per litre	1	0	—	—	—
Conductivity	microsiemens per centimetre	4	0	—	—	—
Copper	milligrams per litre	1	0	—	—	—
Ethyl benzene	milligrams per litre	1	0	—	—	—
Fluoride	milligrams per litre	4	0	—	—	—
Iron	milligrams per litre	4	0	—	—	—
Lead	milligrams per litre	1	0	—	—	—
Magnesium	milligrams per litre	4	0	—	—	—
Manganese	milligrams per litre	4	0	—	—	—

Mercury	milligrams per litre	1	0	—	—	—
Nitrate	milligrams per litre	4	0	—	—	—
Organochlorine pesticides	milligrams per litre	4	0	—	—	—
Organophosphate pesticides	milligrams per litre	1	0	—	—	—
PCBs	milligrams per litre	1	0	—	—	—
pH	pH	4	0	—	—	—
Phosphate	milligrams per litre	1	0	—	—	—
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	—	—	—
Potassium	milligrams per litre	4	0	—	—	—
Sodium	milligrams per litre	4	0	—	—	—
Sulfate	milligrams per litre	4	0	—	—	—
Toluene	milligrams per litre	1	0	—	—	—
Total dissolved solids	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	0	—	—	—
Total petroleum hydrocarbons	milligrams per litre	1	0	—	—	—
Total Phenolics	milligrams per litre	4	0	—	—	—

Total suspended solids	milligrams per litre	1	0	—	—	—
Zinc	milligrams per litre	1	0	—	—	—

* No Samples collected in 2012 as site was DRY.

Monitoring Point 9

Surface water quality monitoring, Surface water quality monitoring point located in a natural watercourse south east of landfill cell 3 labelled as 'Site 9' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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 of calcium carbonate per litre	4	0	—	—	—
Aluminium	milligrams per litre	1	0	—	—	—
Ammonia	milligrams per litre	4	0	—	—	—
Arsenic	milligrams per litre	1	0	—	—	—
Barium	milligrams per litre	1	0	—	—	—
Benzene	milligrams per litre	1	0	—	—	—
BOD	milligrams per litre	1	0	—	—	—
Cadmium	milligrams per litre	1	0	—	—	—
Calcium	milligrams per litre	4	0	—	—	—
Chloride	milligrams per litre	4	0	—	—	—

Chlorinated volatile compounds	milligrams per litre	1	0	—	—	—
Chromium (hexavalent)	milligrams per litre	1	0	—	—	—
Chromium (total)	milligrams per litre	1	0	—	—	—
Cobalt	milligrams per litre	1	0	—	—	—
Conductivity	microsiemens per centimetre	4	0	—	—	—
Copper	milligrams per litre	1	0	—	—	—
Ethyl benzene	milligrams per litre	1	0	—	—	—
Fluoride	milligrams per litre	4	0	—	—	—
Iron	milligrams per litre	4	0	—	—	—
Lead	milligrams per litre	1	0	—	—	—
Magnesium	milligrams per litre	4	0	—	—	—
Manganese	milligrams per litre	4	0	—	—	—
Mercury	milligrams per litre	1	0	—	—	—
Nitrate	milligrams per litre	4	0	—	—	—
Organochlorine pesticides	milligrams per litre	4	0	—	—	—
Organophosphate pesticides	milligrams per litre	1	0	—	—	—

PCBs	milligrams per litre	1	0	—	—	—
pH	pH	4	0	—	—	—
Phosphate	milligrams per litre	1	0	—	—	—
Polycyclic aromatic hydrocarbons	milligrams per litre	1	0	—	—	—
Potassium	milligrams per litre	4	0	—	—	—
Sodium	milligrams per litre	4	0	—	—	—
Sulfate	milligrams per litre	4	0	—	—	—
Toluene	milligrams per litre	1	0	—	—	—
Total dissolved solids	milligrams per litre	1	0	—	—	—
Total organic carbon	milligrams per litre	4	0	—	—	—
Total petroleum hydrocarbons	milligrams per litre	1	0	—	—	—
Total Phenolics	milligrams per litre	4	0	—	—	—
Total suspended solids	milligrams per litre	4	0	—	—	—
Zinc	milligrams per litre	1	0	—	—	—

* No samples collected in 2012 as site was DRY.

Monitoring Point 10

Leachate quality monitoring, Leachat quality monitoring point located in leachate pond 2 labelled as 'Site 10' in Figure 5 of the LEMP dated April 2000 titled "Location of Water Monitoring Sites"

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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	<LOR	N/C	<LOR
Ammonia	milligrams per litre	4	4	1.34	439.84	684
BOD	milligrams per litre	4	4	16	44.75	77
Calcium	milligrams per litre	4	4	91	101.5	106
Chloride	milligrams per litre	4	4	1540	1705	1980
Fluoride	milligrams per litre	4	4	0.70	0.73	0.80
Iron	milligrams per litre	4	3	0.18	3.39	5.76
Magnesium	milligrams per litre	4	4	86	93.75	104
Manganese	milligrams per litre	4	3	0.127	0.41	0.627
Nitrate	milligrams per litre	4	4	<LOR	N/C	<LOR
Organochlorine pesticides	milligrams per litre	4	4	<LOR	N/C	<LOR
pH	pH	4	4	8.1	8.22	8.38
Potassium	milligrams per litre	4	4	384	450	508
Sodium	milligrams per litre	4	4	787	953.25	1120
Sulfate	milligrams per litre	4	4	<LOR	N/C	3

Total organic carbon	milligrams per litre	4	4	4	281.25	401
Total petroleum hydrocarbons	milligrams per litre	4	4	4490	7920	11200
Total Phenolics	milligrams per litre	4	4	<LOR	N/C	<LOR
Total suspended solids	milligrams per litre	4	4	22	45.25	74

N/C = Non calculable
LOR Limit of Reporting.

Dissolved Iron & Manganese concentrations have been used.

B3 Volume or Mass Monitoring Summary

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

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

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

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☑ the boxes)

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

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 registration 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 E of this Annual Return

4

APPENDIX A

Licence condition number not complied with:

Condition M2.1 monitoring concentration of pollutants.

Summary of particulars of non-compliance

Some water samples were unable to be collected due to insufficient volume being available in the watercourse. Sample locations are detailed in the landfill Licence 5873. Locations 1-5 are groundwater sites. Locations 6-9 are surface water sample locations.

Dates when the non-compliance occurred:

Table 1 shows the dates and sites where insufficient volume for any sample to be taken

Table 1

Date	Sites
01/02/2012	1,8,9
3/05/2012	7,8,9
3/08/2012	1,8,9
3/10/2012	6,8,9

Cause of the non-compliance:

No sample volume available

Action taken to mitigate the effects of the non-compliance

The non-compliance will have no adverse effect.

Action taken to prevent a recurrence of the non-compliance:

The non-compliance is unavoidable due to reliance on rainfall for sufficient sample to be available.

APPENDIX B

Condition 011.2- Compaction rates for waste:

According to condition 011.2 of the licence, the licensee must ensure that the achieved compaction rate of land filled waste (excluding cover material) is stated in the Annual Return for the waste premises submitted to the EPA.

Table 2

Total waste land filled	121,900 tonnes
Change in void space	107,015m3
Compaction rate	107,015 m3 ÷ 121,900 tonnes = 0.87 tonnes/m3

APPENDIX C

Licence condition number not complied with:

Condition L7 Potentially offensive odour

Summary of particulars of non-compliance

During the reporting period, there were 31odour complaints received

Dates when the non-compliance occurred:

Table 1 shows the dates when the odour complaints were received

Table 1

Date	Service Request No. allocated
22/11/2011	1398566
22/11/2011	1398686
22/11/2011	1398692
13/12/2011	1402702
13/12/2011	1402742
14/12/2011	1402814
14/12/2011	1402878
14/12/2011	1402884
28/12/2011	1404768
23/01/2012	1409660
24/01/2012	1409808
27/01/2012	1410590
14/02/2012	1414324
14/02/2012	1414370
14/02/2012	1414552
15/02/2012	1414670
15/02/2012	1414946
15/02/2012	1414950
22/02/2012	1416624
22/02/2012	1416736
2/03/2012	1418882
5/03/2012	1419288

Date	Service Request No. allocated
7/03/2012	1419914
7/03/2012	1419924
19/03/2012	1422448
20/03/2012	1422840
12/04/2012	1427328
26/04/2012	1430070
11/05/2012	1433558
18/05/2012	1434802
12/06/2012	1439266

Cause of the non-compliance:

All 31complaints were investigated and person making complaint spoken to regarding odour. Each odour complaint is logged as a Service Request and allocated a Service Request Number. Supervisor gets customer making complaint to fill out Odour Complaint Form, which is then filed using Lake Macquarie City Councils document filing system.

The Odour Complaint Form records time odour detected, intensity of odour, wind direction and weather conditions at time of incident

Action taken to mitigate the effects of the non-compliance

Installation of aeration pump devices in main leachate dam.

Continual benchmarking with other Waste Facilities with regards odour mitigation.

A change to work practices regards uncovering waste.

Action taken to prevent a recurrence of the non-compliance:

All complaints are investigated and residents visited as soon as practical after odour complaint received.

All complaints recorded in Trim.

BwB

Annual Return

LAKE MACQUARIE CITY COUNCIL

NSW EPA

E 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 and D 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 13-Oct-2011 to 12-Oct-2012 or ___/___/___ to ___/___/___

SIGNATURE: _____

NAME: (printed) RICHARD BRINDLEY

POSITION: WASTE SITES COORDINATOR

DATE: 22 / 11 / 2012

SIGNATURE: Brian Bell *

NAME: (printed) BRIAN BELL

POSITION: GENERAL MANAGER

DATE: 29 / 11 / 12

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

The data presented in the worksheets are organised according to each monitoring site (Sites 1-10).

Cardno has entered in the data from the Annual Returns on behalf of Council within each worksheet (columns A to AA).
Additional columns of data (AE to BG) were used for graphing the data. The following was undertaken:

- Summarising the data to make graphic more straight forward; and
- Deleting all "<" from data values for graphing purposes
- Where data values indicated a "<", the "<" symbol has been removed for graphing purposes
- Values of NC, LOR and N/A have been changed to #N/A for graphing purposes. This was so the value is displayed on the graph for these values.

Key to Abbreviations:	
NC	Not calculated
LOR	Limit of reporting
N/A	No sample
#N/A	No data - for graphing purposes only

Graphs are provided for each site on the relevant tab below the data. The variable scale of the monitoring results for each parameter makes it impossible to meaningfully represent all parameters on a single graph. Plotting additional graphs would allow trends to be better illustrated, however these should be prepared as needed to evaluate a specific trend which may be of interest.

Some issues that became apparent during the data analysis included the following (cells have been highlighted in yellow and orange as per below):
indicates values that were not clear on the scanned data received as input files. We recommend these data are checked against the originals.
These values seem strange given the number of samples, and several values in the 2004-2005 dataset also showed averages of 0 when there was only one sample taken.

Cardno has taken reasonable care to accurately transcribe the results from the .pdf document into this spreadsheet, however cannot guarantee that the spreadsheet is free from errors.

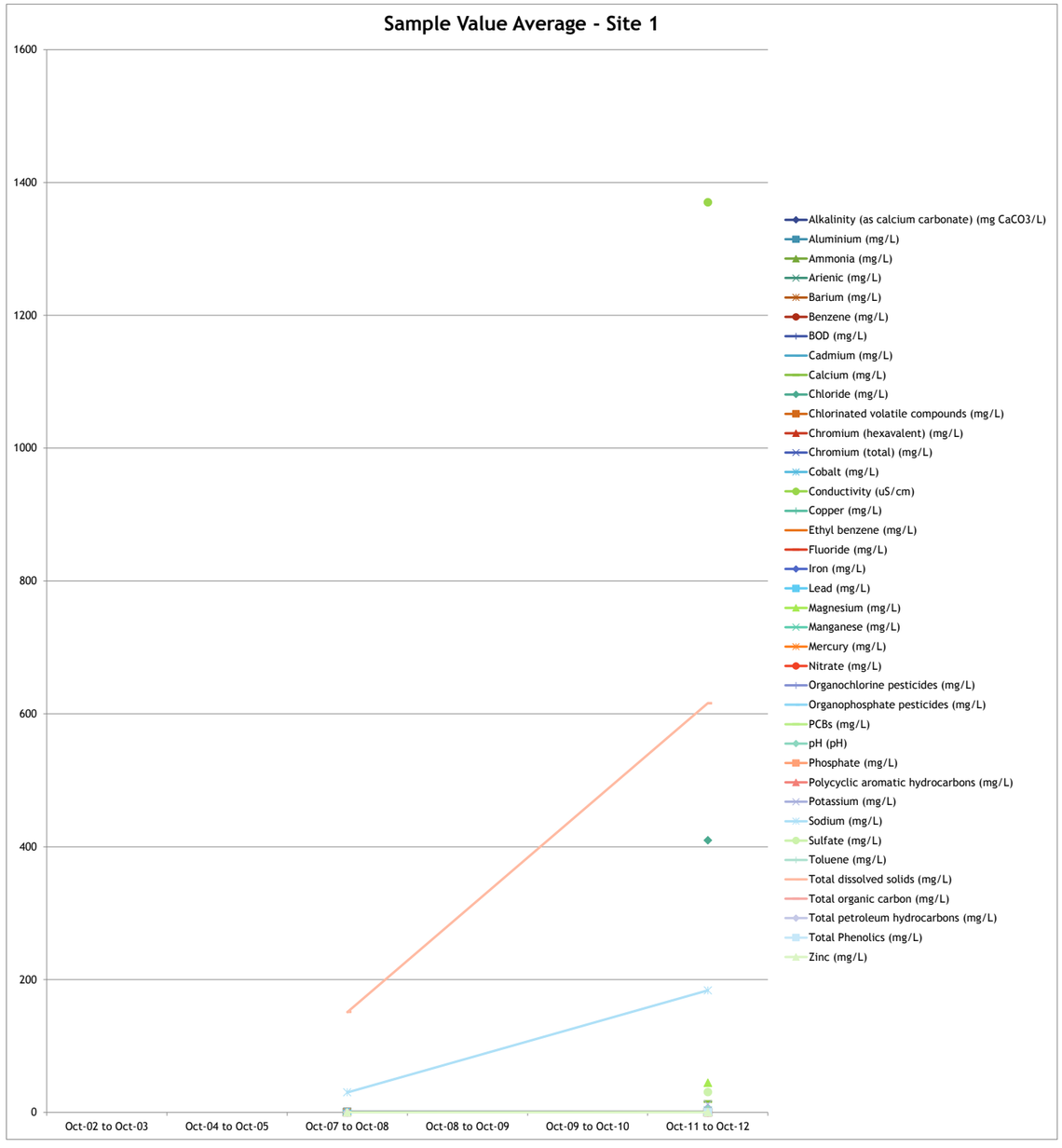
Monitoring Site 1 with Charts

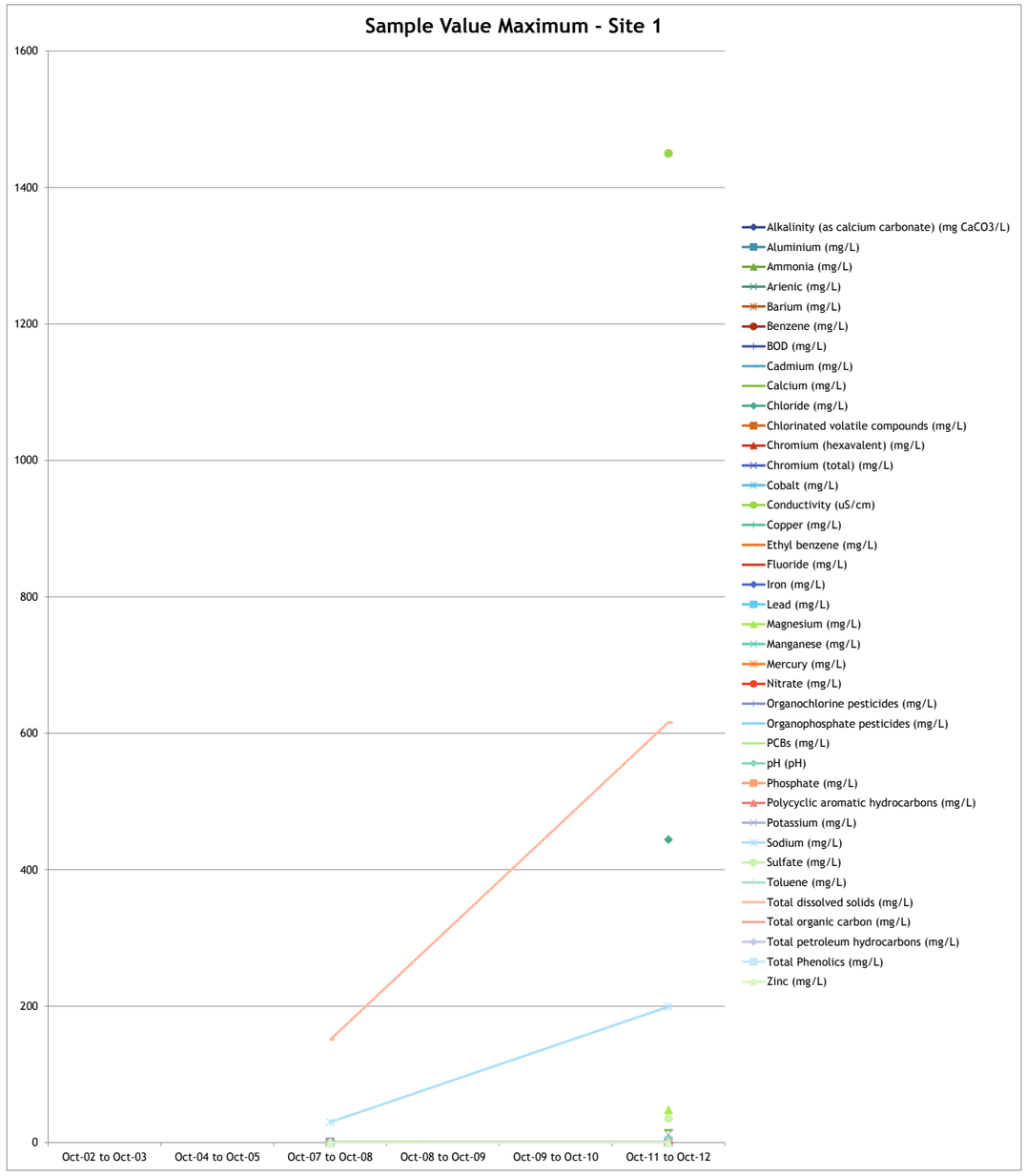
Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	<LOR	N/C	<LOR
Aluminium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.37	0.37	0.37	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.13	0.13	0.13
Ammonia	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	0.05	0.11	0.17
Arienic	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Barium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.046	0.046	0.046	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.164	0.164	0.164
Benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
BOD	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	1	1	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Cadmium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0002	0.0002	0.0002	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.001	0.001	0.001
Calcium	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	15	16.5	18
Chloride	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	375	409.5	444
Chlorinated volatile compounds	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.223	0.223	0.223	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Chromium (hexavalent)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.005	0.005	0.005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Chromium (total)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Cobalt	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	0.002	0.002	0.002	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.034	0.034	0.034
Conductivity	uS/cm	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	1290	1370	1450
Copper	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.004	0.004	0.004	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.007	0.007	0.007
Ethyl benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Fluoride	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	0.3	0.3	0.3
Iron	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Lead	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.021	0.021	0.021
Magnesium	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	41	44.5	48
Manganese	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	2.83	2.83	2.83
Mercury	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Nitrate	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	0.03	0.07	0.11
Organochlorine pesticides	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	<LOR	N/C	<LOR
Organophosphate pesticides	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.008	0.008	0.008	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
PCBs	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
pH	pH	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	6.24	6.3	6.35
Phosphate	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.008	0.008	0.008	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Potassium	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	12	12	12
Sodium	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	30	30	30	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	168	183.5	199
Sulfate	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	26	30.5	35
Toluene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.003	0.003	0.003	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Total dissolved solids	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	151	151	151	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	616	616	616
Total organic carbon	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	<LOR	N/C	2
Total petroleum hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.11	0.11	0.11	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	N/C	<LOR
Total Phenolics	mg/L	4	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	2	<LOR	N/C	<LOR
Zinc	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.022	0.022	0.022	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.123	0.123	0.123

Note: for all monitoring sites in this period, where contaminant concentrations were below the level of reporteing (LOR) on one or more events, summary values (min, mean, max) have been calculated using 50% of LOR.

NC	Not calculated
LOR	Limit of reporting
N/A	No sample


Sample Value Average - Site 1
1600
1400
1200
1000
800
600
400
200
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)


Sample Value Maximum - Site 1
1600
1400
1200
1000
800
600
400
200
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)

Site 1 Groundwater Data
Awaba Landfill Environmental Assessment

Cardno

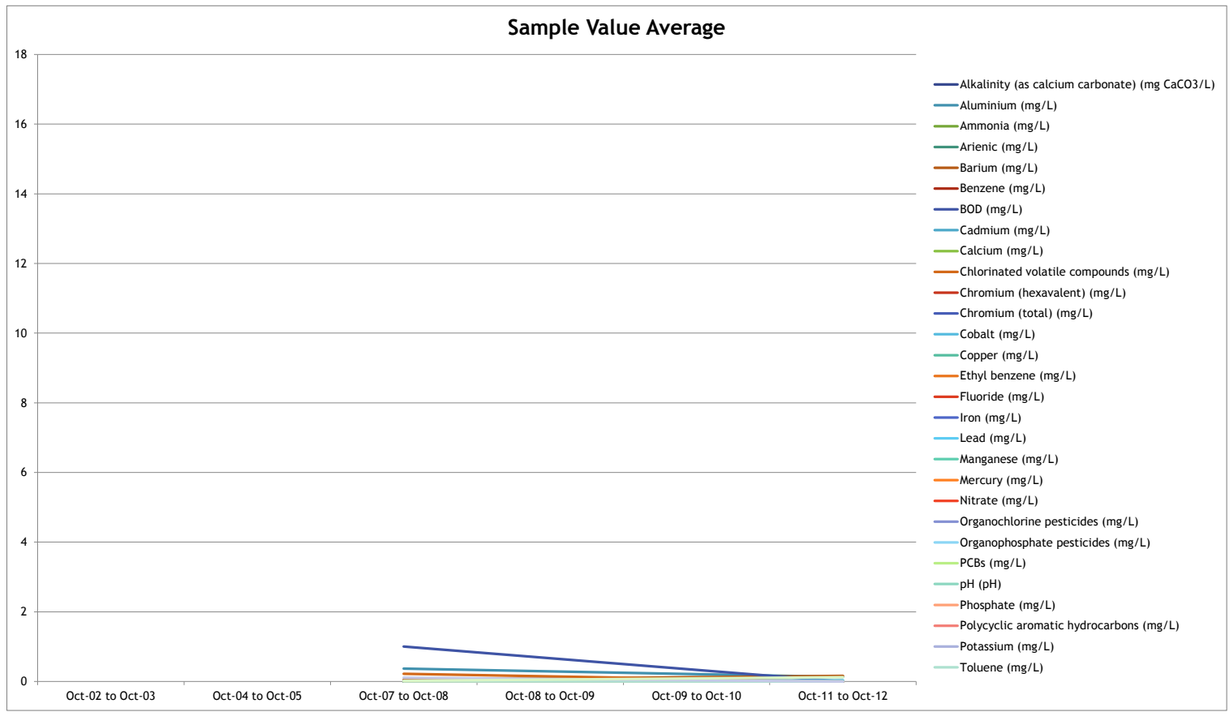
Data for charts
This data has been copied and pasted values, then>>>>

Replace < with <blank>
Replace N/A with =NA()

Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate)	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Aluminium	N/A	N/A	0.37	N/A	N/A	0.13	N/A	N/A	0.37	N/A	N/A	0.13
Ammonia	N/A	N/A	N/A	N/A	N/A	0.11	N/A	N/A	N/A	N/A	N/A	0.17
Arienic	N/A	N/A	0.0005	N/A	N/A	N/C	N/A	N/A	0.0005	N/A	N/A	<LOR
Barium	N/A	N/A	0.046	N/A	N/A	0.164	N/A	N/A	0.046	N/A	N/A	0.164
Benzene	N/A	N/A	0.0005	N/A	N/A	N/C	N/A	N/A	0.0005	N/A	N/A	<LOR
BOD	N/A	N/A	1	N/A	N/A	N/C	N/A	N/A	1	N/A	N/A	<LOR
Cadmium	N/A	N/A	0.0002	N/A	N/A	0.001	N/A	N/A	0.0002	N/A	N/A	0.001
Calcium	N/A	N/A	N/A	N/A	N/A	16.5	N/A	N/A	N/A	N/A	N/A	18
Chloride	N/A	N/A	N/A	N/A	N/A	409.5	N/A	N/A	N/A	N/A	N/A	444
Chlorinated volatile compounds	N/A	N/A	0.223	N/A	N/A	N/C	N/A	N/A	0.223	N/A	N/A	<LOR
Chromium (hexavalent)	N/A	N/A	0.005	N/A	N/A	N/C	N/A	N/A	0.005	N/A	N/A	<LOR
Chromium (total)	N/A	N/A	0.0005	N/A	N/A	N/C	N/A	N/A	0.0005	N/A	N/A	<LOR
Cobalt	N/A	N/A	0.002	N/A	N/A	0.034	N/A	N/A	0.002	N/A	N/A	0.034
Conductivity	N/A	N/A	N/A	N/A	N/A	1370	N/A	N/A	N/A	N/A	N/A	1450
Copper	N/A	N/A	0.004	N/A	N/A	0.007	N/A	N/A	0.004	N/A	N/A	0.007
Ethyl benzene	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Fluoride	N/A	N/A	N/A	N/A	N/A	0.3	N/A	N/A	N/A	N/A	N/A	0.3
Iron	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Lead	N/A	N/A	0.0005	N/A	N/A	0.021	N/A	N/A	0.0005	N/A	N/A	0.021
Magnesium	N/A	N/A	N/A	N/A	N/A	44.5	N/A	N/A	N/A	N/A	N/A	48
Manganese	N/A	N/A	N/A	N/A	N/A	2.83	N/A	N/A	N/A	N/A	N/A	2.83
Mercury	N/A	N/A	0.0005	N/A	N/A	N/C	N/A	N/A	0.0005	N/A	N/A	<LOR
Nitrate	N/A	N/A	N/A	N/A	N/A	0.07	N/A	N/A	N/A	N/A	N/A	0.11
Organochlorine pesticides	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Organophosphate pesticides	N/A	N/A	0.008	N/A	N/A	N/C	N/A	N/A	0.008	N/A	N/A	<LOR
PCBs	N/A	N/A	0.0005	N/A	N/A	N/C	N/A	N/A	0.0005	N/A	N/A	<LOR
pH	N/A	N/A	N/A	N/A	N/A	6.3	N/A	N/A	N/A	N/A	N/A	6.35
Phosphate	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Polycyclic aromatic hydrocarbons	N/A	N/A	0.008	N/A	N/A	N/C	N/A	N/A	0.008	N/A	N/A	<LOR
Potassium	N/A	N/A	N/A	N/A	N/A	12	N/A	N/A	N/A	N/A	N/A	12
Sodium	N/A	N/A	30	N/A	N/A	183.5	N/A	N/A	30	N/A	N/A	199
Sulfate	N/A	N/A	N/A	N/A	N/A	30.5	N/A	N/A	N/A	N/A	N/A	35
Toluene	N/A	N/A	0.003	N/A	N/A	N/C	N/A	N/A	0.003	N/A	N/A	<LOR
Total dissolved solids	N/A	N/A	151	N/A	N/A	616	N/A	N/A	151	N/A	N/A	616
Total organic carbon	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	2
Total petroleum hydrocarbons	N/A	N/A	0.11	N/A	N/A	N/C	N/A	N/A	0.11	N/A	N/A	<LOR
Total Phenolics	N/A	N/A	N/A	N/A	N/A	N/C	N/A	N/A	N/A	N/A	N/A	<LOR
Zinc	N/A	N/A	0.022	N/A	N/A	0.123	N/A	N/A	0.022	N/A	N/A	0.123

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Aluminium (mg/L)	#N/A	#N/A	0.37	#N/A	#N/A	0.13	#N/A	#N/A	0.37	#N/A	#N/A	0.13
Ammonia (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	0.11	#N/A	#N/A	#N/A	#N/A	#N/A	0.17
Arienic (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	N/C	#N/A	#N/A	0.0005	#N/A	#N/A	#N/A
Barium (mg/L)	#N/A	#N/A	0.046	#N/A	#N/A	0.164	#N/A	#N/A	0.046	#N/A	#N/A	0.164
Benzene (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	N/C	#N/A	#N/A	0.0005	#N/A	#N/A	#N/A
BOD (mg/L)	#N/A	#N/A	1	#N/A	#N/A	N/C	#N/A	#N/A	1	#N/A	#N/A	#N/A
Cadmium (mg/L)	#N/A	#N/A	0.0002	#N/A	#N/A	0.001	#N/A	#N/A	0.0002	#N/A	#N/A	0.001
Calcium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	16.5	#N/A	#N/A	#N/A	#N/A	#N/A	18
Chloride (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	409.5	#N/A	#N/A	#N/A	#N/A	#N/A	444
Chlorinated volatile compounds (mg/L)	#N/A	#N/A	0.223	#N/A	#N/A	N/C	#N/A	#N/A	0.223	#N/A	#N/A	#N/A
Chromium (hexavalent) (mg/L)	#N/A	#N/A	0.005	#N/A	#N/A	N/C	#N/A	#N/A	0.005	#N/A	#N/A	#N/A
Chromium (total) (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	N/C	#N/A	#N/A	0.0005	#N/A	#N/A	#N/A
Cobalt (mg/L)	#N/A	#N/A	0.002	#N/A	#N/A	0.034	#N/A	#N/A	0.002	#N/A	#N/A	0.034
Conductivity (uS/cm)	#N/A	#N/A	#N/A	#N/A	#N/A	1370	#N/A	#N/A	#N/A	#N/A	#N/A	1450
Copper (mg/L)	#N/A	#N/A	0.004	#N/A	#N/A	0.007	#N/A	#N/A	0.004	#N/A	#N/A	0.007
Ethyl benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Fluoride (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	0.3	#N/A	#N/A	#N/A	#N/A	#N/A	0.3
Iron (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Lead (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	0.021	#N/A	#N/A	0.0005	#N/A	#N/A	0.021
Magnesium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	44.5	#N/A	#N/A	#N/A	#N/A	#N/A	48
Manganese (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	2.83	#N/A	#N/A	#N/A	#N/A	#N/A	2.83
Mercury (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	N/C	#N/A	#N/A	0.0005	#N/A	#N/A	#N/A
Nitrate (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	0.07	#N/A	#N/A	#N/A	#N/A	#N/A	0.11
Organochlorine pesticides (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Organophosphate pesticides (mg/L)	#N/A	#N/A	0.008	#N/A	#N/A	N/C	#N/A	#N/A	0.008	#N/A	#N/A	#N/A
PCBs (mg/L)	#N/A	#N/A	0.0005	#N/A	#N/A	N/C	#N/A	#N/A	0.0005	#N/A	#N/A	#N/A
pH (pH)	#N/A	#N/A	#N/A	#N/A	#N/A	6.3	#N/A	#N/A	#N/A	#N/A	#N/A	6.35
Phosphate (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	#N/A	#N/A	0.008	#N/A	#N/A	N/C	#N/A	#N/A	0.008	#N/A	#N/A	#N/A
Potassium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	12	#N/A	#N/A	#N/A	#N/A	#N/A	12
Sodium (mg/L)	#N/A	#N/A	30	#N/A	#N/A	183.5	#N/A	#N/A	30	#N/A	#N/A	199
Sulfate (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	30.5	#N/A	#N/A	#N/A	#N/A	#N/A	35
Toluene (mg/L)	#N/A	#N/A	0.003	#N/A	#N/A	N/C	#N/A	#N/A	0.003	#N/A	#N/A	#N/A
(mg/L)	#N/A	#N/A	151	#N/A	#N/A	616	#N/A	#N/A	151	#N/A	#N/A	616
(mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	2
Total petroleum hydrocarbons (mg/L)	#N/A	#N/A	0.11	#N/A	#N/A	N/C	#N/A	#N/A	0.11	#N/A	#N/A	#N/A
Total Phenolics (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	N/C	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Zinc (mg/L)	#N/A	#N/A	0.022	#N/A	#N/A	0.123	#N/A	#N/A	0.022	#N/A	#N/A	0.123

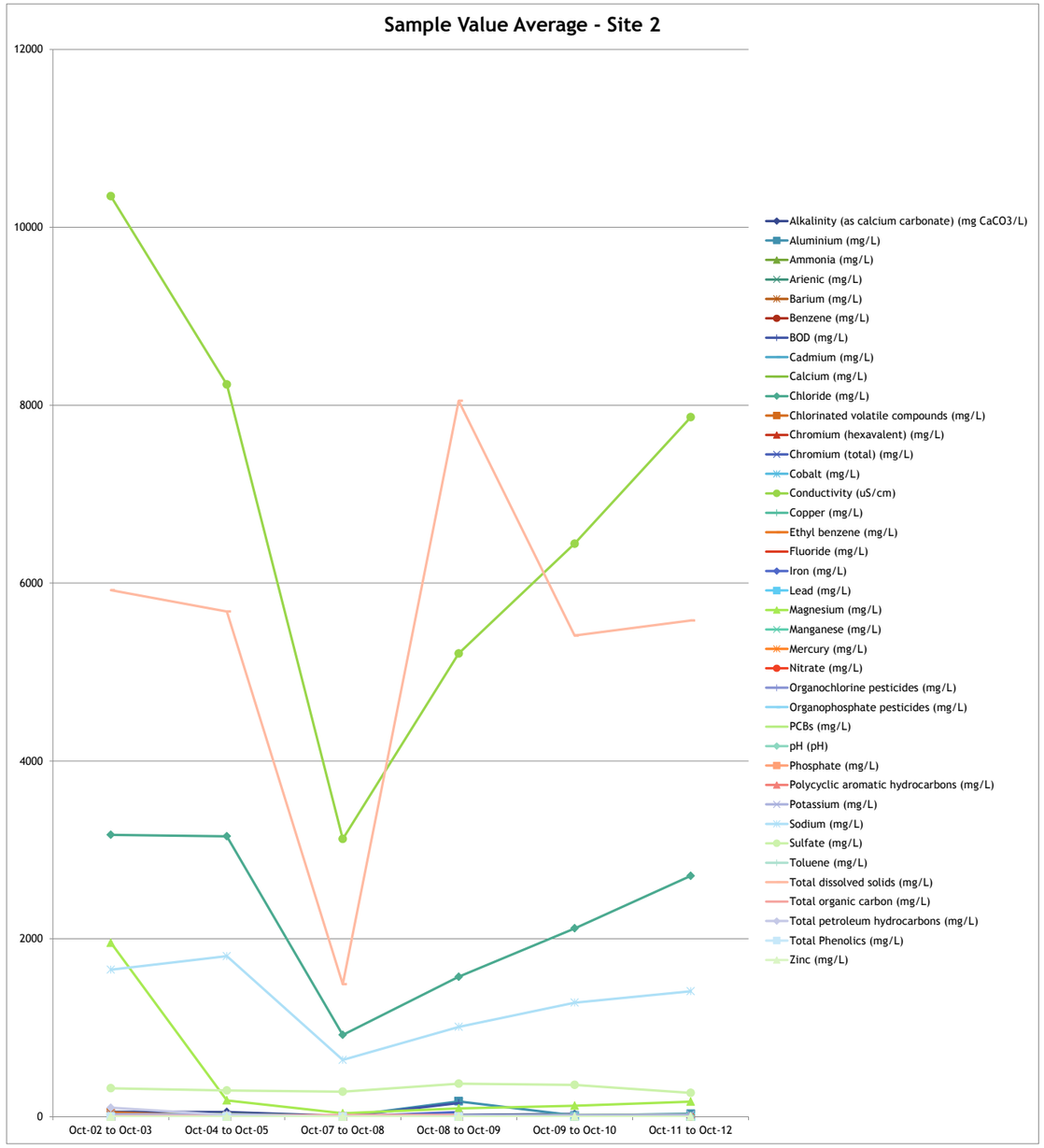

Sample Value Average
18
16
14
12
10
8
6
4
2
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Toluene (mg/L)

Monitoring Site 2 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	2	55	55.6	57	3	25	53	80	4	5	7	9	4	4	20	38	4	10	29.25	42	4	<LOR	NC	<LOR
Aluminium	mg/L	1	1	2.7	2.7	2.7	1	1.28	1.25	1.25	1	1.46	1.46	1.46	1	173	173	173	1	15	15	15	1	33.1	33.1	33.1
Ammonia	mg/L	4	2	0.04	0.045	0.05	2	0.14	0.15	0.159	4	0.029	0.281	0.959	4	0.005	0.0525	0.12	4	<LOR	NC	0.64	4	<LOR	NC	<LOR
Arienic	mg/L	1	1	0.01	0.01	0.01	1	0.002	0.002	0.002	1	0.004	0.004	0.004	1	0.096	0.096	0.096	1	0.012	0.012	0.012	1	0.032	0.032	0.032
Barium	mg/L	1	1	<0.01	<0.01	<0.01	1	0.038	0.038	0.038	1	0.028	0.028	0.028	1	0.298	0.298	0.298	1	0.12	0.12	0.12	1	0.09	0.09	0.09
Benzene	mg/L	1	1	<5	<5	<5	1	<1	<1	<1	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
BOD	mg/L	1	1	3	3	3	1	4	4	4	1	1	1	1	1	154	154	154	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Cadmium	mg/L	1	1	<0.005	<0.005	<0.005	1	0.0002	0.0002	0.0002	1	0.00005	0.00005	0.00005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Calcium	mg/L	4	2	32	32	32	3	23	31	37	4	3	5	6	4	4	14.5	25	4	4	20.5	28	4	21	24.75	29
Chloride	mg/L	4	2	3070	3170	3270	3	2660	3153	3520	4	651	919.3	1080	4	800	1572.5	2420	4	730	2117.5	3000	4	5410	2707.5	3220
Chlorinated volatile compounds	mg/L	1	1	<50	<50	<50	1	<5	<5	<5	1	0.23	0.23	0.23	1	0.025	0.025	0.025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (hexavalent)	mg/L	1	1	<0.01	<0.01	<0.01	1	<0.01	<0.01	<0.01	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (total)	mg/L	1	1	<0.01	<0.01	<0.01	1	<0.001	<0.001	<0.001	1	0.0005	0.0005	0.0005	1	0.116	0.116	0.116	1	0.0009	0.0009	0.0009	1	0.025	0.025	0.025
Cobalt	mg/L	1	1	0.04	0.04	0.04	1	0.043	0.043	0.043	1	0.003	0.003	0.003	1	0.0005	0.0005	0.0005	1	0.048	0.048	0.048	1	0.063	0.063	0.063
Conductivity	uS/cm	4	2	10100	10350	10600	3	7540	8233	8800	4	2420	3122.5	3700	4	2640	5207.5	7600	4	2460	6442.5	8680	4	7190	7865	9030
Copper	mg/L	1	1	0.25	0.25	0.25	1	0.058	0.058	0.058	1	0.007	0.007	0.007	1	0.0049	0.0049	0.0049	1	0.011	0.011	0.011	1	0.015	0.015	0.015
Ethyl benzene	mg/L	1	1	<5	<5	<5	1	<2	<2	<2	1	0.001	0.001	0.001	1	0.001	0.001	0.001	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Fluoride	mg/L	4	2	1	1.06	1.2	3	0.9	1.1	1.2	4	0.2	0.3	0.4	4	0.01	0.538	1.14	4	0.19	0.38	0.7	4	0.8	0.95	1.2
Iron	mg/L	4	2	1.2	1.55		3	1.31	1.61	1.81	4	0.025	1.28	3.3	5	0.025	51.67	258	4	<LOR	NC	0.15	3	<LOR	NC	<LOR
Lead	mg/L	1	1			1.9	1	0.003	0.003	0.003	1	0.008	0.008	0.008	1	0.002	0.002	0.002	1	0.019	0.019	0.019	1	0.028	0.028	0.028
Magnesium	mg/L	4	2	186	1955	205	3	155	184	213	4	23	37.3	44	4	30	92.5	161	4	33	122.75	170	4	146	170.5	206
Manganese	mg/L	4	2	0.86	0.877	0.894	3	0.486	0.69	0.853	4	0.08	0.12	0.15	5	0.107	0.497	0.934	4	0.128	0.53	0.748	3	0.661	0.69	0.718
Mercury	mg/L	1	1	<0.0001	<0.0001	<0.0001	1	<0.0001	<0.0001	<0.0001	0	0.0001	0.0001	0.0001	1	0.00005	0.00005	0.00005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Nitrate	mg/L	4	2	0.02	0.025	0.05	3	<0.01	0.19	0.51	4	0.015	0.1	0.24	4	0.005	0.02	0.03	4	<LOR	NC	<LOR	4	0.02	0.038	0.06
Organochlorine pesticides	mg/L	4	2	<0.05	<0.5	<0.5	1	<0.6	<0.6	<0.6	4	0.00025	0.00032	0.001	4	0.00025	0.00025	0.00025	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	1	<0.2	<0.2	<0.2	0	N/A	N/A	N/A	1	0.016	0.016	0.016	1	0.00025	0.00025	0.00025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
PCBs	mg/L	1	1	<0.3	<0.3	<0.3	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
pH	pH	4	2	5.32	6.05	6.45	3	5.21	5.59	6.1	4	4.8	5.24	5.7	4	5.18	5.34	5.6	4	5.23	5.3	5.38	4	5.44	5.59	5.71
Phosphate	mg/L	1	1	0.06	0.06	0.06	1	<0.01	<0.01	<0.01	1	0.01	0.01	0.01	1	0.01	0.01	0.01	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	1	<2	<2	<2	0	N/A	N/A	N/A	1	0.008	0.008	0.008	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Potassium	mg/L	4	2	28	28.5	29	3	26	28	30	4	7	9	10	4	8	14.25	20	4	8	18.75	25	4	21	23	26
Sodium	mg/L	5	2	1780	1653.3	1850	2	1730	1805	1880	5	463	637.5	778	4	513	1009.5	1500	4	570	1282.5	1690	4	1250	1410	1640
Sulfate	mg/L	4	2	318	320	322	3	273	294	311	4	230	280.3	360	4	242	371.5	736	4	239	356.8	573	4	239	268	309
Toluene	mg/L	1	1	<5	<5	<5	1	<2	<2	<2	1	0.0025	0.0025	0.0025	1	0.0025	0.0025	0.0025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total dissolved solids	mg/L	1	1	5920	5920	5920	1	5680	5680	5680	1	1490	1490	1490	1	8050	8050	8050	1	5410	5410	5410	1	5580	5580	5580
Total organic carbon	mg/L	4	2	3	7.3	12	3	1	12	22	4	8	19.75	52	4	5	20.25	50	4	<LOR	NC	10	4	<LOR	NC	427
Total petroleum hydrocarbons	mg/L	1	1	<100	<100	<100	1	<20	<20	<20	1	0.11	0.11	0.11	1	0.01	0.01	0.01	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total Phenolics	mg/L	4	2	<0.05	<0.05	<0.05	2	<0.05	<0.05	<0.05	4	0.025	0.084	0.26	4	0.0015	0.1468	0.36	4	<LOR	NC	0.37	4	<LOR	NC	<LOR
Zinc	mg/L	1	1	0.28	0.28	0.28	1	0.146	0.146	0.146	1	0.049	0.049	0.049	1	0.041	0.041	0.041	1	0.148	0.148	0.148	1	0.245	0.245	0.245

NC	Not calculated
LOR	Limit of reporting
N/A	No sample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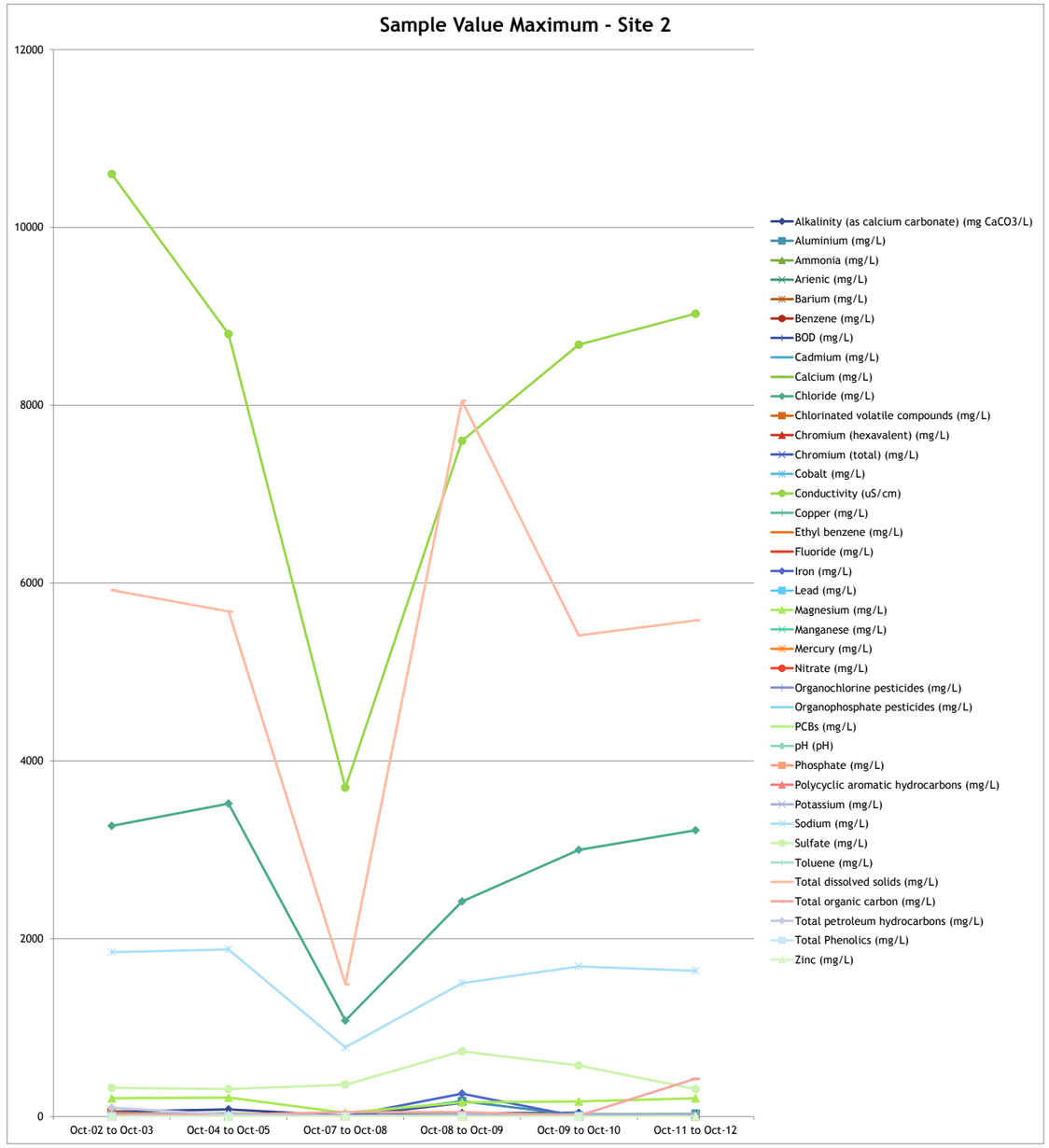
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)


Sample Value Maximum - Site 2
12000
10000
8000
6000
4000
2000
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)

Data for charts
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Replace LOR with =NA()
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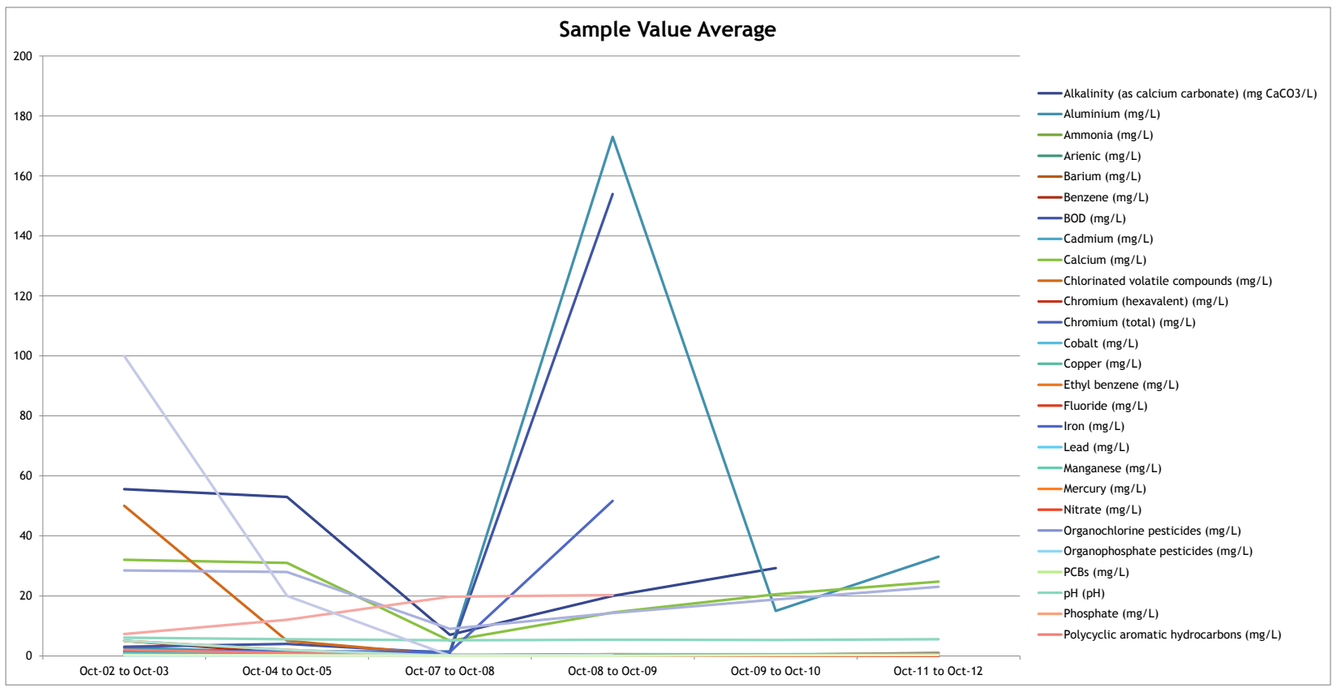
	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate)	55.6	53	7	20	29.25	NC	57	80	9	38	42	<LOR
Aluminium	2.7	1.25	1.46	173	15	33.1	2.7	1.25	1.46	173	15	33.1
Ammonia	0.045	0.15	0.281	0.0525	NC	NC	0.05	0.159	0.959	0.12	0.64	<LOR
Arienic	0.01	0.002	0.004	0.096	0.012	0.032	0.01	0.002	0.004	0.096	0.012	0.032
Barium	<0.01	0.038	0.028	0.298	0.12	0.09	<0.01	0.038	0.028	0.298	0.12	0.09
Benzene	<5	<1	0.0005	0.0005	NC	NC	<5	<1	0.0005	0.0005	<LOR	<LOR
BOD	3	4	1	154	NC	NC	3	4	1	154	<LOR	<LOR
Cadmium	<0.005	0.0002	0.00005	0.0005	NC	NC	<0.005	0.0002	0.00005	0.0005	<LOR	<LOR
Calcium	32	31	5	14.5	20.5	24.75	32	37	6	25	28	29
Chloride	3170	3153	919.3	1572.5	2117.5	2707.5	3270	3520	1080	2420	3000	3220
Chlorinated volatile compounds	<50	<5	0.23	0.025	NC	NC	<50	<5	0.23	0.025	<LOR	<LOR
Chromium (hexavalent)	<0.01	<0.01	0.005	0.005	NC	NC	<0.01	<0.01	0.005	0.005	<LOR	<LOR
Chromium (total)	<0.01	<0.001	0.0005	0.116	0.0009	0.025	<0.01	<0.001	0.0005	0.116	0.0009	0.025
Cobalt	0.04	0.043	0.003	0.0005	0.048	0.063	0.04	0.043	0.003	0.0005	0.048	0.063
Conductivity	10350	8233	3122.5	5207.5	6442.5	7865	10600	8800	3700	7600	8680	9030
Copper	0.25	0.058	0.007	0.0049	0.011	0.015	0.25	0.058	0.007	0.0049	0.011	0.015
Ethyl benzene	<5	<2	0.001	0.001	NC	NC	<5	<2	0.001	0.001	<LOR	<LOR
Fluoride	1.06	1.1	0.3	0.538	0.38	0.95	1.2	1.2	0.4	1.14	0.7	1.2
Iron	1.55	1.61	1.28	51.67	NC	NC	0	1.81	3.3	258	0.15	<LOR
Lead	0	0.003	0.008	0.002	0.019	0.028	1.9	0.003	0.008	0.002	0.019	0.028
Magnesium	1955	184	37.3	92.5	122.75	170.5	205	213	44	161	170	206
Manganese	0.877	0.69	0.12	0.497	0.53	0.69	0.894	0.853	0.15	0.934	0.748	0.718
Mercury	<0.0001	<0.0001	0.0001	0.00005	NC	NC	<0.0001	<0.0001	0.0001	0.00005	<LOR	<LOR
Nitrate	0.025	0.19	0.1	0.02	NC	0.038	0.05	0.51	0.24	0.03	<LOR	0.06
Organochlorine pesticides	<0.5	<0.6	0.00032	0.00025	NC	NC	<0.5	<0.6	0.001	0.00025	<LOR	<LOR
Organophosphate pesticides	<0.2	N/A	0.016	0.00025	NC	NC	<0.2	N/A	0.016	0.00025	<LOR	<LOR
PCBs	<0.3	N/A	0.0005	0.0005	NC	NC	<0.3	N/A	0.0005	0.0005	<LOR	<LOR
pH	6.05	5.59	5.24	5.34	5.3	5.59	6.45	6.1	5.7	5.6	5.38	5.71
Phosphate	0.06	<0.01	0.01	0.01	NC	NC	0.06	<0.01	0.01	0.01	<LOR	<LOR
Polycyclic aromatic hydrocarbons	<2	N/A	0.008	0.0005	NC	NC	<2	N/A	0.008	0.0005	<LOR	<LOR
Potassium	28.5	28	9	14.25	18.75	23	29	30	10	20	25	26
Sodium	1653.3	1805	637.5	1009.5	1282.5	1410	1850	1880	778	1500	1690	1640
Sulfate	320	294	280.3	371.5	356.8	268	322	311	360	736	573	309
Toluene	<5	<2	0.0025	0.0025	NC	NC	<5	<2	0.0025	0.0025	<LOR	<LOR
Total dissolved solids	5920	5680	1490	8050	5410	5580	5920	5680	1490	8050	5410	5580
Total organic carbon	7.3	12	19.75	20.25	NC	NC	12	22	52	50	10	427
Total petroleum hydrocarbons	<100	<20	0.11	0.01	NC	NC	<100	<20	0.11	0.01	<LOR	<LOR
Total Phenolics	<0.05	<0.05	0.084	0.1468	NC	NC	<0.05	<0.05	0.26	0.36	0.37	<LOR
Zinc	0.28	0.146	0.049	0.041	0.148	0.245	0.28	0.146	0.049	0.041	0.148	0.245

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	55.6	53	7	20	29.25	#N/A	57	80	9	38	42	#N/A
Aluminium (mg/L)	2.7	1.25	1.46	173	15	33.1	2.7	1.25	1.46	173	15	33.1
Ammonia (mg/L)	0.045	0.15	0.281	0.0525	#N/A	#N/A	0.05	0.159	0.959	0.12	0.64	#N/A
Arienic (mg/L)	0.01	0.002	0.004	0.096	0.012	0.032	0.01	0.002	0.004	0.096	0.012	0.032
Barium (mg/L)	0.01	0.038	0.028	0.298	0.12	0.09	0.01	0.038	0.028	0.298	0.12	0.09
Benzene (mg/L)	5	1	0.0005	0.0005	#N/A	#N/A	5	1	0.0005	0.0005	#N/A	#N/A
BOD (mg/L)	3	4	1	154	#N/A	#N/A	3	4	1	154	#N/A	#N/A
Cadmium (mg/L)	0.005	0.0002	0.00005	0.0005	#N/A	#N/A	0.005	0.0002	0.00005	0.0005	#N/A	#N/A
Calcium (mg/L)	32	31	5	14.5	20.5	24.75	32	37	6	25	28	29
Chloride (mg/L)	3170	3153	919.3	1572.5	2117.5	2707.5	3270	3520	1080	2420	3000	3220
Chlorinated volatile compounds (mg/L)	50	5	0.23	0.025	#N/A	#N/A	50	5	0.23	0.025	#N/A	#N/A
Chromium (hexavalent) (mg/L)	0.01	0.01	0.005	0.005	#N/A	#N/A	0.01	0.01	0.005	0.005	#N/A	#N/A
Chromium (total) (mg/L)	0.01	0.001	0.0005	0.116	0.0009	0.025	0.01	0.001	0.0005	0.116	0.0009	0.025
Cobalt (mg/L)	0.04	0.043	0.003	0.0005	0.048	0.063	0.04	0.043	0.003	0.0005	0.048	0.063
Conductivity (uS/cm)	10350	8233	3122.5	5207.5	6442.5	7865	10600	8800	3700	7600	8680	9030
Copper (mg/L)	0.25	0.058	0.007	0.0049	0.011	0.015	0.25	0.058	0.007	0.0049	0.011	0.015
Ethyl benzene (mg/L)	5	2	0.001	0.001	#N/A	#N/A	5	2	0.001	0.001	#N/A	#N/A
Fluoride (mg/L)	1.06	1.1	0.3	0.538	0.38	0.95	1.2	1.2	0.4	1.14	0.7	1.2
Iron (mg/L)	1.55	1.61	1.28	51.67	#N/A	#N/A	0	1.81	3.3	258	0.15	#N/A
Lead (mg/L)	0	0.003	0.008	0.002	0.019	0.028	1.9	0.003	0.008	0.002	0.019	0.028
Magnesium (mg/L)	1955	184	37.3	92.5	122.75	170.5	205	213	44	161	170	206
Manganese (mg/L)	0.877	0.69	0.12	0.497	0.53	0.69	0.894	0.853	0.15	0.934	0.748	0.718
Mercury (mg/L)	0.0001	0.0001	0.0001	0.00005	#N/A	#N/A	0.0001	0.0001	0.0001	0.00005	#N/A	#N/A
Nitrate (mg/L)	0.025	0.19	0.1	0.02	#N/A	0.038	0.05	0.51	0.24	0.03	#N/A	0.06
Organochlorine pesticides (mg/L)	0.5	0.6	0.00032	0.00025	#N/A	#N/A	0.5	0.6	0.001	0.00025	#N/A	#N/A
Organophosphate pesticides (mg/L)	0.2	#N/A	0.016	0.00025	#N/A	#N/A	0.2	#N/A	0.016	0.00025	#N/A	#N/A
PCBs (mg/L)	0.3	#N/A	0.0005	0.0005	#N/A	#N/A	0.3	#N/A	0.0005	0.0005	#N/A	#N/A
pH (pH)	6.05	5.59	5.24	5.34	5.3	5.59	6.45	6.1	5.7	5.6	5.38	5.71
Phosphate (mg/L)	0.06	0.01	0.01	0.01	#N/A	#N/A	0.06	0.01	0.01	0.01	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	2	#N/A	0.008	0.0005	#N/A	#N/A	2	#N/A	0.008	0.0005	#N/A	#N/A
Potassium (mg/L)	28.5	28	9	14.25	18.75	23	29	30	10	20	25	26
Sodium (mg/L)	1653.3	1805	637.5	1009.5	1282.5	1410	1850	1880	778	1500	1690	1640
Sulfate (mg/L)	320	294	280.3	371.5	356.8	268	322	311	360	736	573	309
Toluene (mg/L)	5	2	0.0025	0.0025	#N/A	#N/A	5	2	0.0025	0.0025	#N/A	#N/A
(mg/L)	5920	5680	1490	8050	5410	5580	5920	5680	1490	8050	5410	5580
(mg/L)	7.3	12	19.75	20.25	#N/A	#N/A	12	22	52	50	10	427
Total petroleum hydrocarbons (mg/L)	100	20	0.11	0.01	#N/A	#N/A	100	20	0.11	0.01	#N/A	#N/A
Total Phenolics (mg/L)	0.05	0.05	0.084	0.1468	#N/A	#N/A	0.05	0.05	0.26	0.36	0.37	#N/A
Zinc (mg/L)	0.28	0.146	0.049	0.041	0.148	0.245	0.28	0.146	0.049	0.041	0.148	0.245


Sample Value Average
200
180
160
140
120
100
80
60
40
20
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)

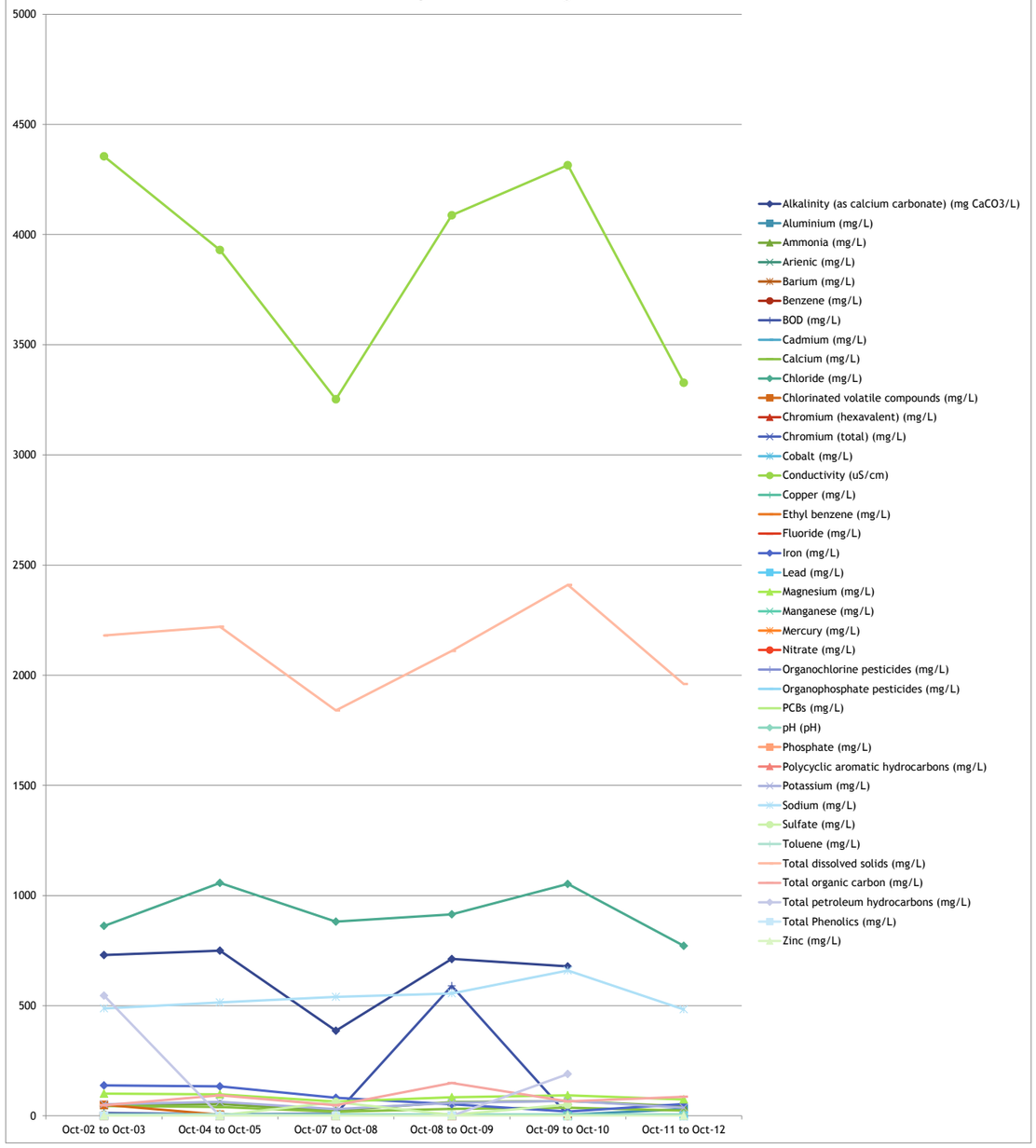
Monitoring Site 3 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

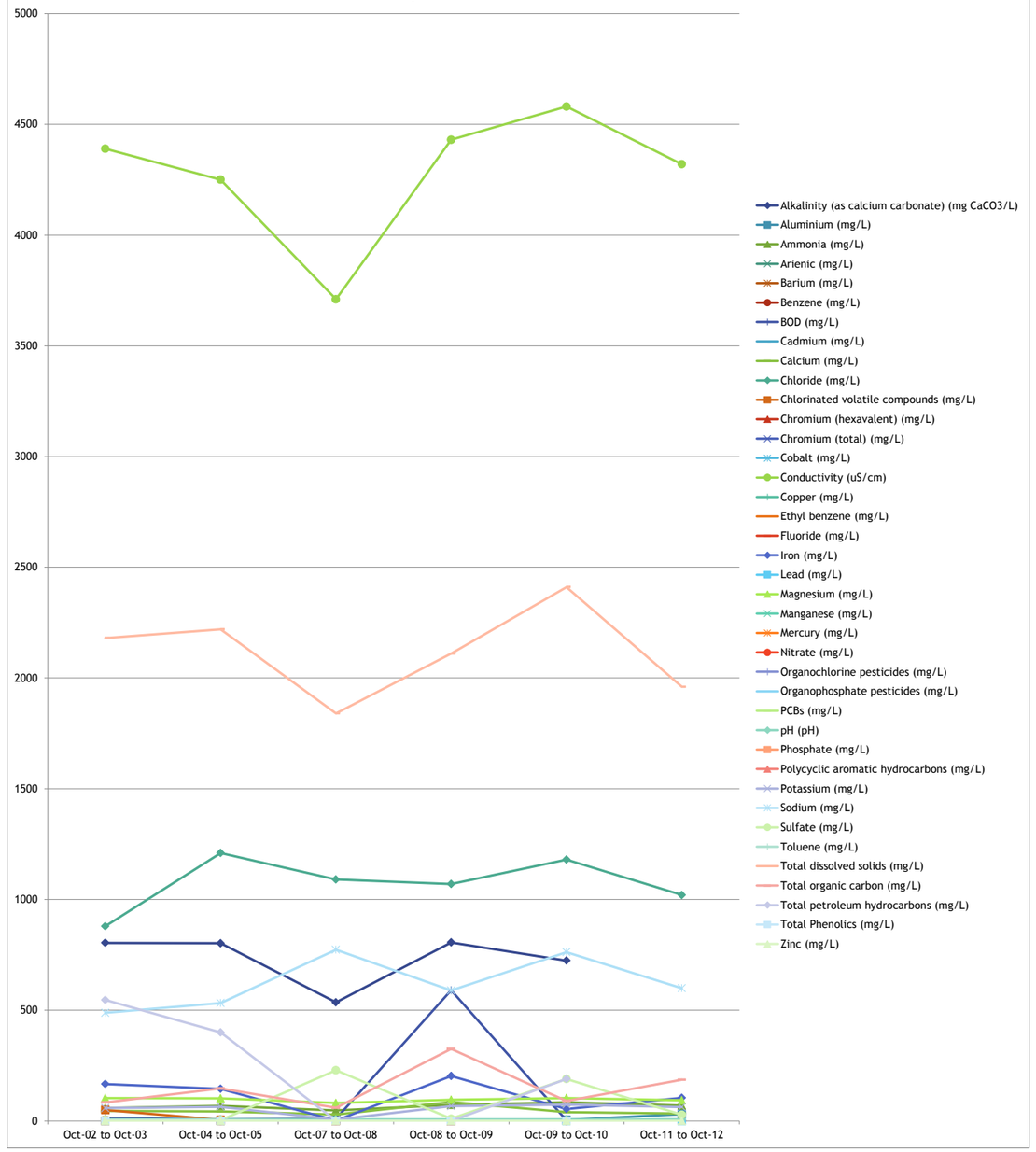
Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	2	656	730	804	3	719	750	802	4	5	386	535	4	518	712	806	4	634	678.25	724	4	<LOR	NC	<LOR
Aluminium	mg/L	1	1	0.7	0.7	0.7	1	1.04	1.04	1.04	1	5.14	5.14	5.14	1	0.026	0.026	0.026	1	4.83	4.83	4.83	1	31.1	31.1	31.1
Ammonia	mg/L	4	2	39.9	48.9	57.9	3	45.9	53.9	67.7	4	7.69	23.67	46.9	4	49.2	62.125	72.2	4	44.2	67.78	84.9	4	13	42.23	69.7
Arienic	mg/L	1	1	0.05	0.05	0.05	1	0.009	0.009	0.009	1	0.01	0.01	0.01	1	1.94	1.94	1.94	1	0.01	0.01	0.01	1	0.014	0.014	0.014
Barium	mg/L	1	1	<0.005	<0.005	<0.005	1	0.674	0.674	0.674	1	1.54	1.54	1.54	1	0.0016	0.0016	0.0016	1	1.07	1.07	1.07	1	1.08	1.08	1.08
Benzene	mg/L	1	1	<5	<5	<5	1	2	2	2	1	0.0005	0.0005	0.0005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
BOD	mg/L	1	1	13	13	13	1	8	8	8	1	10	10	10	1	590	590	590	1	3	3	3	1	<LOR	NC	<LOR
Cadmium	mg/L	1	1	<0.01	<0.01	<0.01	1	0.0005	0.0005	0.0005	1	0.00005	0.00005	0.00005	1	0.087	0.087	0.087	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Calcium	mg/L	4	2	44	44.5	45	3	37	40	43	4	5	18.75	29	4	24	31.75	86	4	34	37.25	40	4	13	23.5	33
Chloride	mg/L	4	2	845	862	879	3	940	1057	1210	4	568	881.25	1090	4	723	914.75	1070	4	975	1052.5	1180	4	516	771.75	1020
Chlorinated volatile compounds	mg/L	1	1	<50	<50	<50	1	<5	<5	<5	1	0.23	0.23	0.23	1	0.025	0.025	0.025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (hexavalent)	mg/L	1	1	<0.01	<0.01	<0.01	1	<0.01	<0.01	<0.01	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (total)	mg/L	1	1	<0.01	<0.01	<0.01	1	0.003	0.003	0.003	1	0.004	0.004	0.004	1	0.005	0.005	0.005	1	0.002	0.002	0.002	1	0.03	0.03	0.03
Cobalt	mg/L	1	1	0.18	0.18	0.18	1	0.004	0.004	0.004	1	0.003	0.003	0.003	1	0.008	0.008	0.008	1	0.003	0.003	0.003	1	0.008	0.008	0.008
Conductivity	uS/cm	4	2	4320	4355	4390	3	3550	3930	4250	4	2480	3252.5	3710	4	3400	4087.5	4430	4	4050	4315	4580	4	2380	3327.5	4320
Copper	mg/L	1	1	0.18	0.18	0.18	1	0.126	0.126	0.126	1	0.001	0.001	0.001	1	0.032	0.032	0.032	1	0.006	0.006	0.006	1	0.027	0.027	0.027
Ethyl benzene	mg/L	1	1	<5	<5	<5	1	<2	<2	<2	1	0.001	0.001	0.001	1	0.001	0.001	0.001	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Fluoride	mg/L	4	2	0.3	0.3	0.3	3	0.2	0.2	0.2	4	0.1	0.2	0.4	4	0.01	0.18	0.41	4	<LOR	NC	0.37	4	0.1	0.175	0.2
Iron	mg/L	4	2	109	138	167	3	120	134	145	4	0.28	82.1	1.88	5	10.2	53	203	4	4.02	19.79	54	3	1.3	53.8	104
Lead	mg/L	1	1	0.02	0.02	0.02	1	0.008	0.008	0.008	1	0.042	0.042	0.042	1	0.115	0.115	0.115	1	0.038	0.038	0.038	1	0.066	0.066	0.066
Magnesium	mg/L	4	2	99	101	103	3	95	98	102	4	40	64.5	81	4	62	84.75	95	4	87	93.25	103	4	59	75	93
Manganese	mg/L	4	2	0.951	0.9755	1	3	0.636	0.73	0.8	4	0.11	1.045	1.94	5	0.187	0.6084	1.07	4	0.546	0.64	0.695	3	<LOR	NC	<LOR
Mercury	mg/L	1	1	<0.0001	<0.0001	<0.0001	1	<0.0001	<0.0001	<0.0001	1	0.0002	0.0002	0.0002	1	0.00005	0.00005	0.00005	1	<LOR	NC	<LOR	1	<LOR	NC	0.002
Nitrate	mg/L	4	2	<0.01	<0.01	<0.01	3	0.02	0.027	0.031	4	0.018	0.08	0.2	4	0.003	0.01	0.02	4	0.01	0.048	0.12	4	<LOR	NC	<LOR
Organochlorine pesticides	mg/L	4	2	<0.05	<0.5	<0.5	3	<0.5	0	<2	4	0.25	0.34	1	4	0.00025	0.00032	0.001	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	1	<0.2	<0.2	<0.2	1	<2	<2	<2	1	0.007	0.007	0.007	1	0.00025	0.00025	0.00025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
PCBs	mg/L	1	1	<0.3	<0.3	<0.3	1	<1	<1	<1	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
pH	pH	4	2	6.38	6.42	6.44	3	6.4	6.51	6.66	4	4.75	5.91	6.44	4	6.32	6.38	6.44	4	6.45	6.49	6.53	4	6.73	6.755	6.79
Phosphate	mg/L	1	1	0.05	0.05	0.05	1	<0.01	<0.01	<0.01	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	1	<2	<2	<2	1	1.4	1.4	1.4	1	0.008	0.008	0.008	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Potassium	mg/L	4	2	48	53	58	3	63	64	64	4	10	30.5	5.5	4	47	59.5	67	4	61	67.5	74	4	12	37	63
Sodium	mg/L	4	2	487	487.5	488	2	4.97	515	532	4	370	540	773	4	501	555.75	589	4	614	660	762	4	362	483.5	599
Sulfate	mg/L	4	2	2	4	5	3	<1	2.3	4	4	4	62.5	229	4	0.82	4.28	10	4	0.64	51.22	190	4	<LOR	NC	28
Toluene	mg/L	1	1	<5	<5	<5	1	6	6	6	1	0.0025	0.0025	0.0025	1	0.0025	0.0025	0.0025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total dissolved solids	mg/L	1	1	2180	2180	2180	1	2220	2220	2220	1	1840	1840	1840	1	2110	2110	2110	1	2410	2410	2410	1	1960	1960	1960
Total organic carbon	mg/L	4	2	12	48	84	3	39	93	147	4	43	48.25	59	4	75	149	325	4	50	65.75	90	4	42	86.75	186
Total petroleum hydrocarbons	mg/L	1	1	546	546	546	1	<20	0	400	1	1.22	1.22	1.22	1	0.22	0.22	0.22	1	190	190	190	1	<LOR	NC	<LOR
Total Phenolics	mg/L	4	2	<0.05	<0.05	<0.05	2	<0.05	<0.05	<0.05	4	0.025	0.04	0.083	4	0.025	0.1437	0.25	4	<LOR	NC	0.11	4	<LOR	NC	<LOR
Zinc	mg/L	1	1	0.12	0.12	0.12	1	0.144	0.144	0.144	1	0.055	0.055	0.055	1	0.072	0.072	0.072	1	0.022	0.022	0.022	1	0.073	0.073	0.073

NC	Not calculated
LOR	Limit of reporting
N/A	No sample

Sample Value Average - Site 3



Sample Value Maximum - Site 3



Data for charts
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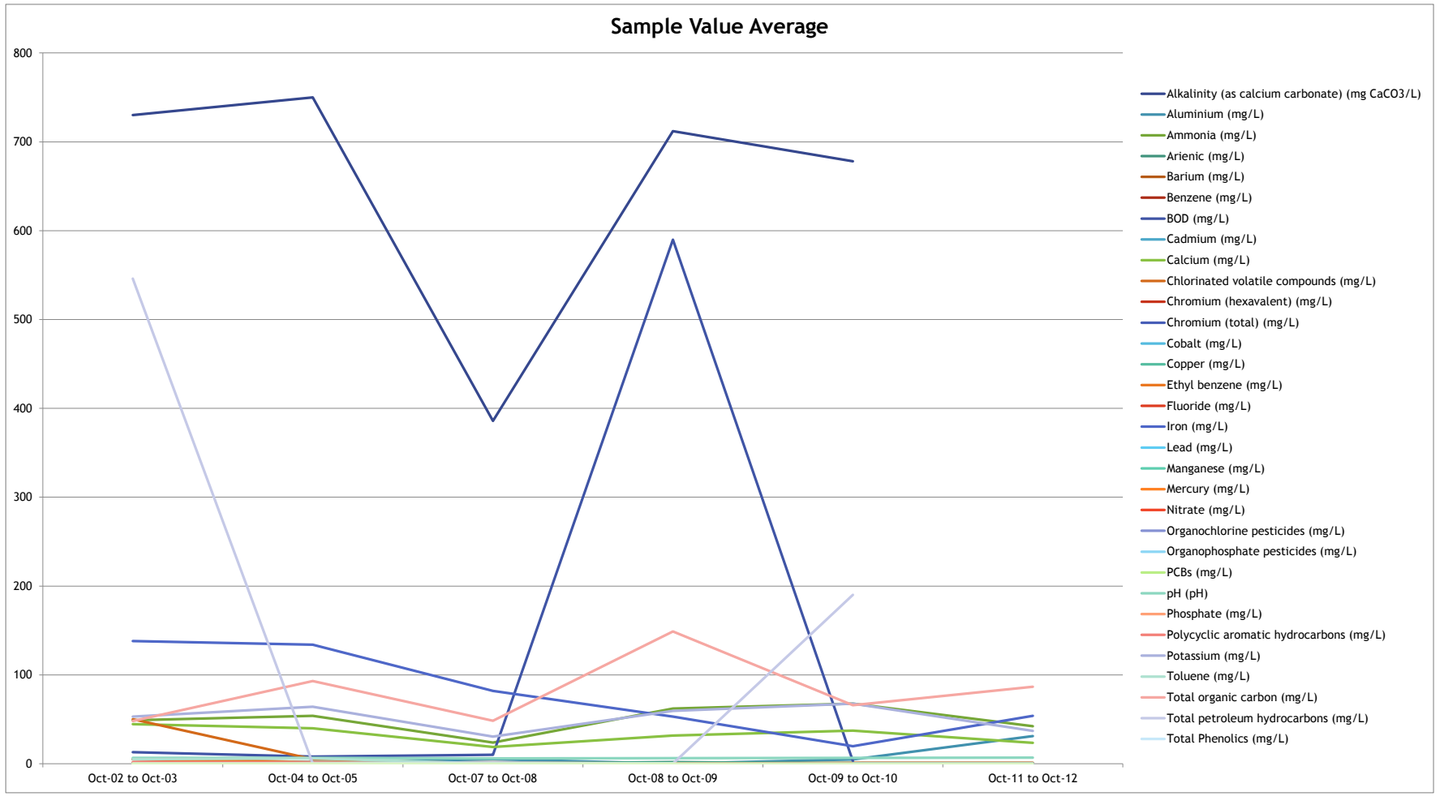
Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate)	730	750	386	712	678.25	NC		804	802	535	806	724	<LOR
Aluminium	0.7	1.04	5.14	0.026	4.83	31.1		0.7	1.04	5.14	0.026	4.83	31.1
Ammonia	48.9	53.9	23.67	62.125	67.78	42.23		57.9	67.7	46.9	72.2	84.9	69.7
Arienic	0.05	0.009	0.01	1.94	0.01	0.014		0.05	0.009	0.01	1.94	0.01	0.014
Barium	<0.005	0.674	1.54	0.0016	1.07	1.08		<0.005	0.674	1.54	0.0016	1.07	1.08
Benzene	<5	2	0.0005	0.005	NC	NC		<5	2	0.0005	0.005	<LOR	<LOR
BOD	13	8	10	590	3	NC		13	8	10	590	3	<LOR
Cadmium	<0.01	0.0005	0.00005	0.087	NC	NC		<0.01	0.0005	0.00005	0.087	<LOR	<LOR
Calcium	44.5	40	18.75	31.75	37.25	23.5		45	43	29	86	40	33
Chloride	862	1057	881.25	914.75	1052.5	771.75		879	1210	1090	1070	1180	1020
Chlorinated volatile compounds	<50	<5	0.23	0.025	NC	NC		<50	<5	0.23	0.025	<LOR	<LOR
Chromium (hexavalent)	<0.01	<0.01	0.005	0.005	NC	NC		<0.01	<0.01	0.005	0.005	<LOR	<LOR
Chromium (total)	<0.01	0.003	0.004	0.005	0.002	0.03		<0.01	0.003	0.004	0.005	0.002	0.03
Cobalt	0.18	0.004	0.003	0.008	0.003	0.008		0.18	0.004	0.003	0.008	0.003	0.008
Conductivity	4355	3930	3252.5	4087.5	4315	3327.5		4390	4250	3710	4430	4580	4320
Copper	0.18	0.126	0.001	0.032	0.006	0.027		0.18	0.126	0.001	0.032	0.006	0.027
Ethyl benzene	<5	<2	0.001	0.001	NC	NC		<5	<2	0.001	0.001	<LOR	<LOR
Fluoride	0.3	0.2	0.2	0.18	NC	0.175		0.3	0.2	0.4	0.41	0.37	0.2
Iron	138	134	82.1	53	19.79	53.8		167	145	1.88	203	54	104
Lead	0.02	0.008	0.042	0.115	0.038	0.066		0.02	0.008	0.042	0.115	0.038	0.066
Magnesium	101	98	64.5	84.75	93.25	75		103	102	81	95	103	93
Manganese	0.9755	0.73	1.045	0.6084	0.64	NC		1	0.8	1.94	1.07	0.695	<LOR
Mercury	<0.0001	<0.0001	0.0002	0.00005	NC	NC		<0.0001	<0.0001	0.0002	0.00005	<LOR	0.002
Nitrate	<0.01	0.027	0.08	0.01	0.048	NC		<0.01	0.031	0.2	0.02	0.12	<LOR
Organochlorine pesticides	<0.5	0	0.34	0.00032	NC	NC		<0.5	<2	1	0.001	<LOR	<LOR
Organophosphate pesticides	<0.2	<2	0.007	0.00025	NC	NC		<0.2	<2	0.007	0.00025	<LOR	<LOR
PCBs	<0.3	<1	0.0005	0.0005	NC	NC		<0.3	<1	0.0005	0.0005	<LOR	<LOR
pH	6.42	6.51	5.91	6.38	6.49	6.755		6.44	6.66	6.44	6.44	6.53	6.79
Phosphate	0.05	<0.01	0.005	0.005	NC	NC		0.05	<0.01	0.005	0.005	<LOR	<LOR
Polycyclic aromatic hydrocarbons	<2	1.4	0.008	0.0005	NC	NC		<2	1.4	0.008	0.0005	<LOR	<LOR
Potassium	53	64	30.5	59.5	67.5	37		58	64	5.5	67	74	63
Sodium	487.5	515	540	555.75	660	483.5		488	532	773	589	762	599
Sulfate	4	2.3	62.5	4.28	51.22	NC		5	4	229	10	190	28
Toluene	<5	6	0.0025	0.0025	NC	NC		<5	6	0.0025	0.0025	<LOR	<LOR
Total dissolved solids	2180	2220	1840	2110	2410	1960		2180	2220	1840	2110	2410	1960
Total organic carbon	48	93	48.25	149	65.75	86.75		84	147	59	325	90	186
Total petroleum hydrocarbons	546	0	1.22	0.22	190	NC		546	400	1.22	0.22	190	<LOR
Total Phenolics	<0.05	<0.05	0.04	0.1437	NC	NC		<0.05	<0.05	0.083	0.25	0.11	<LOR
Zinc	0.12	0.144	0.055	0.072	0.022	0.073		0.12	0.144	0.055	0.072	0.022	0.073

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	730	750	386	712	678.25	#N/A		804	802	535	806	724	#N/A
Aluminium (mg/L)	0.7	1.04	5.14	0.026	4.83	31.1		0.7	1.04	5.14	0.026	4.83	31.1
Ammonia (mg/L)	48.9	53.9	23.67	62.125	67.78	42.23		57.9	67.7	46.9	72.2	84.9	69.7
Arienic (mg/L)	0.05	0.009	0.01	1.94	0.01	0.014		0.05	0.009	0.01	1.94	0.01	0.014
Barium (mg/L)	0.005	0.674	1.54	0.0016	1.07	1.08		0.005	0.674	1.54	0.0016	1.07	1.08
Benzene (mg/L)	5	2	0.0005	0.005	#N/A	#N/A		5	2	0.0005	0.005	#N/A	#N/A
BOD (mg/L)	13	8	10	590	3	#N/A		13	8	10	590	3	#N/A
Cadmium (mg/L)	0.01	0.0005	0.00005	0.087	#N/A	#N/A		0.01	0.0005	0.00005	0.087	#N/A	#N/A
Calcium (mg/L)	44.5	40	18.75	31.75	37.25	23.5		45	43	29	86	40	33
Chloride (mg/L)	862	1057	881.25	914.75	1052.5	771.75		879	1210	1090	1070	1180	1020
Chlorinated volatile compounds (mg/L)	50	5	0.23	0.025	#N/A	#N/A		50	5	0.23	0.025	#N/A	#N/A
Chromium (hexavalent) (mg/L)	0.01	0.01	0.005	0.005	#N/A	#N/A		0.01	0.01	0.005	0.005	#N/A	#N/A
Chromium (total) (mg/L)	0.01	0.003	0.004	0.005	0.002	0.03		0.01	0.003	0.004	0.005	0.002	0.03
Cobalt (mg/L)	0.18	0.004	0.003	0.008	0.003	0.008		0.18	0.004	0.003	0.008	0.003	0.008
Conductivity (uS/cm)	4355	3930	3252.5	4087.5	4315	3327.5		4390	4250	3710	4430	4580	4320
Copper (mg/L)	0.18	0.126	0.001	0.032	0.006	0.027		0.18	0.126	0.001	0.032	0.006	0.027
Ethyl benzene (mg/L)	5	2	0.001	0.001	#N/A	#N/A		5	2	0.001	0.001	#N/A	#N/A
Fluoride (mg/L)	0.3	0.2	0.2	0.18	#N/A	0.175		0.3	0.2	0.4	0.41	0.37	0.2
Iron (mg/L)	138	134	82.1	53	19.79	53.8		167	145	1.88	203	54	104
Lead (mg/L)	0.02	0.008	0.042	0.115	0.038	0.066		0.02	0.008	0.042	0.115	0.038	0.066
Magnesium (mg/L)	101	98	64.5	84.75	93.25	75		103	102	81	95	103	93
Manganese (mg/L)	0.9755	0.73	1.045	0.6084	0.64	#N/A		1	0.8	1.94	1.07	0.695	#N/A
Mercury (mg/L)	0.0001	0.0001	0.0002	0.00005	#N/A	#N/A		0.0001	0.0001	0.0002	0.00005	#N/A	0.002
Nitrate (mg/L)	0.01	0.027	0.08	0.01	0.048	#N/A		0.01	0.031	0.2	0.02	0.12	#N/A
Organochlorine pesticides (mg/L)	0.5	0	0.34	0.00032	#N/A	#N/A		0.5	2	1	0.001	#N/A	#N/A
Organophosphate pesticides (mg/L)	0.2	2	0.007	0.00025	#N/A	#N/A		0.2	2	0.007	0.00025	#N/A	#N/A
PCBs (mg/L)	0.3	1	0.0005	0.0005	#N/A	#N/A		0.3	1	0.0005	0.0005	#N/A	#N/A
pH (pH)	6.42	6.51	5.91	6.38	6.49	6.755		6.44	6.66	6.44	6.44	6.53	6.79
Phosphate (mg/L)	0.05	0.01	0.005	0.005	#N/A	#N/A		0.05	0.01	0.005	0.005	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	2	1.4	0.008	0.0005	#N/A	#N/A		2	1.4	0.008	0.0005	#N/A	#N/A
Potassium (mg/L)	53	64	30.5	59.5	67.5	37		58	64	5.5	67	74	63
Sodium (mg/L)	487.5	515	540	555.75	660	483.5		488	532	773	589	762	599
Sulfate (mg/L)	4	2.3	62.5	4.28	51.22	#N/A		5	4	229	10	190	28
Toluene (mg/L)	5	6	0.0025	0.0025	#N/A	#N/A		5	6	0.0025	0.0025	#N/A	#N/A
Total dissolved solids (mg/L)	2180	2220	1840	2110	2410	1960		2180	2220	1840	2110	2410	1960
(mg/L)	48	93	48.25	149	65.75	86.75		84	147	59	325	90	186
Total petroleum hydrocarbons (mg/L)	546	0	1.22	0.22	190	#N/A		546	400	1.22	0.22	190	#N/A
Total Phenolics (mg/L)	0.05	0.05	0.04	0.1437	#N/A	#N/A		0.05	0.05	0.083	0.25	0.11	#N/A
Zinc (mg/L)	0.12	0.144	0.055	0.072	0.022	0.073		0.12	0.144	0.055	0.072	0.022	0.073


Sample Value Average
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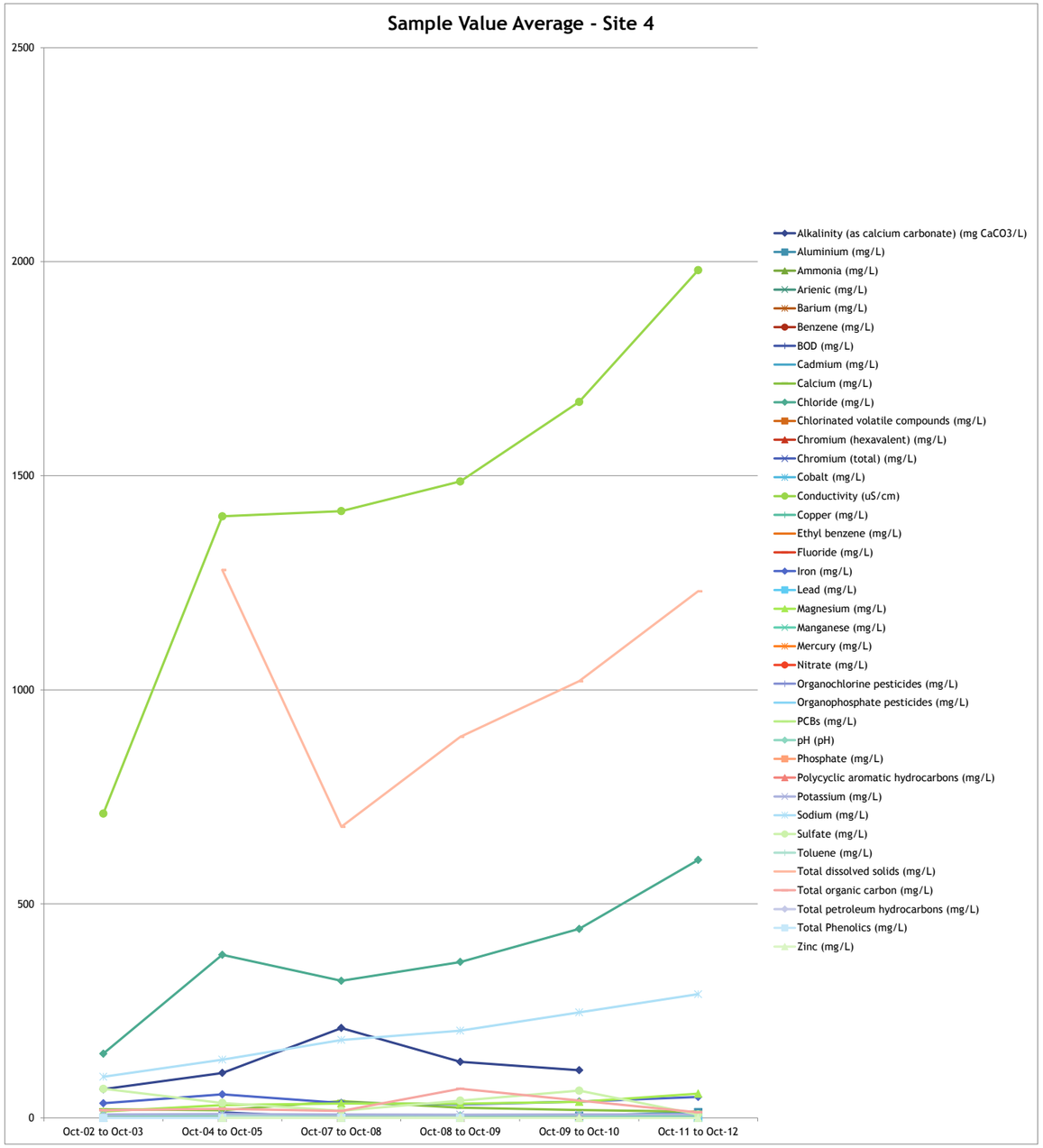
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Toluene (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)

Monitoring Site 4 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	1	67	67	67	3	69	105	166	4	90	210	260	3	65	131	244	4	48	111.5	194	4	<LOR	NC	<LOR
Aluminium	mg/L	1	0	N/A	N/A	N/A	1	.0.62	.0.62	.0.62	1	2.71	2.71	2.71	0	N/A	N/A	N/A	1	4.58	4.58	4.58	1	13.5	13.5	13.5
Ammonia	mg/L	4	1	0.54	0.54	0.54	3	0.25	0.333	0.488	4	0.274	1.173	2.4	3	0.76	1.45	2.31	4	0.43	2.02	3.6	4	3.47	3.59	3.78
Arienic	mg/L	1	0	N/A	N/A	N/A	1	0.009	0.009	0.009	1	0.022	0.022	0.022	0	N/A	N/A	N/A	1	0.009	0.009	0.009	1	0.006	0.006	0.006
Barium	mg/L	1	0	N/A	N/A	N/A	1	0.164	0.164	0.164	1	0.646	0.646	0.646	0	N/A	N/A	N/A	1	0.238	0.238	0.238	1	0.273	0.273	0.273
Benzene	mg/L	1	0	N/A	N/A	N/A	1	1	1	1	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
BOD	mg/L	1	0	N/A	N/A	N/A	1	13	13	13	1	1	1	1	0	N/A	N/A	N/A	1	4	4	4	1	3	3	3
Cadmium	mg/L	1	0	N/A	N/A	N/A	1	<0.0001	<0.0001	<0.0001	1	0.0003	0.0003	0.0003	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Calcium	mg/L	4	1	20	20	20	3	5	17.7	41	4	22	39.5	50	3	14	24	36	4	8	18.25	35	4	12	14.75	17
Chloride	mg/L	4	1	150	150	150	3	160	381	539	4	300	320.3	367	3	252	364.3	469	4	299	441.5	512	4	559	602.75	665
Chlorinated volatile compounds	mg/L	1	0	N/A	N/A	N/A	1	<5	0	<5	1	0.23	0.23	0.23	1	0.025	0.025	0.025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (hexavalent)	mg/L	1	0	N/A	N/A	N/A	1	<0.01	0	<0.01	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (total)	mg/L	1	0	N/A	N/A	N/A	1	<0.001	0	<0.001	1	0.002	0.002	0.002	0	N/A	N/A	N/A	1	0.003	0.003	0.003	1	0.012	0.012	0.012
Cobalt	mg/L	1	0	N/A	N/A	N/A	1	<0.001	<0.001	<0.001	1	0.0005	0.0005	0.0005	1	0.003	0.003	0.003	1	<LOR	NC	<LOR	1	0.001	0.001	0.001
Conductivity	uS/cm	4	1	711	711	711	3	835	1405	11740	4	1290	1417.5	1500	3	1320	1486.6	1570	4	1330	1672.5	1930	4	1880	1980	2110
Copper	mg/L	1	0	N/A	N/A	N/A	1	0.03	0.03	0.03	1	0.004	0.004	0.004	1	0.011	0.011	0.011	1	0.003	0.003	0.003	1	0.009	0.009	0.009
Ethyl benzene	mg/L	1	0	N/A	N/A	N/A	1	<2	0	<2	1	0.001	0.001	0.001	1	0.001	0.001	0.001	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Fluoride	mg/L	4	1	0.2	0.2	0.2	3	0.1	0.1	0.1	4	0.1	0.13	0.2	3	0.1	0.121	0.162	4	<LOR	NC	0.12	4	<LOR	NC	0.2
Iron	mg/L	4	1	34.2	34.2	34.2	3	31.9	54.9	70.7	4	15.8	35.1	51.9	4	9.55	31.7	47.5	4	22.4	38.33	56.7	3	31.9	48.97	62.8
Lead	mg/L	1	0	N/A	N/A	N/A	1	0.002	0.002	0.002	1	0.103	0.103	0.103	1	0.066	0.066	0.066	1	0.019	0.019	0.019	1	0.028	0.028	0.028
Magnesium	mg/L	4	1	15	15	15	3	18	30	37	4	32	34	38	3	32	33.33	34	4	33	37.75	42	4	44	56.75	50
Manganese	mg/L	4	1	0.4	0.4	0.4	3	0.12	0.318	0.662	4	0.371	0.746	0.956	4	0.286	0.412	0.63	4	0.211	0.4	0.715	3	0.297	0.34	0.407
Mercury	mg/L	1	0	N/A	N/A	N/A	1	<0.0001	0	<0.0001	1	0.0004	0.0004	0.0004	1	0.00005	0.00005	0.00005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Nitrate	mg/L	4	1	0.02	0.02	0.02	3	0.023	0.04	0.059	4	0.005	0.04	0.083	3	0.04	0.06	0.09	4	0.02	0.04	0.09	4	<LOR	NC	0.04
Organochlorine pesticides	mg/L	4	1	<0.05	<0.5	<0.5	3	<0.5	0	<0.5	4	0.00025	0.00032	0.001	3	0.00025	0.00032	0.001	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	0	N/A	N/A	N/A	1	<2	0	<2	1	0.008	0.008	0.008	1	0.00025	0.00025	0.00025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
PCBs	mg/L	1	0	N/A	N/A	N/A	1	<2	0	<2	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
pH	pH	4	1	5.89	5.89	5.89	3	5.93	6.1	6.25	4	5.59	6	6.29	3	5.94	5.99	6.04	4	5.91	6.1	6.28	4	6.34	6.42	6.5
Phosphate	mg/L	1	0	N/A	N/A	N/A	1	<0.01	0	<0.01	1	0.005	0.005	0.005	1	0.01	0.01	0.01	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	0	N/A	N/A	N/A	1	<1	0	<1	1	0.008	0.008	0.008	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Potassium	mg/L	4	1	8	8	8	3	8	9	10	4	8	8	8	3	7	7.67	8	4	8	8	8	4	8	8.75	9
Sodium	mg/L	4	1	96	96	96	3	95	136	192	5	149	182	215	3	16	203.67	227	4	215	246.5	26.5	4	252	289	322
Sulfate	mg/L	4	1	68	68	68	3	24	35	50	4	9	17	28	3	28.6	40.53	48	4	16.2	63.58	182	4	6	8	10
Toluene	mg/L	1	0	N/A	N/A	N/A	1	4	4	4	1	0.0025	0.0025	0.0025	1	0.0025	0.0025	0.0025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total dissolved solids	mg/L	1	0	N/A	N/A	N/A	1	1280	1280	1280	1	680	680	680	1	890	890	890	1	1020	1020	1020	1	1230	1230	1230
Total organic carbon	mg/L	4	1	18	18	18	3	10	21	36	4	13	16.5	20	3	2.5	68.3	150	4	<LOR	NC	17	4	10	13	16
Total petroleum hydrocarbons	mg/L	1	0	N/A	N/A	N/A	1	<20	0	<20	1	0.16	0.16	0.16	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total Phenolics	mg/L	4	1	<0.05	<0.05	<0.05	3	<0.05	0	<0.5	4	0.025	0.025	0.025	3	0.025	0.1517	0.36	4	<LOR	NC	0.25	4	<LOR	NC	<LOR
Zinc	mg/L	1	0	N/A	N/A	N/A	1	0.05	0.05	0.05	1	0.082	0.082	0.082	1	0.054	0.054	0.054	1	0.015	0.015	0.015	1	0.031	0.031	0.031

NC	Not calculated
LOR	Limit of reporting
N/A	No sample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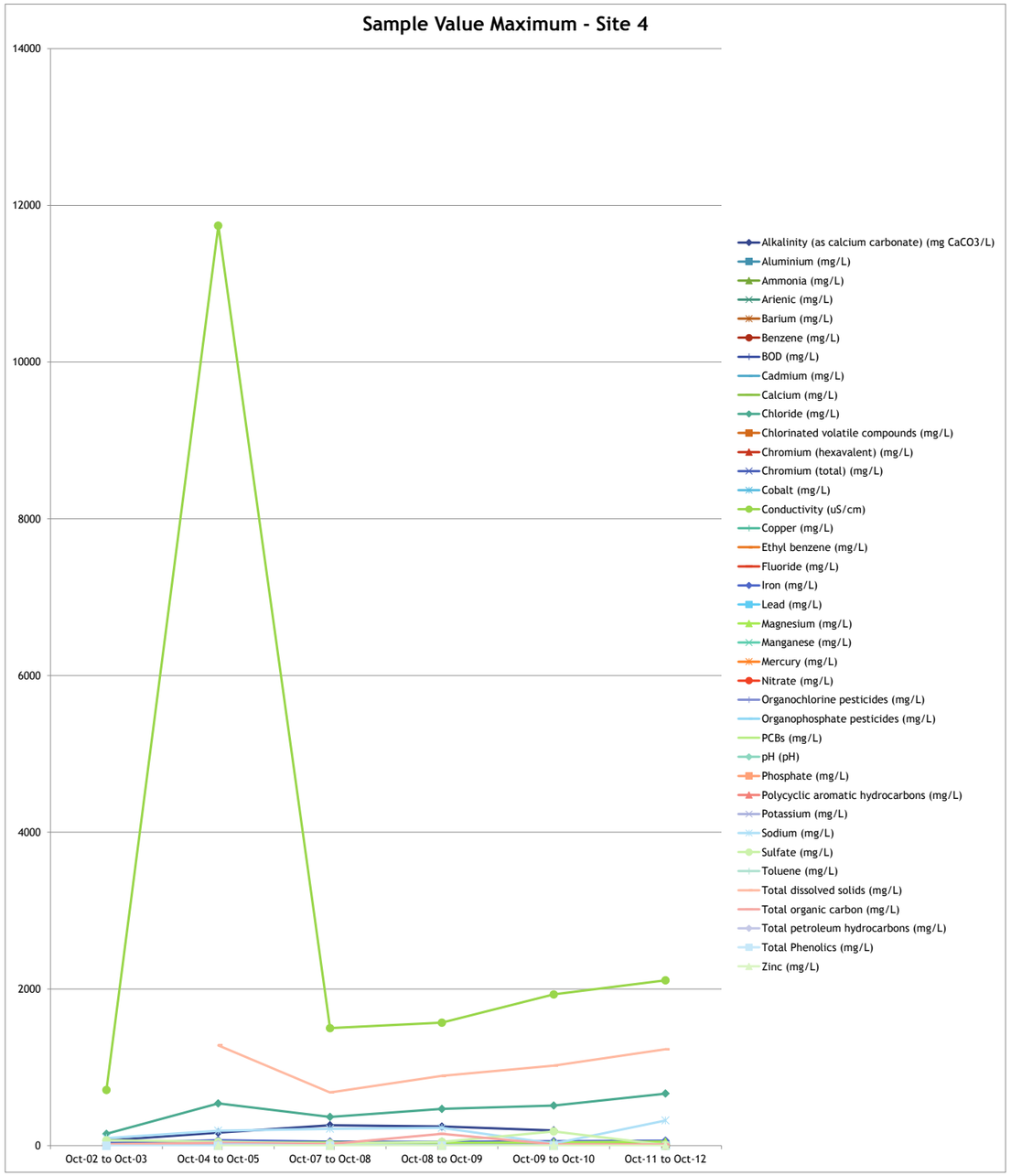
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)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Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)

Data for charts
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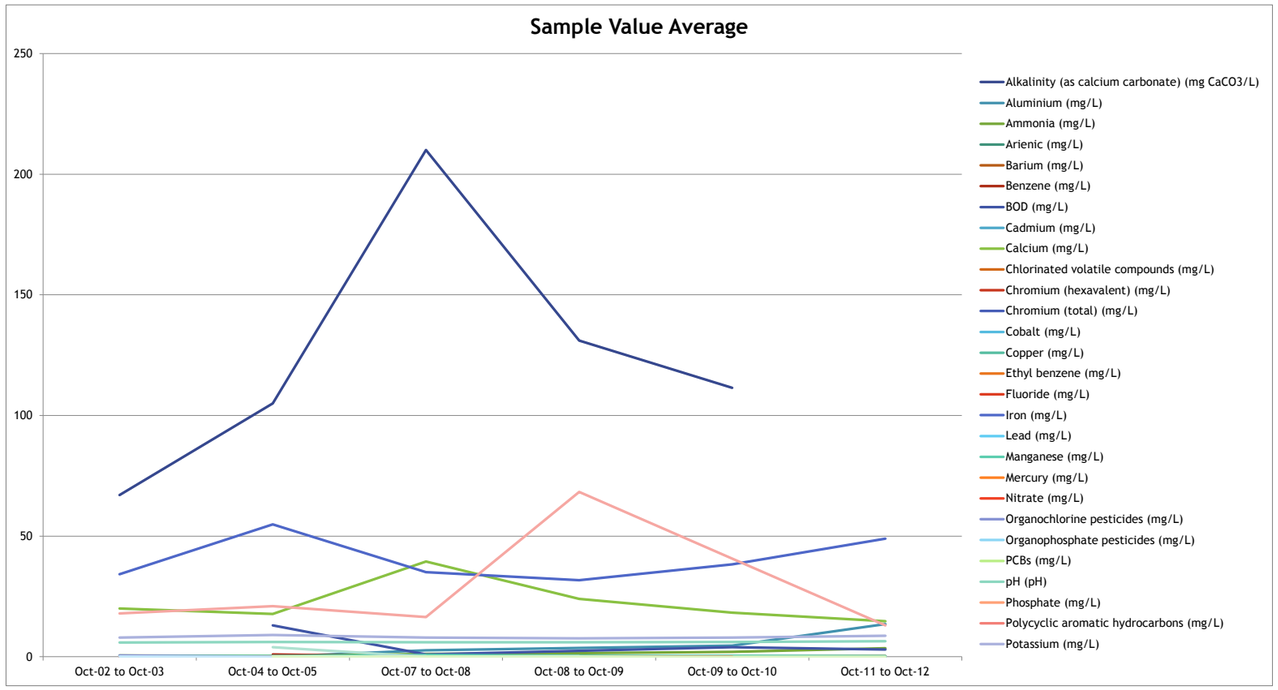
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate)	67	105	210	131	111.5	NC		67	166	260	244	194	<LOR
Aluminium	N/A	.0.62	2.71	N/A	4.58	13.5		N/A	.0.62	2.71	N/A	4.58	13.5
Ammonia	0.54	0.333	1.173	1.45	2.02	3.59		0.54	0.488	2.4	2.31	3.6	3.78
Arienic	N/A	0.009	0.022	N/A	0.009	0.006		N/A	0.009	0.022	N/A	0.009	0.006
Barium	N/A	0.164	0.646	N/A	0.238	0.273		N/A	0.164	0.646	N/A	0.238	0.273
Benzene	N/A	1	0.0005	0.0005	NC	NC		N/A	1	0.0005	0.0005	<LOR	<LOR
BOD	N/A	13	1	N/A	4	3		N/A	13	1	N/A	4	3
Cadmium	N/A	<0.0001	0.0003	N/A	NC	NC		N/A	<0.0001	0.0003	N/A	<LOR	<LOR
Calcium	20	17.7	39.5	24	18.25	14.75		20	41	50	36	35	17
Chloride	150	381	320.3	364.3	441.5	602.75		150	539	367	469	512	665
Chlorinated volatile compounds	N/A	0	0.23	0.025	NC	NC		N/A	<5	0.23	0.025	<LOR	<LOR
Chromium (hexavalent)	N/A	0	0.005	0.005	NC	NC		N/A	<0.01	0.005	0.005	<LOR	<LOR
Chromium (total)	N/A	0	0.002	N/A	0.003	0.012		N/A	<0.001	0.002	N/A	0.003	0.012
Cobalt	N/A	<0.001	0.0005	0.003	NC	0.001		N/A	<0.001	0.0005	0.003	<LOR	0.001
Conductivity	711	1405	1417.5	1486.6	1672.5	1980		711	11740	1500	1570	1930	2110
Copper	N/A	0.03	0.004	0.011	0.003	0.009		N/A	0.03	0.004	0.011	0.003	0.009
Ethyl benzene	N/A	0	0.001	0.001	NC	NC		N/A	<2	0.001	0.001	<LOR	<LOR
Fluoride	0.2	0.1	0.13	0.121	NC	NC		0.2	0.1	0.2	0.162	0.12	0.2
Iron	34.2	54.9	35.1	31.7	38.33	48.97		34.2	70.7	51.9	47.5	56.7	62.8
Lead	N/A	0.002	0.103	0.066	0.019	0.028		N/A	0.002	0.103	0.066	0.019	0.028
Magnesium	15	30	34	33.33	37.75	56.75		15	37	38	34	42	50
Manganese	0.4	0.318	0.746	0.412	0.4	0.34		0.4	0.662	0.956	0.63	0.715	0.407
Mercury	N/A	0	0.0004	0.00005	NC	NC		N/A	<0.0001	0.0004	0.00005	<LOR	<LOR
Nitrate	0.02	0.04	0.04	0.06	0.04	NC		0.02	0.059	0.083	0.09	0.09	0.04
Organochlorine pesticides	<0.5	0	0.00032	0.00032	NC	NC		<0.5	<0.5	0.001	0.001	<LOR	<LOR
Organophosphate pesticides	N/A	0	0.008	0.00025	NC	NC		N/A	<2	0.008	0.00025	<LOR	<LOR
PCBs	N/A	0	0.0005	0.0005	NC	NC		N/A	<2	0.0005	0.0005	<LOR	<LOR
pH	5.89	6.1	6	5.99	6.1	6.42		5.89	6.25	6.29	6.04	6.28	6.5
Phosphate	N/A	0	0.005	0.01	NC	NC		N/A	<0.01	0.005	0.01	<LOR	<LOR
Polycyclic aromatic hydrocarbons	N/A	0	0.008	N/A	NC	NC		N/A	<1	0.008	N/A	<LOR	<LOR
Potassium	8	9	8	7.67	8	8.75		8	10	8	8	8	9
Sodium	96	136	182	203.67	246.5	289		96	192	215	227	26.5	322
Sulfate	68	35	17	40.53	63.58	8		68	50	28	48	182	10
Toluene	N/A	4	0.0025	0.0025	NC	NC		N/A	4	0.0025	0.0025	<LOR	<LOR
Total dissolved solids	N/A	1280	680	890	1020	1230		N/A	1280	680	890	1020	1230
Total organic carbon	18	21	16.5	68.3	NC	13		18	36	20	150	17	16
Total petroleum hydrocarbons	N/A	0	0.16	N/A	NC	NC		N/A	<20	0.16	N/A	<LOR	<LOR
Total Phenolics	<0.05	0	0.025	0.1517	NC	NC		<0.05	<0.5	0.025	0.36	0.25	<LOR
Zinc	N/A	0.05	0.082	0.054	0.015	0.031		N/A	0.05	0.082	0.054	0.015	0.031

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	67	105	210	131	111.5	#N/A		67	166	260	244	194	#N/A
Aluminium (mg/L)	#N/A	.0.62	2.71	#N/A	4.58	13.5		#N/A	.0.62	2.71	#N/A	4.58	13.5
Ammonia (mg/L)	0.54	0.333	1.173	1.45	2.02	3.59		0.54	0.488	2.4	2.31	3.6	3.78
Arienic (mg/L)	#N/A	0.009	0.022	#N/A	0.009	0.006		#N/A	0.009	0.022	#N/A	0.009	0.006
Barium (mg/L)	#N/A	0.164	0.646	#N/A	0.238	0.273		#N/A	0.164	0.646	#N/A	0.238	0.273
Benzene (mg/L)	#N/A	1	0.0005	0.0005	#N/A	#N/A		#N/A	1	0.0005	0.0005	#N/A	#N/A
BOD (mg/L)	#N/A	13	1	#N/A	4	3		#N/A	13	1	#N/A	4	3
Cadmium (mg/L)	#N/A	0.0001	0.0003	#N/A	#N/A	#N/A		#N/A	0.0001	0.0003	#N/A	#N/A	#N/A
Calcium (mg/L)	20	17.7	39.5	24	18.25	14.75		20	41	50	36	35	17
Chloride (mg/L)	150	381	320.3	364.3	441.5	602.75		150	539	367	469	512	665
Chlorinated volatile compounds (mg/L)	#N/A	0	0.23	0.025	#N/A	#N/A		#N/A	5	0.23	0.025	#N/A	#N/A
Chromium (hexavalent) (mg/L)	#N/A	0	0.005	0.005	#N/A	#N/A		#N/A	0.01	0.005	0.005	#N/A	#N/A
Chromium (total) (mg/L)	#N/A	0	0.002	#N/A	0.003	0.012		#N/A	0.001	0.002	#N/A	0.003	0.012
Cobalt (mg/L)	#N/A	0.001	0.0005	0.003	#N/A	0.001		#N/A	0.001	0.0005	0.003	#N/A	0.001
Conductivity (uS/cm)	711	1405	1417.5	1486.6	1672.5	1980		711	11740	1500	1570	1930	2110
Copper (mg/L)	#N/A	0.03	0.004	0.011	0.003	0.009		#N/A	0.03	0.004	0.011	0.003	0.009
Ethyl benzene (mg/L)	#N/A	0	0.001	0.001	#N/A	#N/A		#N/A	2	0.001	0.001	#N/A	#N/A
Fluoride (mg/L)	0.2	0.1	0.13	0.121	#N/A	#N/A		0.2	0.1	0.2	0.162	0.12	0.2
Iron (mg/L)	34.2	54.9	35.1	31.7	38.33	48.97		34.2	70.7	51.9	47.5	56.7	62.8
Lead (mg/L)	#N/A	0.002	0.103	0.066	0.019	0.028		#N/A	0.002	0.103	0.066	0.019	0.028
Magnesium (mg/L)	15	30	34	33.33	37.75	56.75		15	37	38	34	42	50
Manganese (mg/L)	0.4	0.318	0.746	0.412	0.4	0.34		0.4	0.662	0.956	0.63	0.715	0.407
Mercury (mg/L)	#N/A	0	0.0004	0.00005	#N/A	#N/A		#N/A	0.0001	0.0004	0.00005	#N/A	#N/A
Nitrate (mg/L)	0.02	0.04	0.04	0.06	0.04	#N/A		0.02	0.059	0.083	0.09	0.09	0.04
Organochlorine pesticides (mg/L)	0.5	0	0.00032	0.00032	#N/A	#N/A		0.5	0.5	0.001	0.001	#N/A	#N/A
Organophosphate pesticides (mg/L)	#N/A	0	0.008	0.00025	#N/A	#N/A		#N/A	2	0.008	0.00025	#N/A	#N/A
PCBs (mg/L)	#N/A	0	0.0005	0.0005	#N/A	#N/A		#N/A	2	0.0005	0.0005	#N/A	#N/A
pH (pH)	5.89	6.1	6	5.99	6.1	6.42		5.89	6.25	6.29	6.04	6.28	6.5
Phosphate (mg/L)	#N/A	0	0.005	0.01	#N/A	#N/A		#N/A	0.01	0.005	0.01	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	#N/A	0	0.008	#N/A	#N/A	#N/A		#N/A	1	0.008	#N/A	#N/A	#N/A
Potassium (mg/L)	8	9	8	7.67	8	8.75		8	10	8	8	8	9
Sodium (mg/L)	96	136	182	203.67	246.5	289		96	192	215	227	26.5	322
Sulfate (mg/L)	68	35	17	40.53	63.58	8		68	50	28	48	182	10
Toluene (mg/L)	#N/A	4	0.0025	0.0025	#N/A	#N/A		#N/A	4	0.0025	0.0025	#N/A	#N/A
Total dissolved solids (mg/L)	#N/A	1280	680	890	1020	1230		#N/A	1280	680	890	1020	1230
(mg/L)	18	21	16.5	68.3	#N/A	13		18	36	20	150	17	16
Total petroleum hydrocarbons (mg/L)	#N/A	0	0.16	#N/A	#N/A	#N/A		#N/A	20	0.16	#N/A	#N/A	#N/A
Total Phenolics (mg/L)	0.05	0	0.025	0.1517	#N/A	#N/A		0.05	0.5	0.025	0.36	0.25	#N/A
Zinc (mg/L)	#N/A	0.05	0.082	0.054	0.015	0.031		#N/A	0.05	0.082	0.054	0.015	0.031


Sample Value Average
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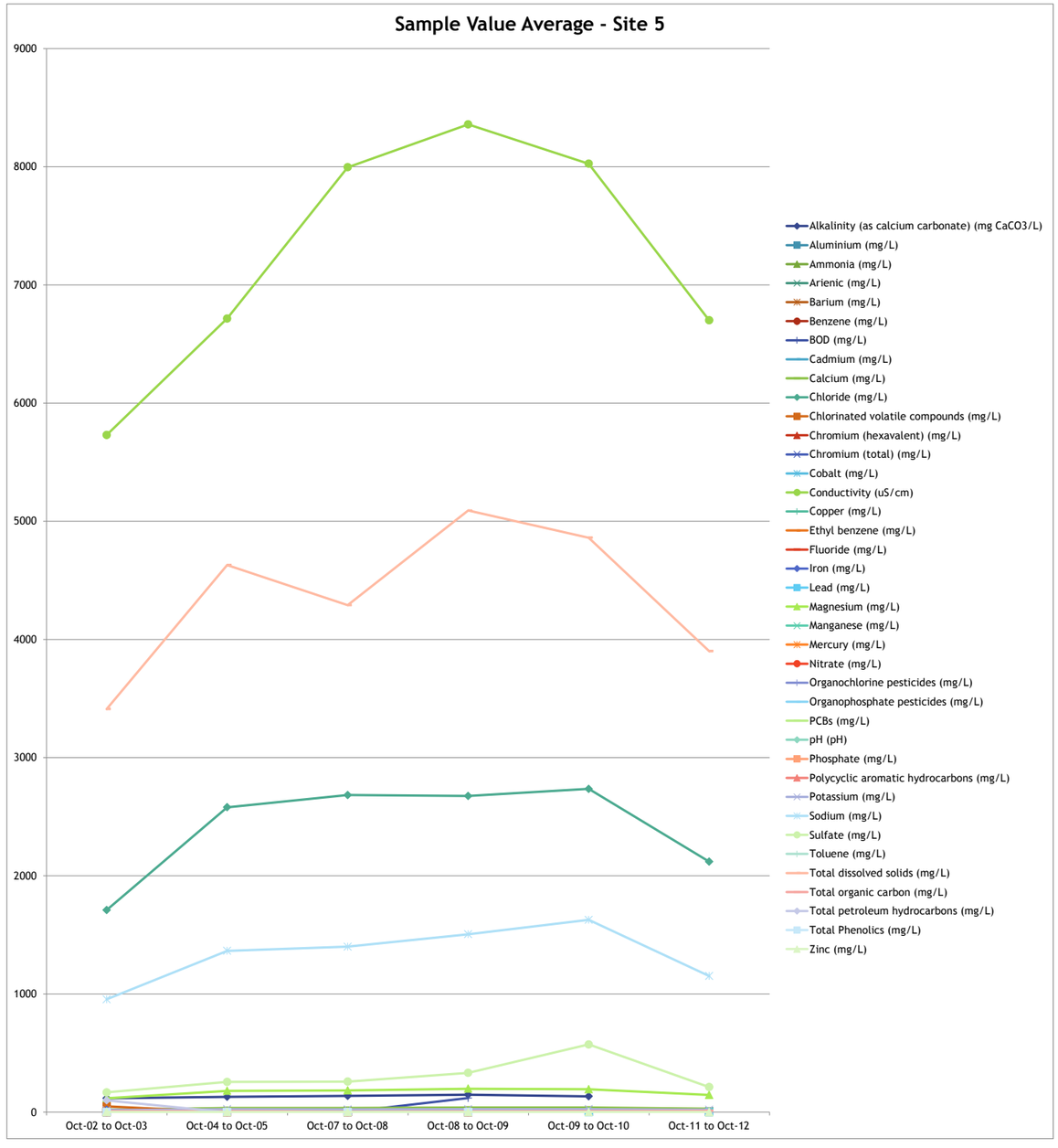
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)

Monitoring Site 5 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	99	117.5	127	4	124	130	133	4	134	137	139	4	140	148	160	4	119	134	145	4	<LOR	NC	<LOR
Aluminium	mg/L	1	1	c	<0.01	<0.01	1	2.7	2.7	2.7	1	1.06	1.06	1.06	1	0.015	0.015	0.015	1	2.2	2.2	2.2	1	6.71	6.71	6.71
Ammonia	mg/L	4	3		0.09	0.14	4	0.193	0.24	0.36	4	0.108	0.197	0.364	4	0.01	0.1125	0.22	4	<LOR	NC	0.36	4	0.38	0.63	0.87
Arienic	mg/L	1	1	3.3	3.3	3.3	1	0.001	0.001	0.001	1	0.011	0.011	0.011	1	0.08	0.08	0.08	1	0.02	0.02	0.02	1	0.003	0.003	0.003
Barium	mg/L	1	1	<0.005	<0.005	<0.005	1	0.034	0.034	0.034	1	0.043	0.043	0.043	1	0.0002	0.0002	0.0002	1	0.033	0.033	0.033	1	0.04	0.04	0.04
Benzene	mg/L	1	1	<5	<6	<7	1	<1	0	<1	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
BOD	mg/L	1	1	15	15	15	1	14	14	14	1	1	1	1	1	119	119	119	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Cadmium	mg/L	1	1	<0.01	<0.01	<0.01	1	0.0001	0.0001	0.0001	1	0.0002	0.0002	0.0002	1	0.031	0.031	0.031	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Calcium	mg/L	4	3	20	20.75	21	4	34	35	36	4	29	35.5	41	4	35	39.75	43	4	35	39.75	45	4	27	28.75	31
Chloride	mg/L	4	3	1680	1710	1750	4	2300	2580	2820	4	2240	2682.5	3030	4	2360	2675	3000	4	2420	2735	2890	4	1930	2120	2530
Chlorinated volatile compounds	mg/L	1	1	<50	<50	<50	1	<5	0	<5	1	0.23	0.23	0.23	1	0.025	0.025	0.025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (hexavalent)	mg/L	1	1	<0.01	<0.01	<0.01	1	<0.01	0	<0.01	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (total)	mg/L	1	1	<0.01	<0.01	<0.01	1	0.002	0	0.002	1	0.0005	0.0005	0.0005	1	0.002	0.002	0.002	1	<LOR	NC	<LOR	1	0.006	0.006	0.006
Cobalt	mg/L	1	1	<0.01	<0.01	<0.01	1	0.001	0.001	0.001	1	0.002	0.002	0.002	1	0.006	0.006	0.006	1	0.001	0.001	0.001	1	0.002	0.002	0.002
Conductivity	uS/cm	4	3	5260	5730	6190	4	6120	6715	7480	4	6640	7995	8930	4	7480	8357.58	9050	4	7300	8025	9200	4	6430	6700	7240
Copper	mg/L	1	1	0.78	0.78	0.78	1	0.14	0.146	0.0146	1	0.028	0.028	0.028	1	0.008	0.008	0.008	1	0.004	0.004	0.004	1	0.004	0.004	0.004
Ethyl benzene	mg/L	1	1	<5	<5	<5	1	<2	0	<2	1	0.001	0.001	0.001	1	0.001	0.001	0.001	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Fluoride	mg/L	4	3	0.2	0.466	0.6	4	0.6	0.63	0.7	4	0.5	0.575	0.6	4	0.01	0.5143	0.8	4	0.22	0.595	0.86	4	0.6	0.625	0.7
Iron	mg/L	4	3	10.9	19.23	34.2	4	<0.05			4	0.025	4.59	9.24	5	0.025	5.66	27.5	4	0.34	1.71	3.08	3	<LOR	NC	4.13
Lead	mg/L	1	1	<0.01	<0.01	<0.01	1	0.004	0.004	0.004	1	0.033	0.033	0.033	1	0.05	0.05	0.05	1	0.006	0.006	0.006	1	0.006	0.006	0.006
Magnesium	mg/L	4	3	109	118	122	4	171	180	185	4	154	184.5	206	4	178	198.75	212	4	176	193.25	215	4	134	146.5	160
Manganese	mg/L	4	3	0.203	0.218	0.23	4	0.309	0.36	0.448	4	0.39	0.48	0.58	5	0.477	0.5444	0.586	4	0.453	0.51	0.55	3	0.396	0.427	0.452
Mercury	mg/L	1	1	<0.0001	<0.0001	<0.0001	1	<0.0001	0	<0.0001	1	0.0002	0.0002	0.0002	1	0.00005	0.00005	0.00005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Nitrate	mg/L	4	3	<0.01	<0.01	<0.01	4	<0.01	0.019	0.033	4	0.01	0.04	0.08	4	0.005	0.02	0.04	4	<LOR	NC	0.07	4	<LOR	NC	0.06
Organochlorine pesticides	mg/L	4	3	<0.5	<0.5	<0.5	4	<0.05	0	<0.05	4	0.00025	0.00032	0.001	4	0.00025	0.00032	0.001	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	1	<0.2	<0.2	<0.2	1	<2	0	<2	1	0.007	0.007	0.007	1	0.0003	0.0003	0.0003	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
PCBs	mg/L	1	1	<0.3	<0.3	<0.3	1	<1	0	<1	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
pH	pH	4	3	5.68	5.73	5.75	4	5.78	6	6.42	4	5.52	5.9	6.22	4	5.91	5.99	6.03	4	5.89	6	6.25	4	6.19	6.268	6.36
Phosphate	mg/L	1	1	0.02	0.02	0.02	1	<0.01	0	<0.01	1	0.005	0.005	0.005	1	0.003	0.003	0.003	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	1	<2	<2	<2	1	<1	0	<1	1	0.008	0.008	0.008	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Potassium	mg/L	4	3	16	16.33	17	4	25	25.5	26	4	19	23.75	27	4	22	24.75	27	4	21	25.75	29	4	19	20.75	23
Sodium	mg/L	4	3	917	954	983	4	1280	1365	1520	5	1240	1400	1560	4	1380	1505	1570	4	1420	1627.5	1770	4	1030	1152.5	1350
Sulfate	mg/L	4	3	166	167	169	4	245	256	272	4	227	258.75	280	4	184	333	607	4	235	572.5	1430	4	190	212	262
Toluene	mg/L	1	1	<5	<5	<5	1	<2	0	<2	1	0.0025	0.0025	0.0025	1	0.0025	0.0025	0.0025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total dissolved solids	mg/L	1	1	3410	3410	3410	1	4630	4630	4630	1	4290	4290	4290	1	5090	5090	5090	1	4860	4860	4860	1	3900	3900	3900
Total organic carbon	mg/L	4	3	4	9	16	4	2	10	23	4	4	5	7	4	5	6.5	8	4	<LOR	NC	5	4	9	10.75	13
Total petroleum hydrocarbons	mg/L	1	1	<100	<100	<100	1	<20	0	<20	1	0.11	0.11	0.11	1	0.01	0.01	0.01	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total Phenolics	mg/L	4	3	<0.05	0.05	0.14	4	<0.05	0	<0.05	4	0.025	0.025	0.025	4	0.025	0.0562	0.15	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
Zinc	mg/L	1	1	0.47	1.47	2.47	1	0.101	0.101	0.101	1	0.068	0.068	0.068	1	0.05	0.05	0.05	1	0.026	0.026	0.026	1	0.033	0.033	0.033

NC	Not calculated
LOR	Limit of reporting
N/A	No sample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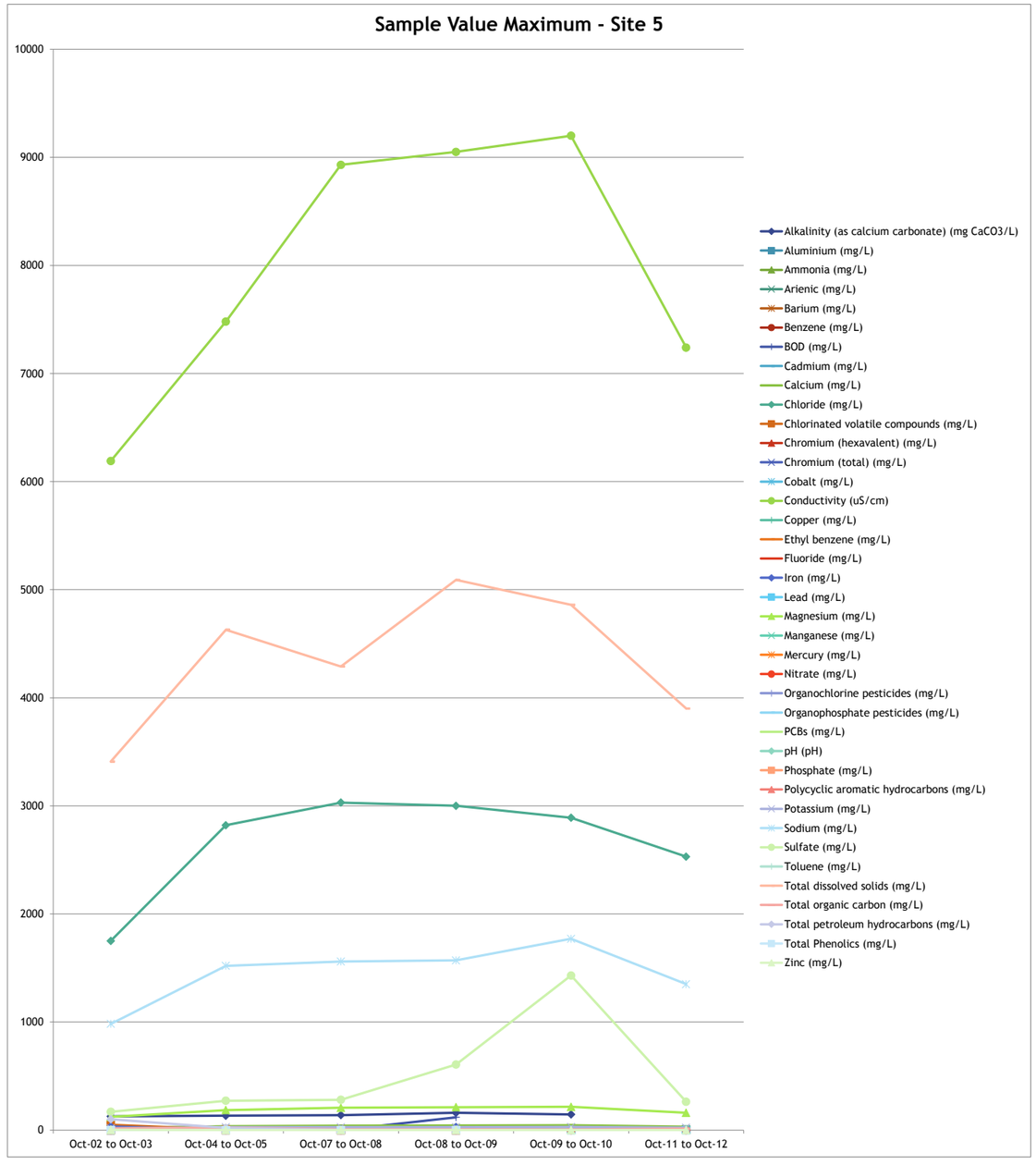
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)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Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Zinc (mg/L)

Data for charts
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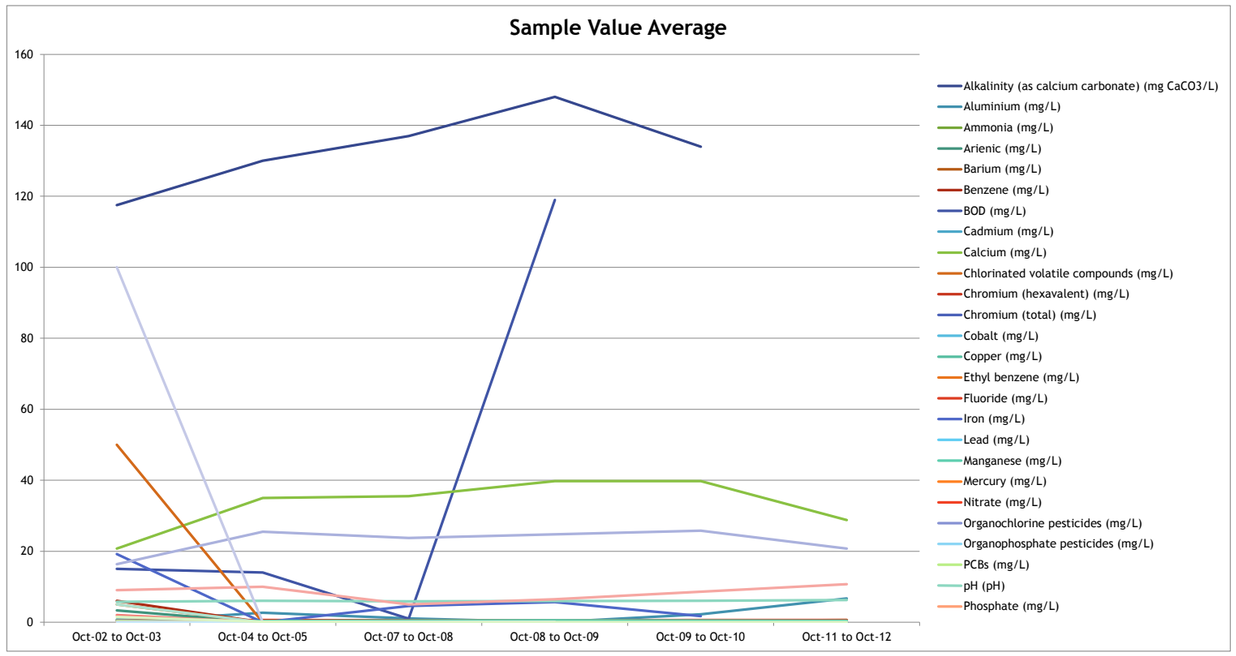
Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate)	117.5	130	137	148	134	NC	127	133	139	160	145	<LOR
Aluminium	<0.01	2.7	1.06	0.015	2.2	6.71	<0.01	2.7	1.06	0.015	2.2	6.71
Ammonia	0.09	0.24	0.197	0.1125	NC	0.63	0.14	0.36	0.364	0.22	0.36	0.87
Arienic	3.3	0.001	0.011	0.08	0.02	0.003	3.3	0.001	0.011	0.08	0.02	0.003
Barium	<0.005	0.034	0.043	0.0002	0.033	0.04	<0.005	0.034	0.043	0.0002	0.033	0.04
Benzene	<6	0	0.0005	0.0005	NC	NC	<7	<1	0.0005	0.0005	<LOR	<LOR
BOD	15	14	1	119	NC	NC	15	14	1	119	<LOR	<LOR
Cadmium	<0.01	0.0001	0.0002	0.031	NC	NC	<0.01	0.0001	0.0002	0.031	<LOR	<LOR
Calcium	20.75	35	35.5	39.75	39.75	28.75	21	36	41	43	45	31
Chloride	1710	2580	2682.5	2675	2735	2120	1750	2820	3030	3000	2890	2530
Chlorinated volatile compounds	<50	0	0.23	0.025	NC	NC	<50	<5	0.23	0.025	<LOR	<LOR
Chromium (hexavalent)	<0.01	0	0.005	0.005	NC	NC	<0.01	<0.01	0.005	0.005	<LOR	<LOR
Chromium (total)	<0.01	0	0.0005	0.002	NC	0.006	<0.01	0.002	0.0005	0.002	<LOR	0.006
Cobalt	<0.01	0.001	0.002	0.006	0.001	0.002	<0.01	0.001	0.002	0.006	0.001	0.002
Conductivity	5730	6715	7995	8357.58	8025	6700	6190	7480	8930	9050	9200	7240
Copper	0.78	0.146	0.028	0.008	0.004	0.004	0.78	0.0146	0.028	0.008	0.004	0.004
Ethyl benzene	<5	0	0.001	0.001	NC	NC	<5	<2	0.001	0.001	<LOR	<LOR
Fluoride	0.466	0.63	0.575	0.5143	0.595	0.625	0.6	0.7	0.6	0.8	0.86	0.7
Iron	19.23	0	4.59	5.66	1.71	NC	34.2	0	9.24	27.5	3.08	4.13
Lead	<0.01	0.004	0.033	0.05	0.006	0.006	<0.01	0.004	0.033	0.05	0.006	0.006
Magnesium	118	180	184.5	198.75	193.25	146.5	122	185	206	212	215	160
Manganese	0.218	0.36	0.48	0.5444	0.51	0.427	0.23	0.448	0.58	0.586	0.55	0.452
Mercury	<0.0001	0	0.0002	0.00005	NC	NC	<0.0001	<0.0001	0.0002	0.00005	<LOR	<LOR
Nitrate	<0.01	0.019	0.04	0.02	NC	NC	<0.01	0.033	0.08	0.04	0.07	0.06
Organochlorine pesticides	<0.5	0	0.00032	0.00032	NC	NC	<0.5	<0.05	0.001	0.001	<LOR	<LOR
Organophosphate pesticides	<0.2	0	0.007	0.0003	NC	NC	<0.2	<2	0.007	0.0003	<LOR	<LOR
PCBs	<0.3	0	0.0005	0.0005	NC	NC	<0.3	<1	0.0005	0.0005	<LOR	<LOR
pH	5.73	6	5.9	5.99	6	6.268	5.75	6.42	6.22	6.03	6.25	6.36
Phosphate	0.02	0	0.005	0.003	NC	NC	0.02	<0.01	0.005	0.003	<LOR	<LOR
Polycyclic aromatic hydrocarbons	<2	0	0.008	0.0005	NC	NC	<2	<1	0.008	0.0005	<LOR	<LOR
Potassium	16.33	25.5	23.75	24.75	25.75	20.75	17	26	27	27	29	23
Sodium	954	1365	1400	1505	1627.5	1152.5	983	1520	1560	1570	1770	1350
Sulfate	167	256	258.75	333	572.5	212	169	272	280	607	1430	262
Toluene	<5	0	0.0025	0.0025	NC	NC	<5	<2	0.0025	0.0025	<LOR	<LOR
Total dissolved solids	3410	4630	4290	5090	4860	3900	3410	4630	4290	5090	4860	3900
Total organic carbon	9	10	5	6.5	NC	10.75	16	23	7	8	5	13
Total petroleum hydrocarbons	<100	0	0.11	0.01	NC	NC	<100	<20	0.11	0.01	<LOR	<LOR
Total Phenolics	0.05	0	0.025	0.0562	NC	NC	0.14	<0.05	0.025	0.15	<LOR	<LOR
Zinc	1.47	0.101	0.068	0.05	0.026	0.033	2.47	0.101	0.068	0.05	0.026	0.033

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	117.5	130	137	148	134	#N/A	127	133	139	160	145	#N/A
Aluminium (mg/L)	0.01	2.7	1.06	0.015	2.2	6.71	0.01	2.7	1.06	0.015	2.2	6.71
Ammonia (mg/L)	0.09	0.24	0.197	0.1125	#N/A	0.63	0.14	0.36	0.364	0.22	0.36	0.87
Arienic (mg/L)	3.3	0.001	0.011	0.08	0.02	0.003	3.3	0.001	0.011	0.08	0.02	0.003
Barium (mg/L)	0.005	0.034	0.043	0.0002	0.033	0.04	0.005	0.034	0.043	0.0002	0.033	0.04
Benzene (mg/L)	6	0	0.0005	0.0005	#N/A	#N/A	7	1	0.0005	0.0005	#N/A	#N/A
BOD (mg/L)	15	14	1	119	#N/A	#N/A	15	14	1	119	#N/A	#N/A
Cadmium (mg/L)	0.01	0.0001	0.0002	0.031	#N/A	#N/A	0.01	0.0001	0.0002	0.031	#N/A	#N/A
Calcium (mg/L)	20.75	35	35.5	39.75	39.75	28.75	21	36	41	43	45	31
Chloride (mg/L)	1710	2580	2682.5	2675	2735	2120	1750	2820	3030	3000	2890	2530
Chlorinated volatile compounds (mg/L)	50	0	0.23	0.025	#N/A	#N/A	50	5	0.23	0.025	#N/A	#N/A
Chromium (hexavalent) (mg/L)	0.01	0	0.005	0.005	#N/A	#N/A	0.01	0.01	0.005	0.005	#N/A	#N/A
Chromium (total) (mg/L)	0.01	0	0.0005	0.002	#N/A	0.006	0.01	0.002	0.0005	0.002	#N/A	0.006
Cobalt (mg/L)	0.01	0.001	0.002	0.006	0.001	0.002	0.01	0.001	0.002	0.006	0.001	0.002
Conductivity (uS/cm)	5730	6715	7995	8357.58	8025	6700	6190	7480	8930	9050	9200	7240
Copper (mg/L)	0.78	0.146	0.028	0.008	0.004	0.004	0.78	0.0146	0.028	0.008	0.004	0.004
Ethyl benzene (mg/L)	5	0	0.001	0.001	#N/A	#N/A	5	2	0.001	0.001	#N/A	#N/A
Fluoride (mg/L)	0.466	0.63	0.575	0.5143	0.595	0.625	0.6	0.7	0.6	0.8	0.86	0.7
Iron (mg/L)	19.23	0	4.59	5.66	1.71	#N/A	34.2	0	9.24	27.5	3.08	4.13
Lead (mg/L)	0.01	0.004	0.033	0.05	0.006	0.006	0.01	0.004	0.033	0.05	0.006	0.006
Magnesium (mg/L)	118	180	184.5	198.75	193.25	146.5	122	185	206	212	215	160
Manganese (mg/L)	0.218	0.36	0.48	0.5444	0.51	0.427	0.23	0.448	0.58	0.586	0.55	0.452
Mercury (mg/L)	0.0001	0	0.0002	0.00005	#N/A	#N/A	0.0001	0.0001	0.0002	0.00005	#N/A	#N/A
Nitrate (mg/L)	0.01	0.019	0.04	0.02	#N/A	#N/A	0.01	0.033	0.08	0.04	0.07	0.06
Organochlorine pesticides (mg/L)	0.5	0	0.00032	0.00032	#N/A	#N/A	0.5	0.05	0.001	0.001	#N/A	#N/A
Organophosphate pesticides (mg/L)	0.2	0	0.007	0.0003	#N/A	#N/A	0.2	2	0.007	0.0003	#N/A	#N/A
PCBs (mg/L)	0.3	0	0.0005	0.0005	#N/A	#N/A	0.3	1	0.0005	0.0005	#N/A	#N/A
pH (pH)	5.73	6	5.9	5.99	6	6.268	5.75	6.42	6.22	6.03	6.25	6.36
Phosphate (mg/L)	0.02	0	0.005	0.003	#N/A	#N/A	0.02	0.01	0.005	0.003	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	2	0	0.008	0.0005	#N/A	#N/A	2	1	0.008	0.0005	#N/A	#N/A
Potassium (mg/L)	16.33	25.5	23.75	24.75	25.75	20.75	17	26	27	27	29	23
Sodium (mg/L)	954	1365	1400	1505	1627.5	1152.5	983	1520	1560	1570	1770	1350
Sulfate (mg/L)	167	256	258.75	333	572.5	212	169	272	280	607	1430	262
Toluene (mg/L)	5	0	0.0025	0.0025	#N/A	#N/A	5	2	0.0025	0.0025	#N/A	#N/A
Total dissolved solids (mg/L)	3410	4630	4290	5090	4860	3900	3410	4630	4290	5090	4860	3900
(mg/L)	9	10	5	6.5	#N/A	10.75	16	23	7	8	5	13
Total petroleum hydrocarbons (mg/L)	100	0	0.11	0.01	#N/A	#N/A	100	20	0.11	0.01	#N/A	#N/A
Total Phenolics (mg/L)	0.05	0	0.025	0.0562	#N/A	#N/A	0.14	0.05	0.025	0.15	#N/A	#N/A
Zinc (mg/L)	1.47	0.101	0.068	0.05	0.026	0.033	2.47	0.101	0.068	0.05	0.026	0.033

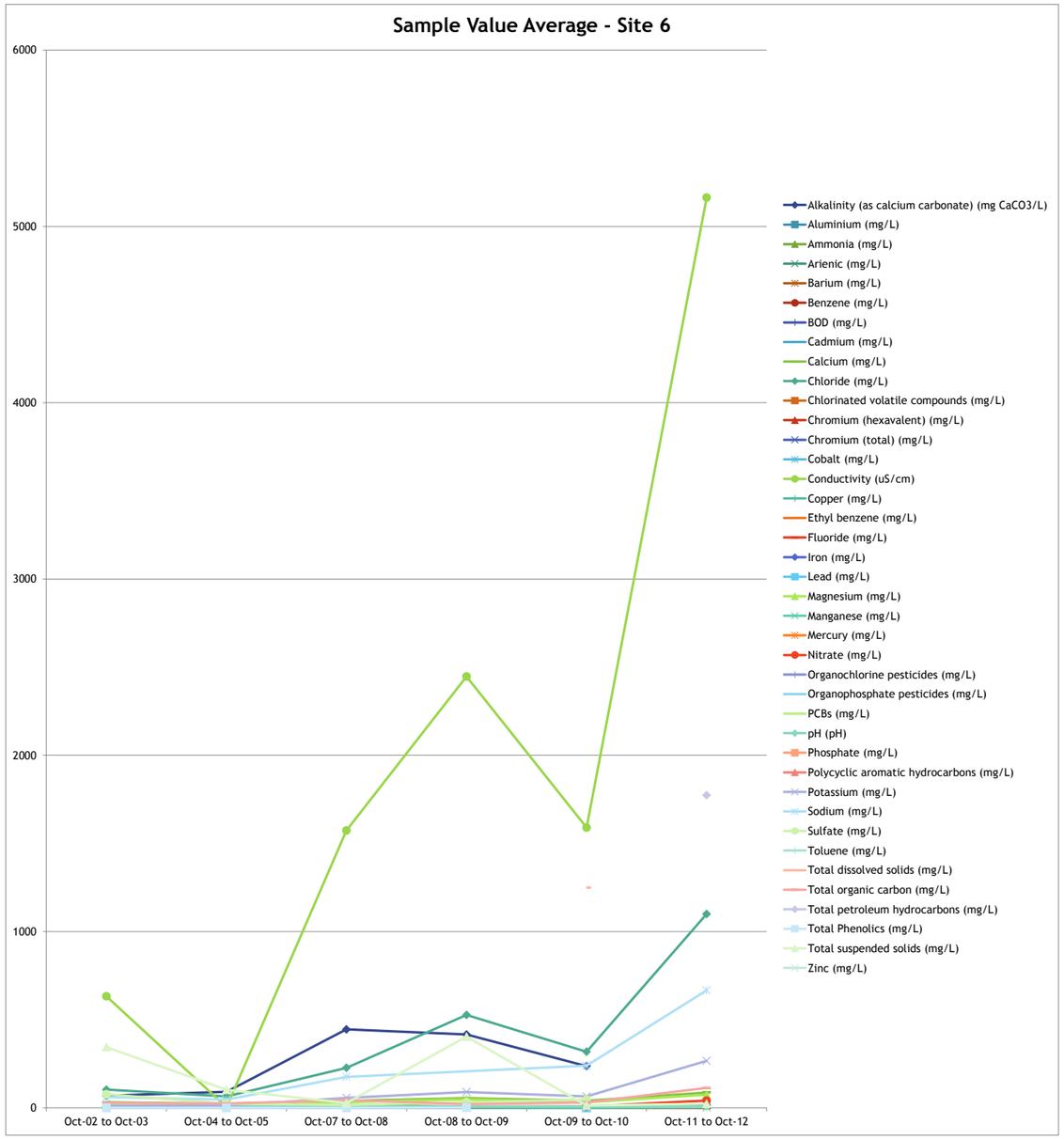

Sample Value Average
160
140
120
100
80
60
40
20
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)

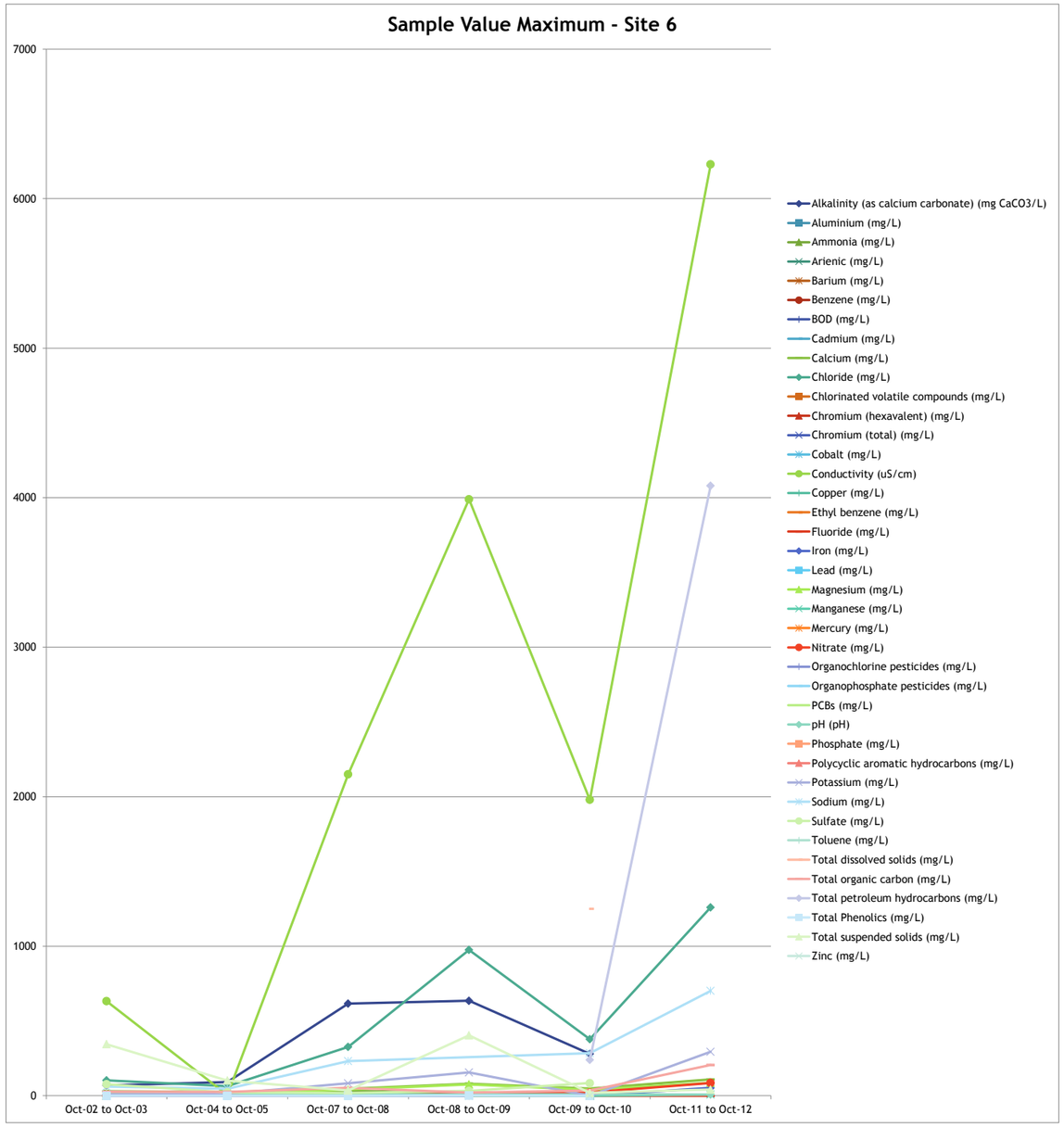
Monitoring Site 6 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	1	69	69	69	1	91	91	91	2	274	445	616	3	274	416	635	3	181	237	280	3	N/A	N/A	N/A
Aluminium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.69	0.69	0.69	0	N/A	N/A	N/A
Ammonia	mg/L	4	1	0.56	0.56	0.56	1	3.888	3.888	3.888	2	0.73	17.52	34.3	3	0.04	5.43	14.2	3	0.21	0.453	0.79	3	N/A	N/A	N/A
Arienic	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.002	0.002	0.002	0	N/A	N/A	N/A
Barium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.138	0.138	0.138	0	N/A	N/A	N/A
Benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
BOD	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	7	7	7	0	N/A	N/A	N/A
Cadmium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Calcium	mg/L	4	1	31	31	31	1	24	24	24	2	35	40.5	46	3	38	55.67	81	3	28	39.67	48	3	56	87	109
Chloride	mg/L	4	1	103	103	103	1	65	65	65	2	127	227	327	3	253	527.33	976	3	269	318.33	378	3	929	1099.67	1260
Chlorinated volatile compounds	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Chromium (total)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.003	0.003	0.003	0	N/A	N/A	N/A
Cobalt	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.005	0.005	0.005	0	N/A	N/A	N/A
Conductivity	uS/cm	4	1	633	633	633	1	4.34	4.34	4.34	2	997	1574	2150	3	1530	2446.6	3990	3	1260	1590	1980	3	4120	5163.33	6230
Copper	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.013	0.013	0.013	0	N/A	N/A	N/A
Ethyl benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Fluoride	mg/L	4	1	0.6	0.6	0.6	1	0.2	0.2	0.2	2	0.3	0.35	0.4	3	0.334	0.411	0.5	3	0.24	0.313	0.4	3	0.5	0.53	0.6
Iron	mg/L	4	1	8.2	8.2	8.2	1	4.84	4.84	4.84	2	0.76	0.98	1.2	3	0.41	1.62	4.02	3	0.11	0.33	0.45	3	0.38	17.89	52.3
Lead	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.001	0.001	0.001	0	N/A	N/A	N/A
Magnesium	mg/L	4	1	15	15	15	1	10	10	10	2	25	33	41	3	31	47.67	75	3	22	31.67	40	3	56	74.33	87
Manganese	mg/L	4	1	0.564	0.564	0.564	1	0.634	0.634	0.634	2	0.077	0.3945	0.712	3	0.093	0.1773	0.22	3	0.004	0.02	0.039	3	0.02	2.82	8.09
Mercury	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Nitrate	mg/L	4	1	0.33	0.33	0.33	1	0.013	0.013	0.013	2	0.868	2	3.13	3	2.06	6.32	14.1	3	0.29	8.647	21.7	3	3.9	40.77	85.9
Organochlorine pesticides	mg/L	4	1	<0.05	<0.05	<0.05	1	<0.6	0	<0.6	2	0.00025	0.00032	0.001	3	0.00025	0.00032	0.001	3	<LOR	NC	<LOR	3	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
PCBs	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
pH	pH	4	1	7.21	7.21	7.21	1	7.18	7.18	7.18	2	7.37	7.88	8.39	3	7.72	8.01	8.81	3	8.07	8.53	8.94	3	8.03	8.13	8.31
Phosphate	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Potassium	mg/L	4	1	11	11	11	1	12	12	12	2	30	56.5	83	3	54	90	156	3	52	65.33		3	227	266.67	294
Sodium	mg/L	4	1	61	61	61	1	47	47	47	2	120	176	232	0	N/A	N/A	N/A	3	183	238.67	285	3	597	666.33	702
Sulfate	mg/L	4	1	77	77	77	1	23	23	23	2	14	16.5	19	1	32	32	32	3	17	47.53	84.6	3	<LOR	NC	<LOR
Toluene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Total dissolved solids	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	1250	1250	1250	0	N/A	N/A	N/A
Total organic carbon	mg/L	4	1	27	27	27	1	25	25	25	2	36	44.5	53	1	21	21	21	3	26	30.33	35	3	41	113	206
Total petroleum hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	3	<LOR	NC	240	3	530	1773.33	4080
Total Phenolics	mg/L	4		<0.05	<0.05	<0.05	1	<0.05	0	<0.05	2	0.025	0.025	0.025	1	1.11	1.11	1.11	3	<LOR	NC	0.57	3	<LOR	NC	<LOR
Total suspended solids	mg/L	4	1	345	345	345	1	102	102	102	2	18	27	36	1	404	404	404	3	5	14.33	19	3	8	23.33	41
Zinc	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.031	0.031	0.031	0	N/A	N/A	N/A

NC	Not calculated
LOR	Limit of reporting
N/A	No sample


Sample Value Average - Site 6
6000
5000
4000
3000
2000
1000
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)


Sample Value Maximum - Site 6
7000
6000
5000
4000
3000
2000
1000
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbor	69	91	445	416	237	N/A		69	91	616	635	280	N/A
Aluminium	N/A	N/A	N/A	N/A	0.69	N/A		N/A	N/A	N/A	N/A	0.69	N/A
Ammonia	0.56	3.888	17.52	5.43	0.453	N/A		0.56	3.888	34.3	14.2	0.79	N/A
Arienic	N/A	N/A	N/A	N/A	0.002	N/A		N/A	N/A	N/A	N/A	0.002	N/A
Barium	N/A	N/A	N/A	N/A	0.138	N/A		N/A	N/A	N/A	N/A	0.138	N/A
Benzene	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
BOD	N/A	N/A	N/A	N/A	7	N/A		N/A	N/A	N/A	N/A	7	N/A
Cadmium	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Calcium	31	24	40.5	55.67	39.67	87		31	24	46	81	48	109
Chloride	103	65	227	527.33	318.33	1099.67		103	65	327	976	378	1260
Chlorinated volatile compou	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Chromium (hexavalent)	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Chromium (total)	N/A	N/A	N/A	N/A	0.003	N/A		N/A	N/A	N/A	N/A	0.003	N/A
Cobalt	N/A	N/A	N/A	N/A	0.005	N/A		N/A	N/A	N/A	N/A	0.005	N/A
Conductivity	633	4.34	1574	2446.6	1590	5163.33		633	4.34	2150	3990	1980	6230
Copper	N/A	N/A	N/A	N/A	0.013	N/A		N/A	N/A	N/A	N/A	0.013	N/A
Ethyl benzene	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Fluoride	0.6	0.2	0.35	0.411	0.313	0.53		0.6	0.2	0.4	0.5	0.4	0.6
Iron	8.2	4.84	0.98	1.62	0.33	17.89		8.2	4.84	1.2	4.02	0.45	52.3
Lead	N/A	N/A	N/A	N/A	0.001	N/A		N/A	N/A	N/A	N/A	0.001	N/A
Magnesium	15	10	33	47.67	31.67	74.33		15	10	41	75	40	87
Manganese	0.564	0.634	0.3945	0.1773	0.02	2.82		0.564	0.634	0.712	0.22	0.039	8.09
Mercury	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Nitrate	0.33	0.013	2	6.32	8.647	40.77		0.33	0.013	3.13	14.1	21.7	85.9
Organochlorine pesticides	<0.05	0	0.00032	0.00032	NC	NC		<0.05	<0.6	0.001	0.001	<LOR	<LOR
Organophosphate pesticides	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
PCBs	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
pH	7.21	7.18	7.88	8.01	8.53	8.13		7.21	7.18	8.39	8.81	8.94	8.31
Phosphate	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Polycyclic aromatic hydroca	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Potassium	11	12	56.5	90	65.33	266.67		11	12	83	156	0	294
Sodium	61	47	176	N/A	238.67	666.33		61	47	232	N/A	285	702
Sulfate	77	23	16.5	32	47.53	NC		77	23	19	32	84.6	<LOR
Toluene	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Total dissolved solids	N/A	N/A	N/A	N/A	1250	N/A		N/A	N/A	N/A	N/A	1250	N/A
Total organic carbon	27	25	44.5	21	30.33	113		27	25	53	21	35	206
Total petroleum hydrocarbo	N/A	N/A	N/A	N/A	NC	1773.33		N/A	N/A	N/A	N/A	240	4080
Total Phenolics	<0.05	0	0.025	1.11	NC	NC		<0.05	<0.05	0.025	1.11	0.57	<LOR
Total suspended solids	345	102	27	404	14.33	23.33		345	102	36	404	19	41
Zinc	N/A	N/A	N/A	N/A	0.031	N/A		N/A	N/A	N/A	N/A	0.031	N/A

Data for charts
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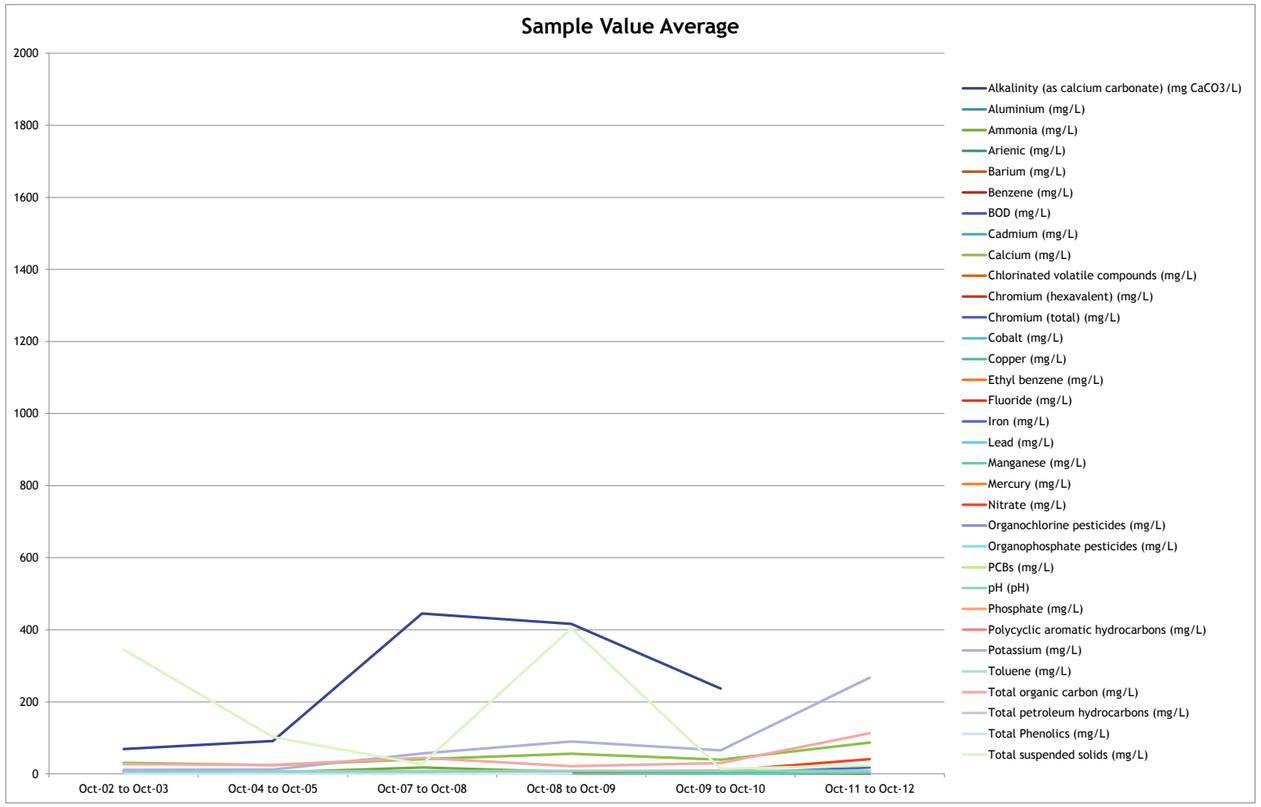
Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	69	91	445	416	237	#N/A		69	91	616	635	280	#N/A
Aluminium (mg/L)	#N/A	#N/A	#N/A	#N/A	0.69	#N/A		#N/A	#N/A	#N/A	#N/A	0.69	#N/A
Ammonia (mg/L)	0.56	3.888	17.52	5.43	0.453	#N/A		0.56	3.888	34.3	14.2	0.79	#N/A
Arienic (mg/L)	#N/A	#N/A	#N/A	#N/A	0.002	#N/A		#N/A	#N/A	#N/A	#N/A	0.002	#N/A
Barium (mg/L)	#N/A	#N/A	#N/A	#N/A	0.138	#N/A		#N/A	#N/A	#N/A	#N/A	0.138	#N/A
Benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
BOD (mg/L)	#N/A	#N/A	#N/A	#N/A	7	#N/A		#N/A	#N/A	#N/A	#N/A	7	#N/A
Cadmium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Calcium (mg/L)	31	24	40.5	55.67	39.67	87		31	24	46	81	48	109
Chloride (mg/L)	103	65	227	527.33	318.33	1099.67		103	65	327	976	378	1260
Chlorinated volatile compounds (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (hexavalent) (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (total) (mg/L)	#N/A	#N/A	#N/A	#N/A	0.003	#N/A		#N/A	#N/A	#N/A	#N/A	0.003	#N/A
Cobalt (mg/L)	#N/A	#N/A	#N/A	#N/A	0.005	#N/A		#N/A	#N/A	#N/A	#N/A	0.005	#N/A
Conductivity (uS/cm)	633	4.34	1574	2446.6	1590	5163.33		633	4.34	2150	3990	1980	6230
Copper (mg/L)	#N/A	#N/A	#N/A	#N/A	0.013	#N/A		#N/A	#N/A	#N/A	#N/A	0.013	#N/A
Ethyl benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Fluoride (mg/L)	0.6	0.2	0.35	0.411	0.313	0.53		0.6	0.2	0.4	0.5	0.4	0.6
Iron (mg/L)	8.2	4.84	0.98	1.62	0.33	17.89		8.2	4.84	1.2	4.02	0.45	52.3
Lead (mg/L)	#N/A	#N/A	#N/A	#N/A	0.001	#N/A		#N/A	#N/A	#N/A	#N/A	0.001	#N/A
Magnesium (mg/L)	15	10	33	47.67	31.67	74.33		15	10	41	75	40	87
Manganese (mg/L)	0.564	0.634	0.3945	0.1773	0.02	2.82		0.564	0.634	0.712	0.22	0.039	8.09
Mercury (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Nitrate (mg/L)	0.33	0.013	2	6.32	8.647	40.77		0.33	0.013	3.13	14.1	21.7	85.9
Organochlorine pesticides (mg/L)	0.05	0	0.00032	0.00032	#N/A	#N/A		0.05	0.6	0.001	0.001	#N/A	#N/A
Organophosphate pesticides (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
PCBs (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
pH (pH)	7.21	7.18	7.88	8.01	8.53	8.13		7.21	7.18	8.39	8.81	8.94	8.31
Phosphate (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Potassium (mg/L)	11	12	56.5	90	65.33	266.67		11	12	83	156	0	294
Sodium (mg/L)	61	47	176	#N/A	238.67	666.33		61	47	232	#N/A	285	702
Sulfate (mg/L)	77	23	16.5	32	47.53	#N/A		77	23	19	32	84.6	#N/A
Toluene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total dissolved solids (mg/L)	#N/A	#N/A	#N/A	#N/A	1250	#N/A		#N/A	#N/A	#N/A	#N/A	1250	#N/A
(mg/L)	27	25	44.5	21	30.33	113		27	25	53	21	35	206
Total petroleum hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	1773.33		#N/A	#N/A	#N/A	#N/A	240	4080
Total Phenolics (mg/L)	0.05	0	0.025	1.11	#N/A	#N/A		0.05	0.05	0.025	1.11	0.57	#N/A
Total suspended solids (mg/L)	345	102	27	404	14.33	23.33		345	102	36	404	19	41
Zinc (mg/L)	#N/A	#N/A	#N/A	#N/A	0.031	#N/A		#N/A	#N/A	#N/A	#N/A	0.031	#N/A

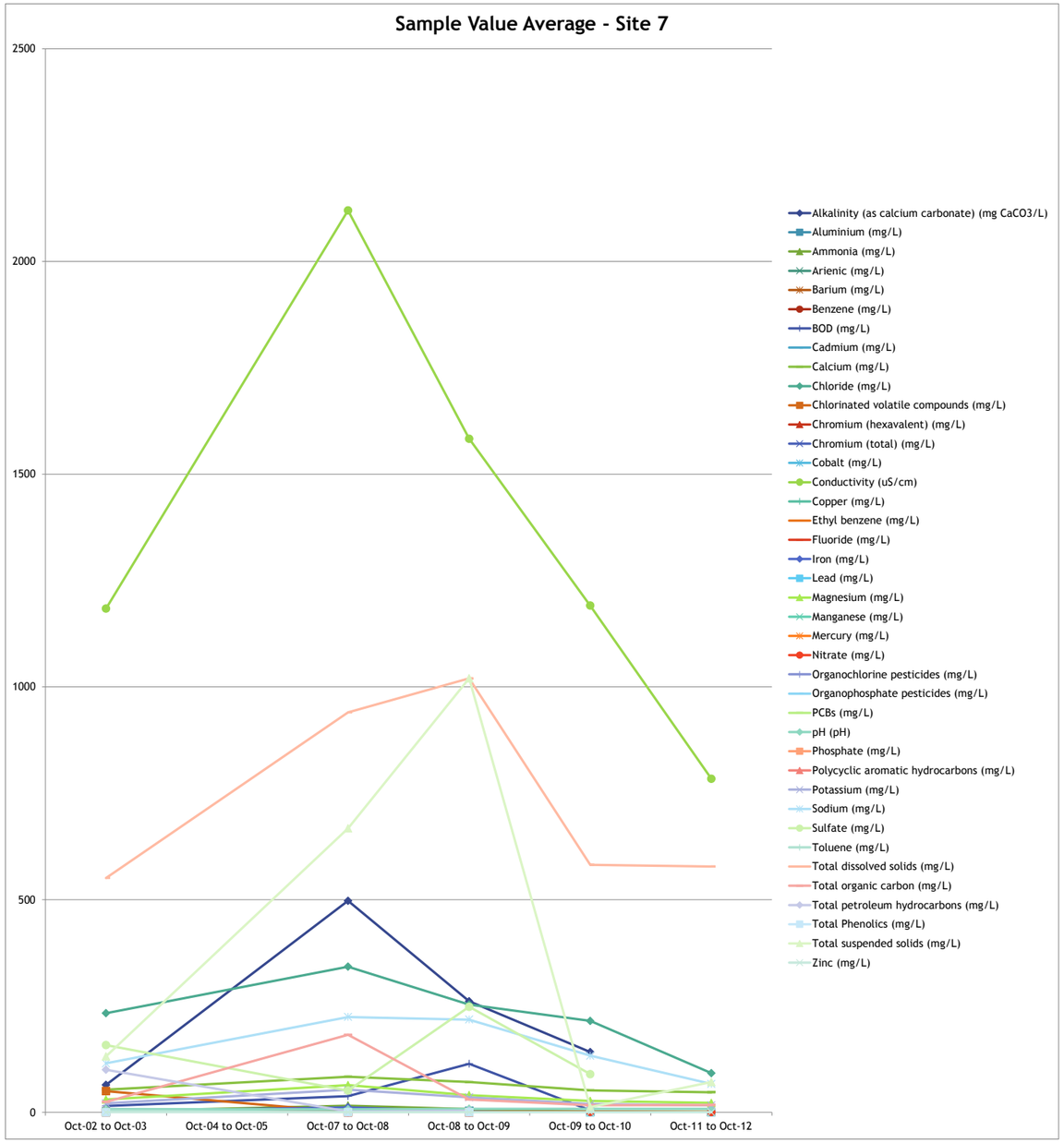

Sample Value Average
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Toluene (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)

Monitoring Site 7 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	10	64.3	109	0	N/A	N/A	N/A	4	228	497	932	3	240	261	290	4	93	141.5	202	3	<LOR	NC	<LOR
Aluminium	mg/L	1	1	1.5	1.5	1.5	0	N/A	N/A	N/A	1	2.82	2.82	2.82	1	3.49	3.49	3.49	1	1.45	1.45	1.45	1	0.5	0.5	0.5
Ammonia	mg/L	4	3	0.02	1.87	5.58	0	N/A	N/A	N/A	4	5.41	15.67	27	3	6.07	7.56	9.53	4	0.93	2.195	3.72	3	0.14	0.9	1.55
Arienic	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.009	0.009	0.009	1	0.014	0.014	0.014	1	0.003	0.003	0.003	1	0.005	0.005	0.005
Barium	mg/L	1	1	<0.1	<0.1	<0.1	0	N/A	N/A	N/A	1	0.118	0.118	0.118	1	0.114	0.114	0.114	1	0.061	0.061	0.061	1	0.08	0.08	0.08
Benzene	mg/L	1	1	<5	<5	<5	0	N/A	N/A	N/A	1	0.0003	0.0003	0.0003	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
BOD	mg/L	1	1	15	15	15	0	N/A	N/A	N/A	1	38	38	38	1	114	114	114	1	5	5	5	1	<LOR	NC	<LOR
Cadmium	mg/L	1	1	<0.005	<0.005	<0.005	0	N/A	N/A	N/A	1	0.0003	0.0003	0.0003	1	0.0002	0.0002	0.0002	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Calcium	mg/L	4	3	25	53	104	0	N/A	N/A	N/A	4	50	83.5	11.9	3	57	71	79	4	44	51.75	59	3	36	47	54
Chloride	mg/L	4	3	168	233	332	0	N/A	N/A	N/A	4	174	342.25	730	3	167	253	313	4	126	214.75	317	3	62	92	131
Chlorinated volatile compounds	mg/L	1	1	<50	<50	<50	0	N/A	N/A	N/A	1	0.23	0.23	0.23	1	0.183	0.183	0.183	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (hexavalent)	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Chromium (total)	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.006	0.006	0.006	1	0.006	0.006	0.006	1	0.002	0.002	0.002	1	0.001	0.001	0.001
Cobalt	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.007	0.007	0.007	1	0.005	0.005	0.005	1	0.001	0.001	0.001	1	0.001	0.001	0.001
Conductivity	uS/cm	4	3	770	1184	1790	0	N/A	N/A	N/A	4	1180	2120	3910	3	1380	1583.3	1810	4	904	1191	1410	3	627	784	933
Copper	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.017	0.017	0.017	1	0.012	0.012	0.012	1	0.007	0.007	0.007	1	0.004	0.004	0.004
Ethyl benzene	mg/L	1	1	<5	<5	<5	0	N/A	N/A	N/A	1	0.001	0.001	0.001	1	0.001	0.001	0.001	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Fluoride	mg/L	4	3	0.3	0.3	0.3	0	N/A	N/A	N/A	4	0.2	0.325	0.4	3	0.01	0.184	0.3	4	0.2	0.228	0.3	3	0.3	0.33	0.4
Iron	mg/L	4	3	0.2	2.66	7.2	0	N/A	N/A	N/A	4	0.025	11.66	29.9	4	0.08	1.73	4.75	4	<LOR	NC	0.14	2	<LOR	NC	0.07
Lead	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.015	0.015	0.015	1	0.026	0.026	0.026	1	0.003	0.003	0.003	1	0.002	0.002	0.002
Magnesium	mg/L	4	3	15	30	52	0	N/A	N/A	N/A	4	29	63.75	143	3	35	40.33	50	4	23	26.5	29	3	16	22	26
Manganese	mg/L	4	3	0.205	1.51	3.88	0	N/A	N/A	N/A	4	0.507	1.579	292	4	0.146	0.4515	0.729	4	0.089	0.18	0.318	2	0.128	0.23	0.337
Mercury	mg/L	1	1	<0.0001	<0.0001	<0.0001	0	N/A	N/A	N/A	1	0.00005	0.00005	0.00005	1	0.00005	0.00005	0.00005	1	<LOR	NC	<LOR	1	0.55	0.55	0.55
Nitrate	mg/L	4	3	0.06	0.6	164	0	N/A	N/A	N/A	4	0.05	0.28	0.88	3	0.005	0.72	2.14	4	0.06	0.895	1.43	3	0.05	0.46	0.94
Organochlorine pesticides	mg/L	4	3	<0.2	<0.5	<0.5	0	N/A	N/A	N/A	4	0.00025	0.00033	0.001	3	0.00025	0.00032	0.001	4	<LOR	NC	<LOR	3	<LOR	NC	<LOR
Organophosphate pesticides	mg/L	1	1	<0.2	<0.2	<0.2	0	N/A	N/A	N/A	1	0.007	0.007	0.007	1	0.007	0.007	0.007	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
PCBs	mg/L	1	1	<0.3	<0.3	<0.3	0	N/A	N/A	N/A	1	0.0005	0.0005	0.0005	1	0.0005	0.0005	0.0005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
pH	pH	4	3	6.96	7.63	8.74	0	N/A	N/A	N/A	4	6.35	7.06	7.77	3	7.6	8.05	8.67	4	7.59	7.95	8.15	3	7.95	8.07	8.15
Phosphate	mg/L	1	1	0.01	0.01	0.01	0	N/A	N/A	N/A	1	0.005	0.005	0.005	1	0.005	0.005	0.005	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Polycyclic aromatic hydrocarbons	mg/L	1	1	<2	<2	<2	0	N/A	N/A	N/A	1	0.008	0.008	0.008	1	0.01	0.01	0.01	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Potassium	mg/L	4	3	13	21.3	36	0	N/A	N/A	N/A	4	26	53	88	3	30	35.33	45	4	15	19.25	26	3	14	16.33	19
Sodium	mg/L	4	3	61	115	174	0	N/A	N/A	N/A	5	117	224.2	519	1	218	218	218	4	93	133	183	3	54	66.67	82
Sulfate	mg/L	4	3	38	158	389	0	N/A	N/A	N/A	4	16	51	139	2	241	248	255	4	60	89.63	112	3	<LOR	NC	46
Toluene	mg/L	1	1	<5	<5	<5	0	N/A	N/A	N/A	1	0.0025	0.0025	0.0025	1	0.0025	0.0025	0.0025	1	<LOR	NC	<LOR	1	<LOR	NC	<LOR
Total dissolved solids	mg/L	1	1	551	551	551	0	N/A	N/A	N/A	1	940	940	940	1	1020	1020	1020	1	582	582	582	1	578	578	578
Total organic carbon	mg/L	4	4	11	24.33	41	0	N/A	N/A	N/A	4	40	182	335	1	30	30	30	4	12	16.5	21	3	14	17	19
Total petroleum hydrocarbons	mg/L	1	1	<100	<100	<100	0	N/A	N/A	N/A	1	1.8	1.8	1.8	1	3.58	3.58	3.58	4	<LOR	NC	400	1	<LOR	NC	<LOR
Total Phenolics	mg/L	4	3	<0.05	0.06	0.18	0	N/A	N/A	N/A	4	0.025	0.159	0.366	1	0.24	0.24	0.24	4	<LOR	NC	0.11	3	<LOR	NC	<LOR
Total suspended solids	mg/L	4	3	10	131.3	355	0	N/A	N/A	N/A	4	66	667.5	2020	1	1020	1020	1020	4	3	12	26	3	22	71.33	116
Zinc	mg/L	1	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	1	0.098	0.098	0.098	1	0.083	0.083	0.083	1	0.014	0.014	0.014	1	0.084	0.084	0.084

NC	Not calculated
LOR	Limit of reporting
N/A	No sample


Sample Value Average - Site 7
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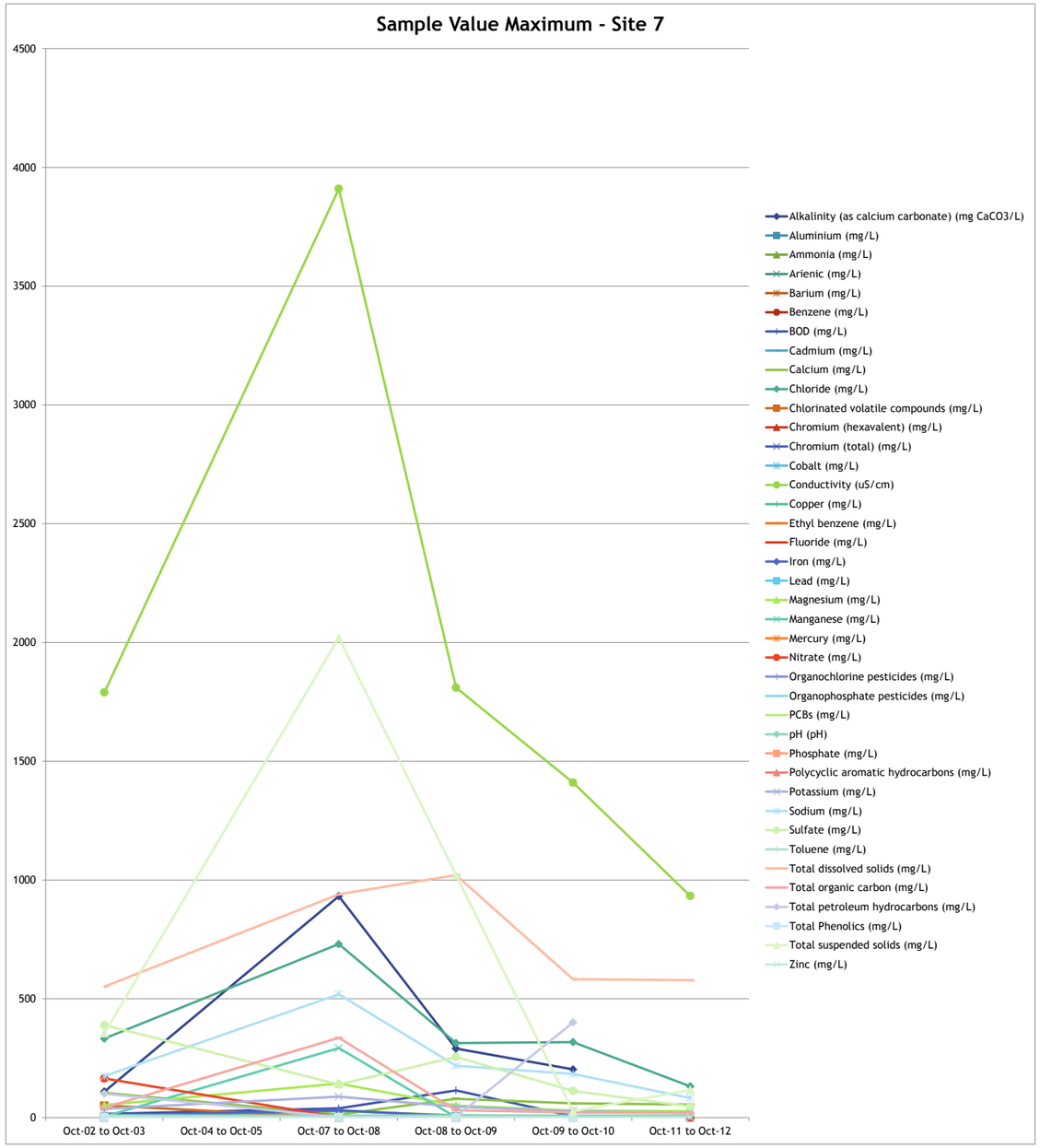
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)


Sample Value Maximum - Site 7
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3500
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2000
1500
1000
500
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)

Data for charts
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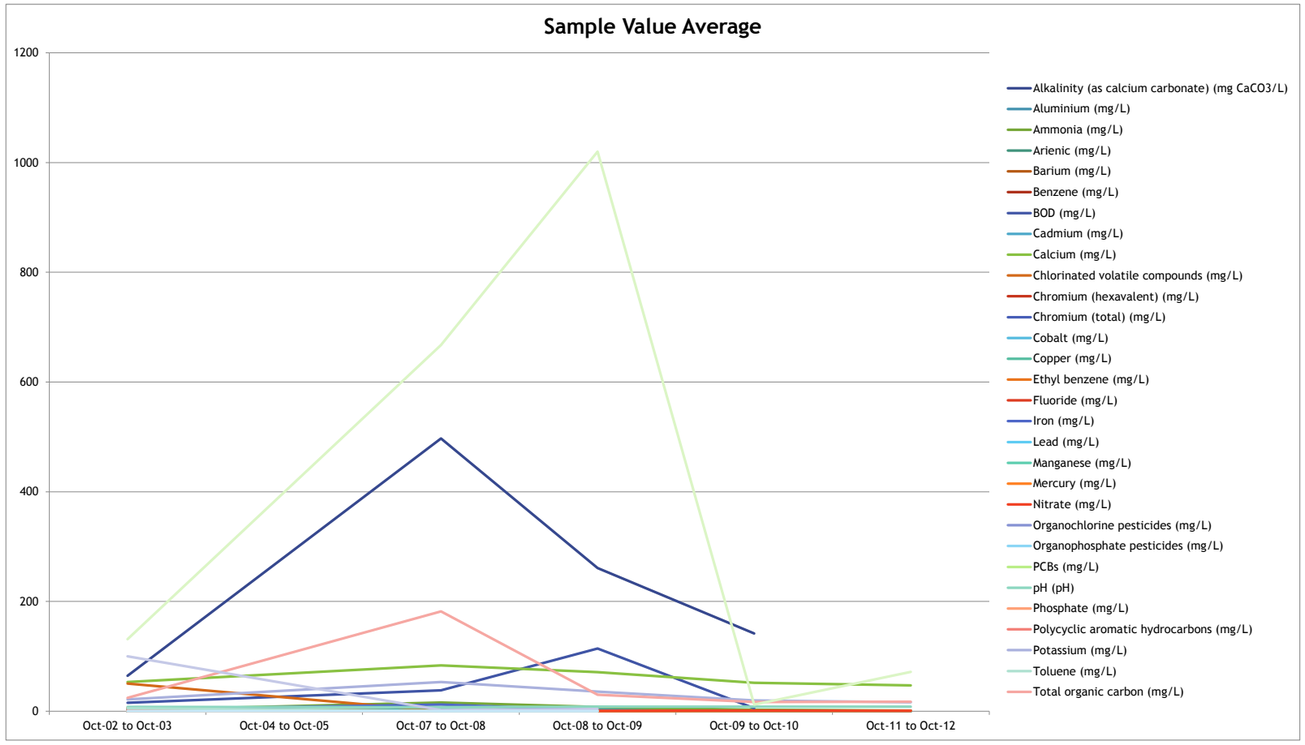
Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbor	64.3	N/A	497	261	141.5	NC		109	N/A	932	290	202	<LOR
Aluminium	1.5	N/A	2.82	3.49	1.45	0.5		1.5	N/A	2.82	3.49	1.45	0.5
Ammonia	1.87	N/A	15.67	7.56	2.195	0.9		5.58	N/A	27	9.53	3.72	1.55
Arienic	<0.01	N/A	0.009	0.014	0.003	0.005		<0.01	N/A	0.009	0.014	0.003	0.005
Barium	<0.1	N/A	0.118	0.114	0.061	0.08		<0.1	N/A	0.118	0.114	0.061	0.08
Benzene	<5	N/A	0.0003	0.0005	NC	NC		<5	N/A	0.0003	0.0005	<LOR	<LOR
BOD	15	N/A	38	114	5	NC		15	N/A	38	114	5	<LOR
Cadmium	<0.005	N/A	0.0003	0.0002	NC	NC		<0.005	N/A	0.0003	0.0002	<LOR	<LOR
Calcium	53	N/A	83.5	71	51.75	47		104	N/A	11.9	79	59	54
Chloride	233	N/A	342.25	253	214.75	92		332	N/A	730	313	317	131
Chlorinated volatile compou	<50	N/A	0.23	0.183	NC	NC		<50	N/A	0.23	0.183	<LOR	<LOR
Chromium (hexavalent)	<0.01	N/A	0.005	0.005	NC	NC		<0.01	N/A	0.005	0.005	<LOR	<LOR
Chromium (total)	<0.01	N/A	0.006	0.006	0.002	0.001		<0.01	N/A	0.006	0.006	0.002	0.001
Cobalt	<0.01	N/A	0.007	0.005	0.001	0.001		<0.01	N/A	0.007	0.005	0.001	0.001
Conductivity	1184	N/A	2120	1583.3	1191	784		1790	N/A	3910	1810	1410	933
Copper	<0.01	N/A	0.017	0.012	0.007	0.004		<0.01	N/A	0.017	0.012	0.007	0.004
Ethyl benzene	<5	N/A	0.001	0.001	NC	NC		<5	N/A	0.001	0.001	<LOR	<LOR
Fluoride	0.3	N/A	0.325	0.184	0.228	0.33		0.3	N/A	0.4	0.3	0.3	0.4
Iron	2.66	N/A	11.66	1.73	NC	NC		7.2	N/A	29.9	4.75	0.14	0.07
Lead	<0.01	N/A	0.015	0.026	0.003	0.002		<0.01	N/A	0.015	0.026	0.003	0.002
Magnesium	30	N/A	63.75	40.33	26.5	22		52	N/A	143	50	29	26
Manganese	1.51	N/A	1.579	0.4515	0.18	0.23		3.88	N/A	292	0.729	0.318	0.337
Mercury	<0.0001	N/A	0.00005	0.00005	NC	0.55		<0.0001	N/A	0.00005	0.00005	<LOR	0.55
Nitrate	0.6	N/A	0.28	0.72	0.895	0.46		164	N/A	0.88	2.14	1.43	0.94
Organochlorine pesticides	<0.5	N/A	0.00033	0.00032	NC	NC		<0.5	N/A	0.001	0.001	<LOR	<LOR
Organophosphate pesticides	<0.2	N/A	0.007	0.007	NC	NC		<0.2	N/A	0.007	0.007	<LOR	<LOR
PCBs	<0.3	N/A	0.0005	0.0005	NC	NC		<0.3	N/A	0.0005	0.0005	<LOR	<LOR
pH	7.63	N/A	7.06	8.05	7.95	8.07		8.74	N/A	7.77	8.67	8.15	8.15
Phosphate	0.01	N/A	0.005	0.005	NC	NC		0.01	N/A	0.005	0.005	<LOR	<LOR
Polycyclic aromatic hydroca	<2	N/A	0.008	0.01	NC	NC		<2	N/A	0.008	0.01	<LOR	<LOR
Potassium	21.3	N/A	53	35.33	19.25	16.33		36	N/A	88	45	26	19
Sodium	115	N/A	224.2	218	133	66.67		174	N/A	519	218	183	82
Sulfate	158	N/A	51	248	89.63	NC		389	N/A	139	255	112	46
Toluene	<5	N/A	0.0025	0.0025	NC	NC		<5	N/A	0.0025	0.0025	<LOR	<LOR
Total dissolved solids	551	N/A	940	1020	582	578		551	N/A	940	1020	582	578
Total organic carbon	24.33	N/A	182	30	16.5	17		41	N/A	335	30	21	19
Total petroleum hydrocarbo	<100	N/A	1.8	3.58	NC	NC		<100	N/A	1.8	3.58	400	<LOR
Total Phenolics	0.06	N/A	0.159	0.24	NC	NC		0.18	N/A	0.366	0.24	0.11	<LOR
Total suspended solids	131.3	N/A	667.5	1020	12	71.33		355	N/A	2020	1020	26	116
Zinc	<0.01	N/A	0.098	0.083	0.014	0.084		<0.01	N/A	0.098	0.083	0.014	0.084

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	64.3	#N/A	497	261	141.5	#N/A		109	#N/A	932	290	202	#N/A
Aluminium (mg/L)	1.5	#N/A	2.82	3.49	1.45	0.5		1.5	#N/A	2.82	3.49	1.45	0.5
Ammonia (mg/L)	1.87	#N/A	15.67	7.56	2.195	0.9		5.58	#N/A	27	9.53	3.72	1.55
Arienic (mg/L)	0.01	#N/A	0.009	0.014	0.003	0.005		0.01	#N/A	0.009	0.014	0.003	0.005
Barium (mg/L)	0.1	#N/A	0.118	0.114	0.061	0.08		0.1	#N/A	0.118	0.114	0.061	0.08
Benzene (mg/L)	5	#N/A	0.0003	0.0005	#N/A	#N/A		5	#N/A	0.0003	0.0005	#N/A	#N/A
BOD (mg/L)	15	#N/A	38	114	5	#N/A		15	#N/A	38	114	5	#N/A
Cadmium (mg/L)	0.005	#N/A	0.0003	0.0002	#N/A	#N/A		0.005	#N/A	0.0003	0.0002	#N/A	#N/A
Calcium (mg/L)	53	#N/A	83.5	71	51.75	47		104	#N/A	11.9	79	59	54
Chloride (mg/L)	233	#N/A	342.25	253	214.75	92		332	#N/A	730	313	317	131
Chlorinated volatile compounds (mg/L)	50	#N/A	0.23	0.183	#N/A	#N/A		50	#N/A	0.23	0.183	#N/A	#N/A
Chromium (hexavalent) (mg/L)	0.01	#N/A	0.005	0.005	#N/A	#N/A		0.01	#N/A	0.005	0.005	#N/A	#N/A
Chromium (total) (mg/L)	0.01	#N/A	0.006	0.006	0.002	0.001		0.01	#N/A	0.006	0.006	0.002	0.001
Cobalt (mg/L)	0.01	#N/A	0.007	0.005	0.001	0.001		0.01	#N/A	0.007	0.005	0.001	0.001
Conductivity (uS/cm)	1184	#N/A	2120	1583.3	1191	784		1790	#N/A	3910	1810	1410	933
Copper (mg/L)	0.01	#N/A	0.017	0.012	0.007	0.004		0.01	#N/A	0.017	0.012	0.007	0.004
Ethyl benzene (mg/L)	5	#N/A	0.001	0.001	#N/A	#N/A		5	#N/A	0.001	0.001	#N/A	#N/A
Fluoride (mg/L)	0.3	#N/A	0.325	0.184	0.228	0.33		0.3	#N/A	0.4	0.3	0.3	0.4
Iron (mg/L)	2.66	#N/A	11.66	1.73	#N/A	#N/A		7.2	#N/A	29.9	4.75	0.14	0.07
Lead (mg/L)	0.01	#N/A	0.015	0.026	0.003	0.002		0.01	#N/A	0.015	0.026	0.003	0.002
Magnesium (mg/L)	30	#N/A	63.75	40.33	26.5	22		52	#N/A	143	50	29	26
Manganese (mg/L)	1.51	#N/A	1.579	0.4515	0.18	0.23		3.88	#N/A	292	0.729	0.318	0.337
Mercury (mg/L)	0.0001	#N/A	0.00005	0.00005	#N/A	0.55		0.0001	#N/A	0.00005	0.00005	#N/A	0.55
Nitrate (mg/L)	0.6	#N/A	0.28	0.72	0.895	0.46		164	#N/A	0.88	2.14	1.43	0.94
Organochlorine pesticides (mg/L)	0.5	#N/A	0.00033	0.00032	#N/A	#N/A		0.5	#N/A	0.001	0.001	#N/A	#N/A
Organophosphate pesticides (mg/L)	0.2	#N/A	0.007	0.007	#N/A	#N/A		0.2	#N/A	0.007	0.007	#N/A	#N/A
PCBs (mg/L)	0.3	#N/A	0.0005	0.0005	#N/A	#N/A		0.3	#N/A	0.0005	0.0005	#N/A	#N/A
pH (pH)	7.63	#N/A	7.06	8.05	7.95	8.07		8.74	#N/A	7.77	8.67	8.15	8.15
Phosphate (mg/L)	0.01	#N/A	0.005	0.005	#N/A	#N/A		0.01	#N/A	0.005	0.005	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	2	#N/A	0.008	0.01	#N/A	#N/A		2	#N/A	0.008	0.01	#N/A	#N/A
Potassium (mg/L)	21.3	#N/A	53	35.33	19.25	16.33		36	#N/A	88	45	26	19
Sodium (mg/L)	115	#N/A	224.2	218	133	66.67		174	#N/A	519	218	183	82
Sulfate (mg/L)	158	#N/A	51	248	89.63	#N/A		389	#N/A	139	255	112	46
Toluene (mg/L)	5	#N/A	0.0025	0.0025	#N/A	#N/A		5	#N/A	0.0025	0.0025	#N/A	#N/A
Total dissolved solids (mg/L)	551	#N/A	940	1020	582	578		551	#N/A	940	1020	582	578
(mg/L)	24.33	#N/A	182	30	16.5	17		41	#N/A	335	30	21	19
Total petroleum hydrocarbons (mg/L)	100	#N/A	1.8	3.58	#N/A	#N/A		100	#N/A	1.8	3.58	400	#N/A
Total Phenolics (mg/L)	0.06	#N/A	0.159	0.24	#N/A	#N/A		0.18	#N/A	0.366	0.24	0.11	#N/A
Total suspended solids (mg/L)	131.3	#N/A	667.5	1020	12	71.33		355	#N/A	2020	1020	26	116
Zinc (mg/L)	0.01	#N/A	0.098	0.083	0.014	0.084		0.01	#N/A	0.098	0.083	0.014	0.084

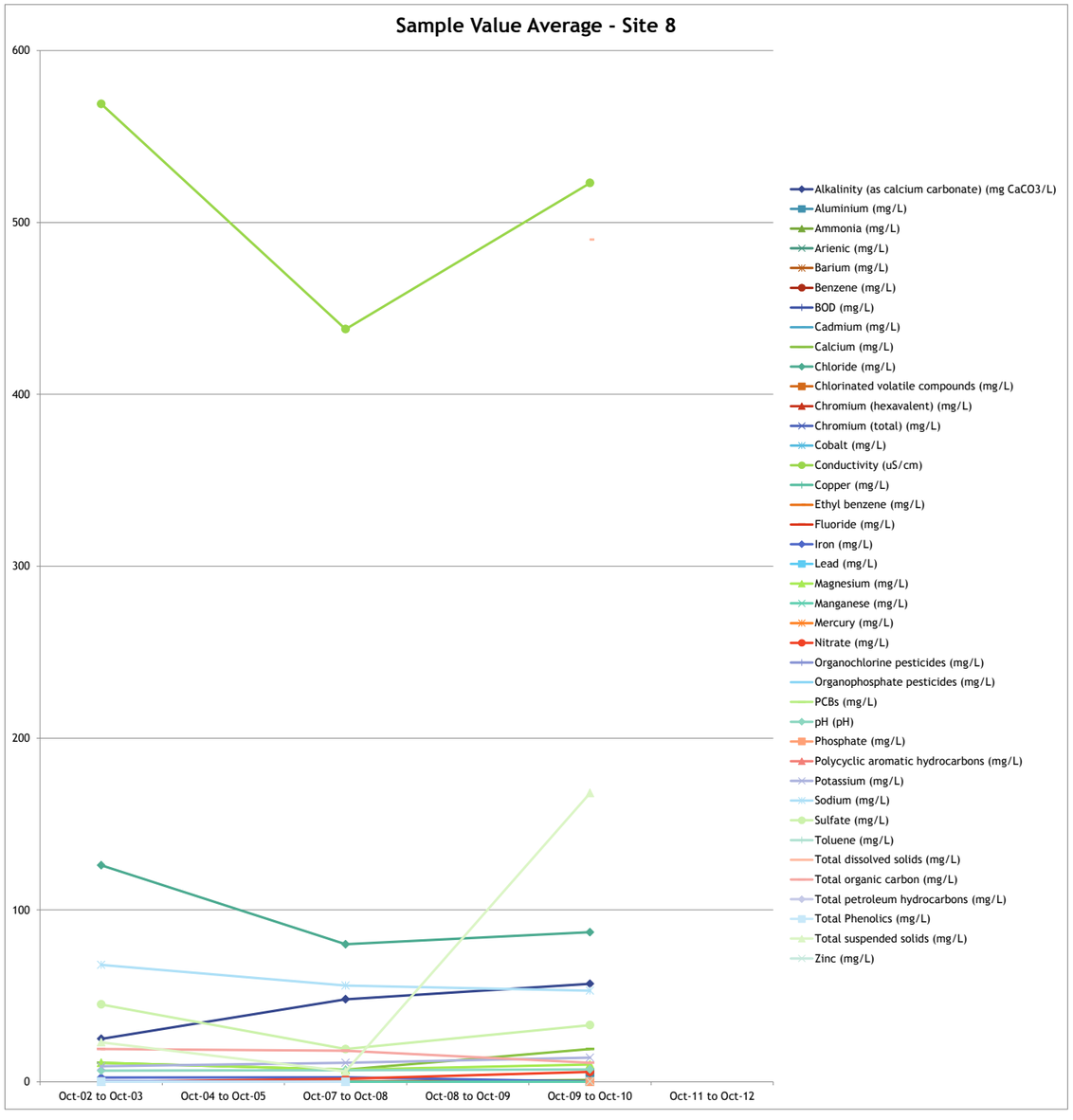

Sample Value Average
1200
1000
800
600
400
200
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Toluene (mg/L)
Total organic carbon (mg/L)

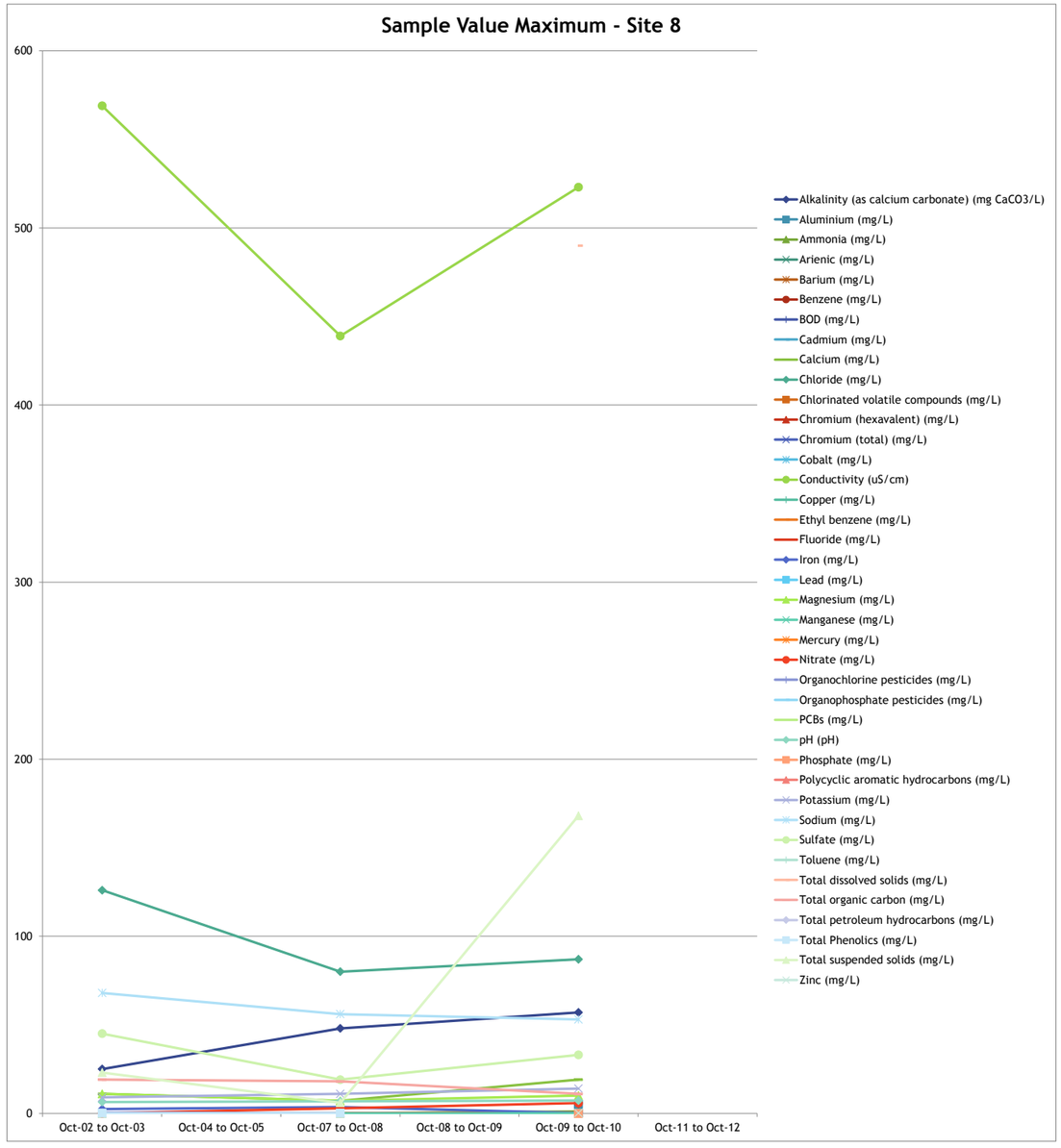
Monitoring Site 8 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	1	25	25	25	0	N/A	N/A	N/A	1	48	48	48	0	N/A	N/A	N/A	1	57	57	57	0	N/A	N/A	N/A
Aluminium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	5.2	5.2	5.2	0	N/A	N/A	N/A
Ammonia	mg/L	4	1	0.07	0.07	0.07	0	N/A	N/A	N/A	1	0.036	0.036	0.036	0	N/A	N/A	N/A	1	0.96	0.96	0.96	0	N/A	N/A	N/A
Arienic	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.004	0.004	0.004	0	N/A	N/A	N/A
Barium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.083	0.083	0.083	0	N/A	N/A	N/A
Benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
BOD	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	5	5	5	0	N/A	N/A	N/A
Cadmium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Calcium	mg/L	4	1	11	11	11	0	N/A	N/A	N/A	1	7	7	7	0	N/A	N/A	N/A	1	19	19	19	0	N/A	N/A	N/A
Chloride	mg/L	4	1	126	126	126	0	N/A	N/A	N/A	1	80	80	80	0	N/A	N/A	N/A	1	87	87	87	0	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Chromium (total)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.004	0.004	0.004	0	N/A	N/A	N/A
Cobalt	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.002	0.002	0.002	0	N/A	N/A	N/A
Conductivity	uS/cm	4	1	569	569	569	0	N/A	N/A	N/A	1	437	438	439	0	N/A	N/A	N/A	1	523	523	523	0	N/A	N/A	N/A
Copper	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.17	0.17	0.17	0	N/A	N/A	N/A
Ethyl benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	1	1	1	0	N/A	N/A	N/A
Fluoride	mg/L	4	1	0.2	0.2	0.2	0	N/A	N/A	N/A	1	0.1	0.1	0.1	0	N/A	N/A	N/A	1	0.3	0.3	0.3	0	N/A	N/A	N/A
Iron	mg/L	4	1	2.4	2.4	2.4	0	N/A	N/A	N/A	1	1.55	2.55	3.55	0	N/A	N/A	N/A	1	0.15	0.15	0.15	0	N/A	N/A	N/A
Lead	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.03	0.03	0.03	0	N/A	N/A	N/A
Magnesium	mg/L	4	1	11	11	11	0	N/A	N/A	N/A	1	7	7	7	0	N/A	N/A	N/A	1	10	10	10	0	N/A	N/A	N/A
Manganese	mg/L	4	1	0.033	0.033	0.033	0	N/A	N/A	N/A	1	0.05	0.05	0.05	0	N/A	N/A	N/A	1	0.045	0.045	0.045	0	N/A	N/A	N/A
Mercury	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Nitrate	mg/L	4	1	0.07	0.07	0.07	0	N/A	N/A	N/A	1	0.77	1.77	2.77	0	N/A	N/A	N/A	1	5.75	5.75	5.75	0	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	1	<0.5	<0.5	<0.5	0	N/A	N/A	N/A	1	0.00075	0.00075	0.00075	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
PCBs	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
pH	pH	4	1	6.42	6.42	6.42	0	N/A	N/A	N/A	1	6.8	6.8	6.8	0	N/A	N/A	N/A	1	7.19	7.19	7.19	0	N/A	N/A	N/A
Phosphate	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.01	0.01	0.01	0	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Potassium	mg/L	4	1	9	9	9	0	N/A	N/A	N/A	1	11	11	11	0	N/A	N/A	N/A	1	14	14	14	0	N/A	N/A	N/A
Sodium	mg/L	4	1	68	68	68	0	N/A	N/A	N/A	1	56	56	56	0	N/A	N/A	N/A	1	53	53	53	0	N/A	N/A	N/A
Sulfate	mg/L	4	1	45	45	45	0	N/A	N/A	N/A	1	19	19	19	0	N/A	N/A	N/A	1	33	33	33	0	N/A	N/A	N/A
Toluene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Total dissolved solids	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	490	490	490	0	N/A	N/A	N/A
Total organic carbon	mg/L	4	1	19	19	19	0	N/A	N/A	N/A	1	18	18	18	0	N/A	N/A	N/A	1	11	11	11	0	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Total Phenolics	mg/L	4	1	<0.05	<0.05	<0.05	0	N/A	N/A	N/A	1	0.025	0.025	0.025	0	N/A	N/A	N/A	1	<LOR	NC	<LOR	0	N/A	N/A	N/A
Total suspended solids	mg/L	4	1	23	23	23	0	N/A	N/A	N/A	1	6	6	6	0	N/A	N/A	N/A	1	168	168	168	0	N/A	N/A	N/A
Zinc	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	0.118	0.118	0.118	0	N/A	N/A	N/A

NC	Not calculated
LOR	Limit of reporting
N/A	No sample


Sample Value Average - Site 8
600
500
400
300
200
100
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)


Sample Value Maximum - Site 8
600
500
400
300
200
100
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)

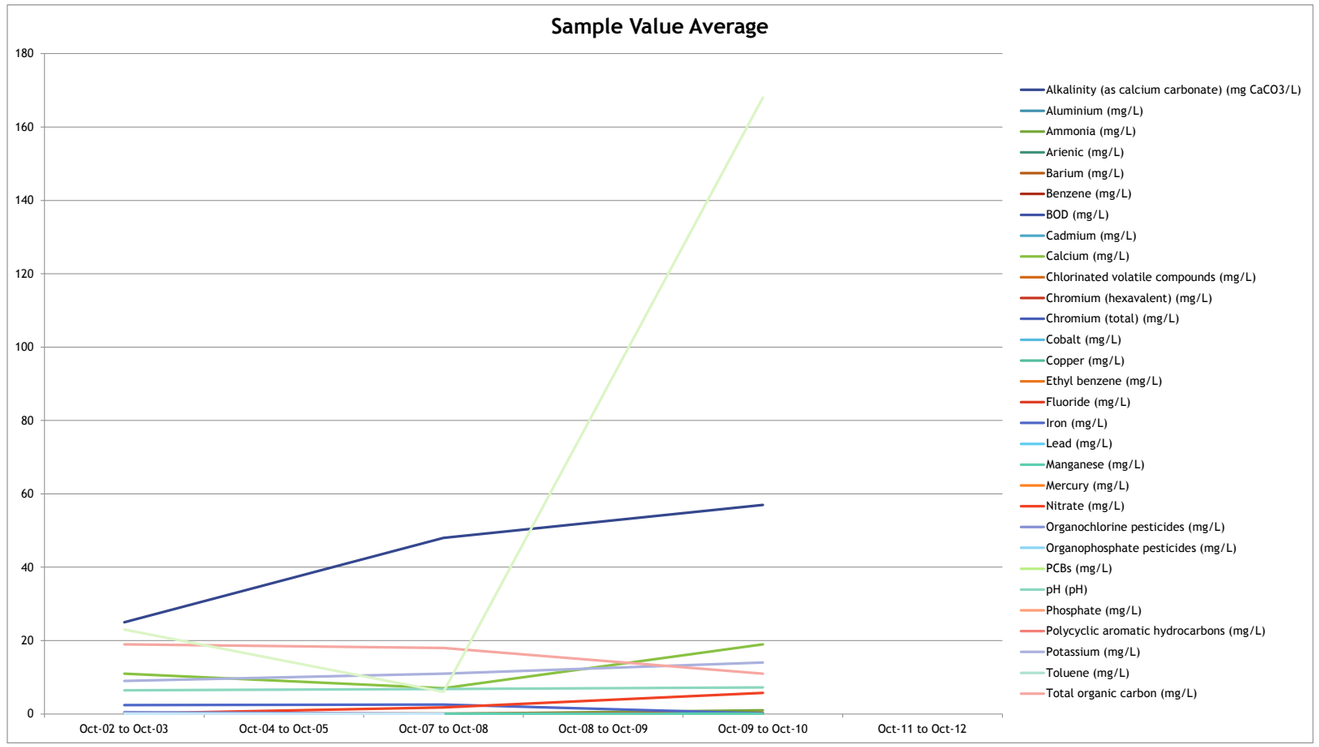
Data for charts
This data has been copied and pasted values, then>>>>

Replace < with <blank>
Replace N/A with =NA()

Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbor	25	N/A	48	N/A	57	N/A		25	N/A	48	N/A	57	N/A
Aluminium	N/A	N/A	N/A	N/A	5.2	N/A		N/A	N/A	N/A	N/A	5.2	N/A
Ammonia	0.07	N/A	0.036	N/A	0.96	N/A		0.07	N/A	0.036	N/A	0.96	N/A
Arienic	N/A	N/A	N/A	N/A	0.004	N/A		N/A	N/A	N/A	N/A	0.004	N/A
Barium	N/A	N/A	N/A	N/A	0.083	N/A		N/A	N/A	N/A	N/A	0.083	N/A
Benzene	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
BOD	N/A	N/A	N/A	N/A	5	N/A		N/A	N/A	N/A	N/A	5	N/A
Cadmium	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Calcium	11	N/A	7	N/A	19	N/A		11	N/A	7	N/A	19	N/A
Chloride	126	N/A	80	N/A	87	N/A		126	N/A	80	N/A	87	N/A
Chlorinated volatile compou	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Chromium (hexavalent)	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Chromium (total)	N/A	N/A	N/A	N/A	0.004	N/A		N/A	N/A	N/A	N/A	0.004	N/A
Cobalt	N/A	N/A	N/A	N/A	0.002	N/A		N/A	N/A	N/A	N/A	0.002	N/A
Conductivity	569	N/A	438	N/A	523	N/A		569	N/A	439	N/A	523	N/A
Copper	N/A	N/A	N/A	N/A	0.17	N/A		N/A	N/A	N/A	N/A	0.17	N/A
Ethyl benzene	N/A	N/A	N/A	N/A	1	N/A		N/A	N/A	N/A	N/A	1	N/A
Fluoride	0.2	N/A	0.1	N/A	0.3	N/A		0.2	N/A	0.1	N/A	0.3	N/A
Iron	2.4	N/A	2.55	N/A	0.15	N/A		2.4	N/A	3.55	N/A	0.15	N/A
Lead	N/A	N/A	N/A	N/A	0.03	N/A		N/A	N/A	N/A	N/A	0.03	N/A
Magnesium	11	N/A	7	N/A	10	N/A		11	N/A	7	N/A	10	N/A
Manganese	0.033	N/A	0.05	N/A	0.045	N/A		0.033	N/A	0.05	N/A	0.045	N/A
Mercury	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Nitrate	0.07	N/A	1.77	N/A	5.75	N/A		0.07	N/A	2.77	N/A	5.75	N/A
Organochlorine pesticides	<0.5	N/A	0.00075	N/A	NC	N/A		<0.5	N/A	0.00075	N/A	<LOR	N/A
Organophosphate pesticides	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
PCBs	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
pH	6.42	N/A	6.8	N/A	7.19	N/A		6.42	N/A	6.8	N/A	7.19	N/A
Phosphate	N/A	N/A	N/A	N/A	0.01	N/A		N/A	N/A	N/A	N/A	0.01	N/A
Polycyclic aromatic hydroca	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Potassium	9	N/A	11	N/A	14	N/A		9	N/A	11	N/A	14	N/A
Sodium	68	N/A	56	N/A	53	N/A		68	N/A	56	N/A	53	N/A
Sulfate	45	N/A	19	N/A	33	N/A		45	N/A	19	N/A	33	N/A
Toluene	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Total dissolved solids	N/A	N/A	N/A	N/A	490	N/A		N/A	N/A	N/A	N/A	490	N/A
Total organic carbon	19	N/A	18	N/A	11	N/A		19	N/A	18	N/A	11	N/A
Total petroleum hydrocarbo	N/A	N/A	N/A	N/A	NC	N/A		N/A	N/A	N/A	N/A	<LOR	N/A
Total Phenolics	<0.05	N/A	0.025	N/A	NC	N/A		<0.05	N/A	0.025	N/A	<LOR	N/A
Total suspended solids	23	N/A	6	N/A	168	N/A		23	N/A	6	N/A	168	N/A
Zinc	N/A	N/A	N/A	N/A	0.118	N/A		N/A	N/A	N/A	N/A	0.118	N/A

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	25	#N/A	48	#N/A	57	#N/A		25	#N/A	48	#N/A	57	#N/A
Aluminium (mg/L)	#N/A	#N/A	#N/A	#N/A	5.2	#N/A		#N/A	#N/A	#N/A	#N/A	5.2	#N/A
Ammonia (mg/L)	0.07	#N/A	0.036	#N/A	0.96	#N/A		0.07	#N/A	0.036	#N/A	0.96	#N/A
Arienic (mg/L)	#N/A	#N/A	#N/A	#N/A	0.004	#N/A		#N/A	#N/A	#N/A	#N/A	0.004	#N/A
Barium (mg/L)	#N/A	#N/A	#N/A	#N/A	0.083	#N/A		#N/A	#N/A	#N/A	#N/A	0.083	#N/A
Benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
BOD (mg/L)	#N/A	#N/A	#N/A	#N/A	5	#N/A		#N/A	#N/A	#N/A	#N/A	5	#N/A
Cadmium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Calcium (mg/L)	11	#N/A	7	#N/A	19	#N/A		11	#N/A	7	#N/A	19	#N/A
Chloride (mg/L)	126	#N/A	80	#N/A	87	#N/A		126	#N/A	80	#N/A	87	#N/A
Chlorinated volatile compounds (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (hexavalent) (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (total) (mg/L)	#N/A	#N/A	#N/A	#N/A	0.004	#N/A		#N/A	#N/A	#N/A	#N/A	0.004	#N/A
Cobalt (mg/L)	#N/A	#N/A	#N/A	#N/A	0.002	#N/A		#N/A	#N/A	#N/A	#N/A	0.002	#N/A
Conductivity (uS/cm)	569	#N/A	438	#N/A	523	#N/A		569	#N/A	439	#N/A	523	#N/A
Copper (mg/L)	#N/A	#N/A	#N/A	#N/A	0.17	#N/A		#N/A	#N/A	#N/A	#N/A	0.17	#N/A
Ethyl benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	1	#N/A		#N/A	#N/A	#N/A	#N/A	1	#N/A
Fluoride (mg/L)	0.2	#N/A	0.1	#N/A	0.3	#N/A		0.2	#N/A	0.1	#N/A	0.3	#N/A
Iron (mg/L)	2.4	#N/A	2.55	#N/A	0.15	#N/A		2.4	#N/A	3.55	#N/A	0.15	#N/A
Lead (mg/L)	#N/A	#N/A	#N/A	#N/A	0.03	#N/A		#N/A	#N/A	#N/A	#N/A	0.03	#N/A
Magnesium (mg/L)	11	#N/A	7	#N/A	10	#N/A		11	#N/A	7	#N/A	10	#N/A
Manganese (mg/L)	0.033	#N/A	0.05	#N/A	0.045	#N/A		0.033	#N/A	0.05	#N/A	0.045	#N/A
Mercury (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Nitrate (mg/L)	0.07	#N/A	1.77	#N/A	5.75	#N/A		0.07	#N/A	2.77	#N/A	5.75	#N/A
Organochlorine pesticides (mg/L)	0.5	#N/A	0.00075	#N/A	#N/A	#N/A		0.5	#N/A	0.00075	#N/A	#N/A	#N/A
Organophosphate pesticides (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
PCBs (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
pH (pH)	6.42	#N/A	6.8	#N/A	7.19	#N/A		6.42	#N/A	6.8	#N/A	7.19	#N/A
Phosphate (mg/L)	#N/A	#N/A	#N/A	#N/A	0.01	#N/A		#N/A	#N/A	#N/A	#N/A	0.01	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Potassium (mg/L)	9	#N/A	11	#N/A	14	#N/A		9	#N/A	11	#N/A	14	#N/A
Sodium (mg/L)	68	#N/A	56	#N/A	53	#N/A		68	#N/A	56	#N/A	53	#N/A
Sulfate (mg/L)	45	#N/A	19	#N/A	33	#N/A		45	#N/A	19	#N/A	33	#N/A
Toluene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total dissolved solids (mg/L)	#N/A	#N/A	#N/A	#N/A	490	#N/A		#N/A	#N/A	#N/A	#N/A	490	#N/A
(mg/L)	19	#N/A	18	#N/A	11	#N/A		19	#N/A	18	#N/A	11	#N/A
Total petroleum hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total Phenolics (mg/L)	0.05	#N/A	0.025	#N/A	#N/A	#N/A		0.05	#N/A	0.025	#N/A	#N/A	#N/A
Total suspended solids (mg/L)	23	#N/A	6	#N/A	168	#N/A		23	#N/A	6	#N/A	168	#N/A
Zinc (mg/L)	#N/A	#N/A	#N/A	#N/A	0.118	#N/A		#N/A	#N/A	#N/A	#N/A	0.118	#N/A

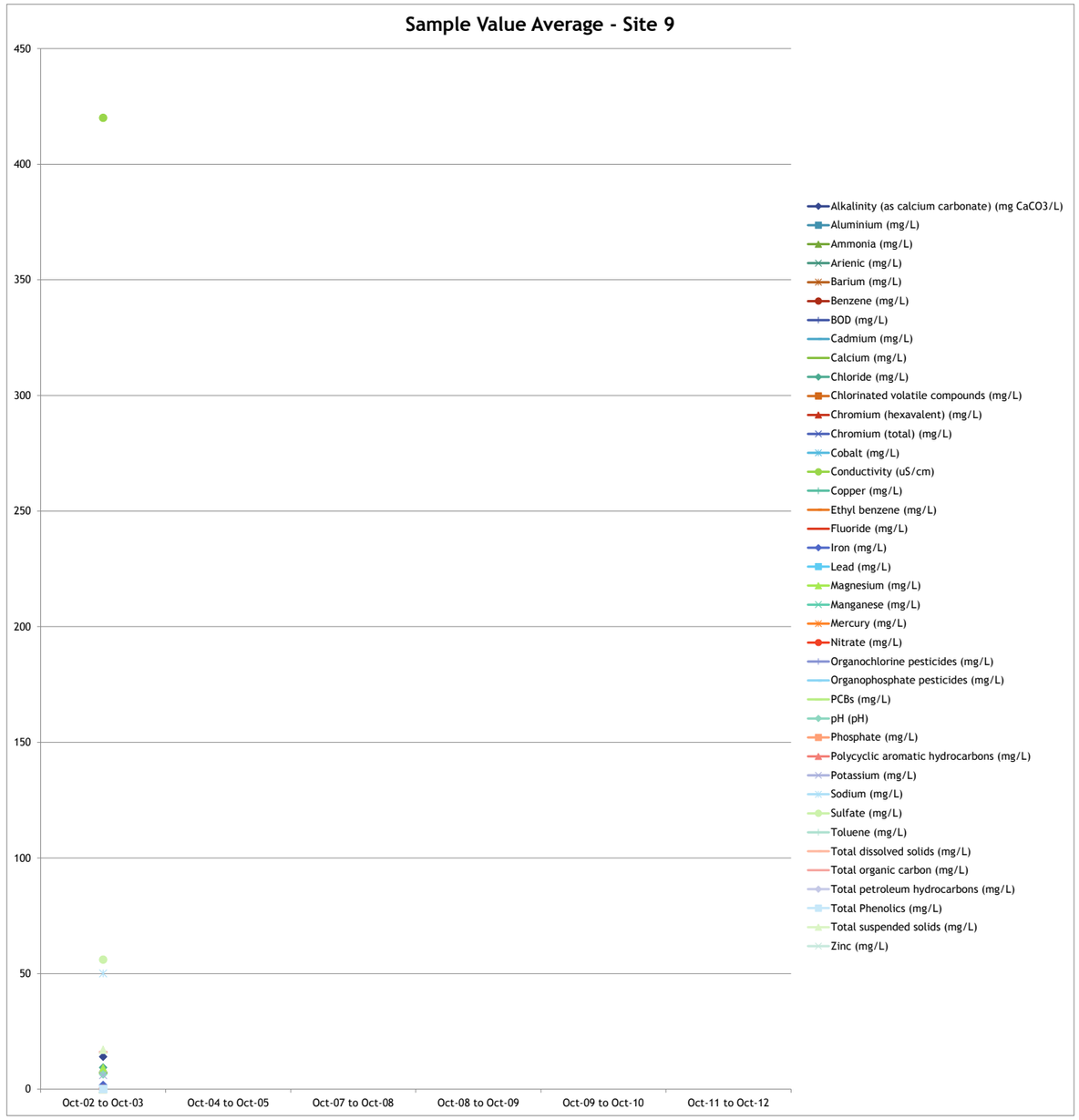

Sample Value Average
180
160
140
120
100
80
60
40
20
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Toluene (mg/L)
Total organic carbon (mg/L)

Monitoring Site 9 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	1	14	14	14	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Aluminium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Ammonia	mg/L	4	1	<0.01	<0.01	<0.01	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Arienic	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Barium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
BOD	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Cadmium	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Calcium	mg/L	4	1	7	7	7	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Chloride	mg/L	4	1	9.3	9.3	9.3	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Chlorinated volatile compounds	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Chromium (hexavalent)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Chromium (total)	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Cobalt	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Conductivity	uS/cm	4	1	420	420	420	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Copper	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Ethyl benzene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Fluoride	mg/L	4	1	0.1	0.1	0.1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Iron	mg/L	4	1	1.8	1.8	1.8	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Lead	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Magnesium	mg/L	4	1	9	9	9	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Manganese	mg/L	4	1	0.05	0.05	0.05	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Mercury	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Nitrate	mg/L	4	1	0.09	0.09	0.09	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Organochlorine pesticides	mg/L	4	1	<0.05	<0.05	<0.05	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Organophosphate pesticides	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
PCBs	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
pH	pH	4	1	6.33	6.33	6.33	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Phosphate	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Polycyclic aromatic hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Potassium	mg/L	4	1	6	6	6	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Sodium	mg/L	4	1	50	50	50	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Sulfate	mg/L	4	1	56	56	56	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Toluene	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Total dissolved solids	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Total organic carbon	mg/L	4	1	16	16	16	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Total petroleum hydrocarbons	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Total Phenolics	mg/L	4	1	<0.05	<0.05	<0.05	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Total suspended solids	mg/L	4	1	17	17	17	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A
Zinc	mg/L	1	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A	0	N/A	N/A	N/A

NC	Not calculated
LOR	Limit of reporting
N/A	No sample


Sample Value Average - Site 9
450
400
350
300
250
200
150
100
50
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)

Sample Value Maximum - Site 9
450
400
350
300
250
200
150
100
50
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Conductivity (uS/cm)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Toluene (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbons (mg/L)
Total Phenolics (mg/L)
Total suspended solids (mg/L)
Zinc (mg/L)

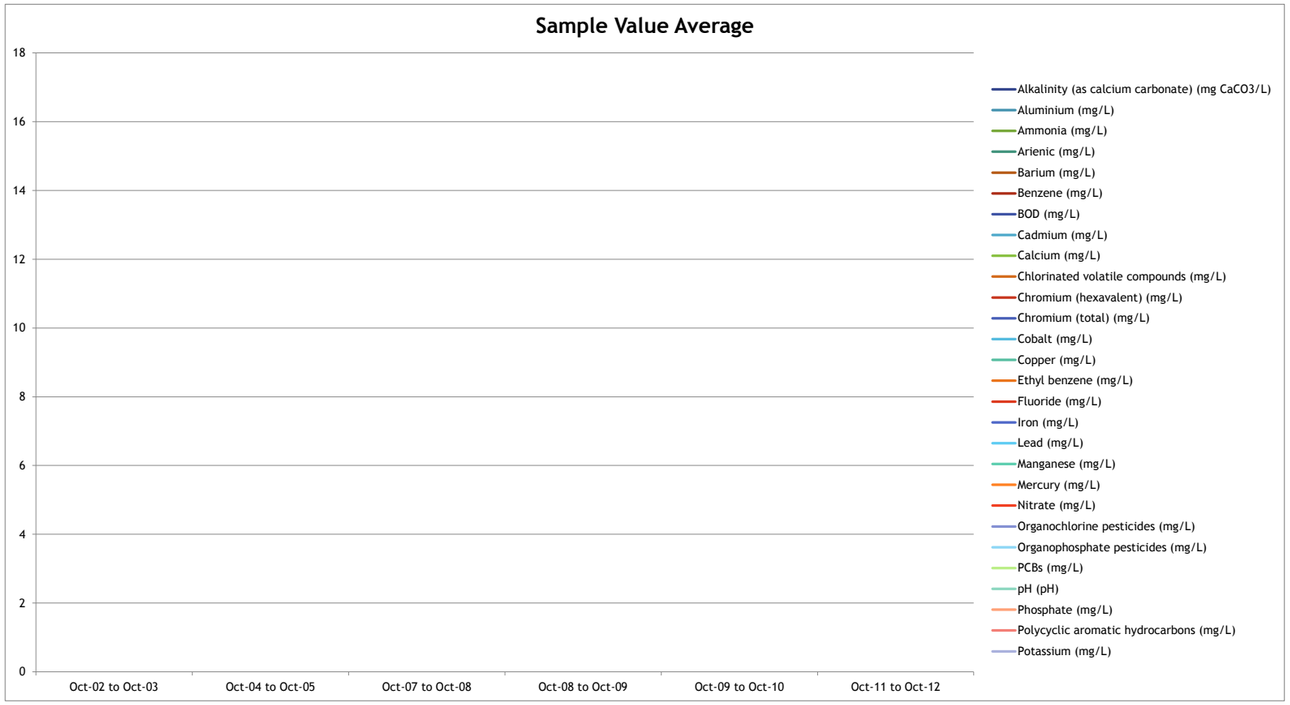
Data for charts
This data has been copied and pasted values, then>>>>

Replace < with <blank>
Replace N/A with =NA()

Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbor	14	N/A	N/A	N/A	N/A	N/A		14	N/A	N/A	N/A	N/A	N/A
Aluminium	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Ammonia	<0.01	N/A	N/A	N/A	N/A	N/A		<0.01	N/A	N/A	N/A	N/A	N/A
Arienic	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Barium	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
BOD	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Calcium	7	N/A	N/A	N/A	N/A	N/A		7	N/A	N/A	N/A	N/A	N/A
Chloride	9.3	N/A	N/A	N/A	N/A	N/A		9.3	N/A	N/A	N/A	N/A	N/A
Chlorinated volatile compou	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Chromium (hexavalent)	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Chromium (total)	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Conductivity	420	N/A	N/A	N/A	N/A	N/A		420	N/A	N/A	N/A	N/A	N/A
Copper	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Ethyl benzene	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Fluoride	0.1	N/A	N/A	N/A	N/A	N/A		0.1	N/A	N/A	N/A	N/A	N/A
Iron	1.8	N/A	N/A	N/A	N/A	N/A		1.8	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Magnesium	9	N/A	N/A	N/A	N/A	N/A		9	N/A	N/A	N/A	N/A	N/A
Manganese	0.05	N/A	N/A	N/A	N/A	N/A		0.05	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Nitrate	0.09	N/A	N/A	N/A	N/A	N/A		0.09	N/A	N/A	N/A	N/A	N/A
Organochlorine pesticides	<0.05	N/A	N/A	N/A	N/A	N/A		<0.05	N/A	N/A	N/A	N/A	N/A
Organophosphate pesticides	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
PCBs	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
pH	6.33	N/A	N/A	N/A	N/A	N/A		6.33	N/A	N/A	N/A	N/A	N/A
Phosphate	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Polycyclic aromatic hydroca	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Potassium	6	N/A	N/A	N/A	N/A	N/A		6	N/A	N/A	N/A	N/A	N/A
Sodium	50	N/A	N/A	N/A	N/A	N/A		50	N/A	N/A	N/A	N/A	N/A
Sulfate	56	N/A	N/A	N/A	N/A	N/A		56	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Total dissolved solids	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Total organic carbon	16	N/A	N/A	N/A	N/A	N/A		16	N/A	N/A	N/A	N/A	N/A
Total petroleum hydrocarbo	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Total Phenolics	<0.05	N/A	N/A	N/A	N/A	N/A		<0.05	N/A	N/A	N/A	N/A	N/A
Total suspended solids	17	N/A	N/A	N/A	N/A	N/A		17	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A

	Sample Value Mean							Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12		Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	14	#N/A	#N/A	#N/A	#N/A	#N/A		14	#N/A	#N/A	#N/A	#N/A	#N/A
Aluminium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Ammonia (mg/L)	0.01	#N/A	#N/A	#N/A	#N/A	#N/A		0.01	#N/A	#N/A	#N/A	#N/A	#N/A
Arienic (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Barium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
BOD (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Cadmium (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Calcium (mg/L)	7	#N/A	#N/A	#N/A	#N/A	#N/A		7	#N/A	#N/A	#N/A	#N/A	#N/A
Chloride (mg/L)	9.3	#N/A	#N/A	#N/A	#N/A	#N/A		9.3	#N/A	#N/A	#N/A	#N/A	#N/A
Chlorinated volatile compounds (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (hexavalent) (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (total) (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Cobalt (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Conductivity (uS/cm)	420	#N/A	#N/A	#N/A	#N/A	#N/A		420	#N/A	#N/A	#N/A	#N/A	#N/A
Copper (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Ethyl benzene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Fluoride (mg/L)	0.1	#N/A	#N/A	#N/A	#N/A	#N/A		0.1	#N/A	#N/A	#N/A	#N/A	#N/A
Iron (mg/L)	1.8	#N/A	#N/A	#N/A	#N/A	#N/A		1.8	#N/A	#N/A	#N/A	#N/A	#N/A
Lead (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Magnesium (mg/L)	9	#N/A	#N/A	#N/A	#N/A	#N/A		9	#N/A	#N/A	#N/A	#N/A	#N/A
Manganese (mg/L)	0.05	#N/A	#N/A	#N/A	#N/A	#N/A		0.05	#N/A	#N/A	#N/A	#N/A	#N/A
Mercury (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Nitrate (mg/L)	0.09	#N/A	#N/A	#N/A	#N/A	#N/A		0.09	#N/A	#N/A	#N/A	#N/A	#N/A
Organochlorine pesticides (mg/L)	0.05	#N/A	#N/A	#N/A	#N/A	#N/A		0.05	#N/A	#N/A	#N/A	#N/A	#N/A
Organophosphate pesticides (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
PCBs (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
pH (pH)	6.33	#N/A	#N/A	#N/A	#N/A	#N/A		6.33	#N/A	#N/A	#N/A	#N/A	#N/A
Phosphate (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Polycyclic aromatic hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Potassium (mg/L)	6	#N/A	#N/A	#N/A	#N/A	#N/A		6	#N/A	#N/A	#N/A	#N/A	#N/A
Sodium (mg/L)	50	#N/A	#N/A	#N/A	#N/A	#N/A		50	#N/A	#N/A	#N/A	#N/A	#N/A
Sulfate (mg/L)	56	#N/A	#N/A	#N/A	#N/A	#N/A		56	#N/A	#N/A	#N/A	#N/A	#N/A
Toluene (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total dissolved solids (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
(mg/L)	16	#N/A	#N/A	#N/A	#N/A	#N/A		16	#N/A	#N/A	#N/A	#N/A	#N/A
Total petroleum hydrocarbons (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total Phenolics (mg/L)	0.05	#N/A	#N/A	#N/A	#N/A	#N/A		0.05	#N/A	#N/A	#N/A	#N/A	#N/A
Total suspended solids (mg/L)	17	#N/A	#N/A	#N/A	#N/A	#N/A		17	#N/A	#N/A	#N/A	#N/A	#N/A
Zinc (mg/L)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

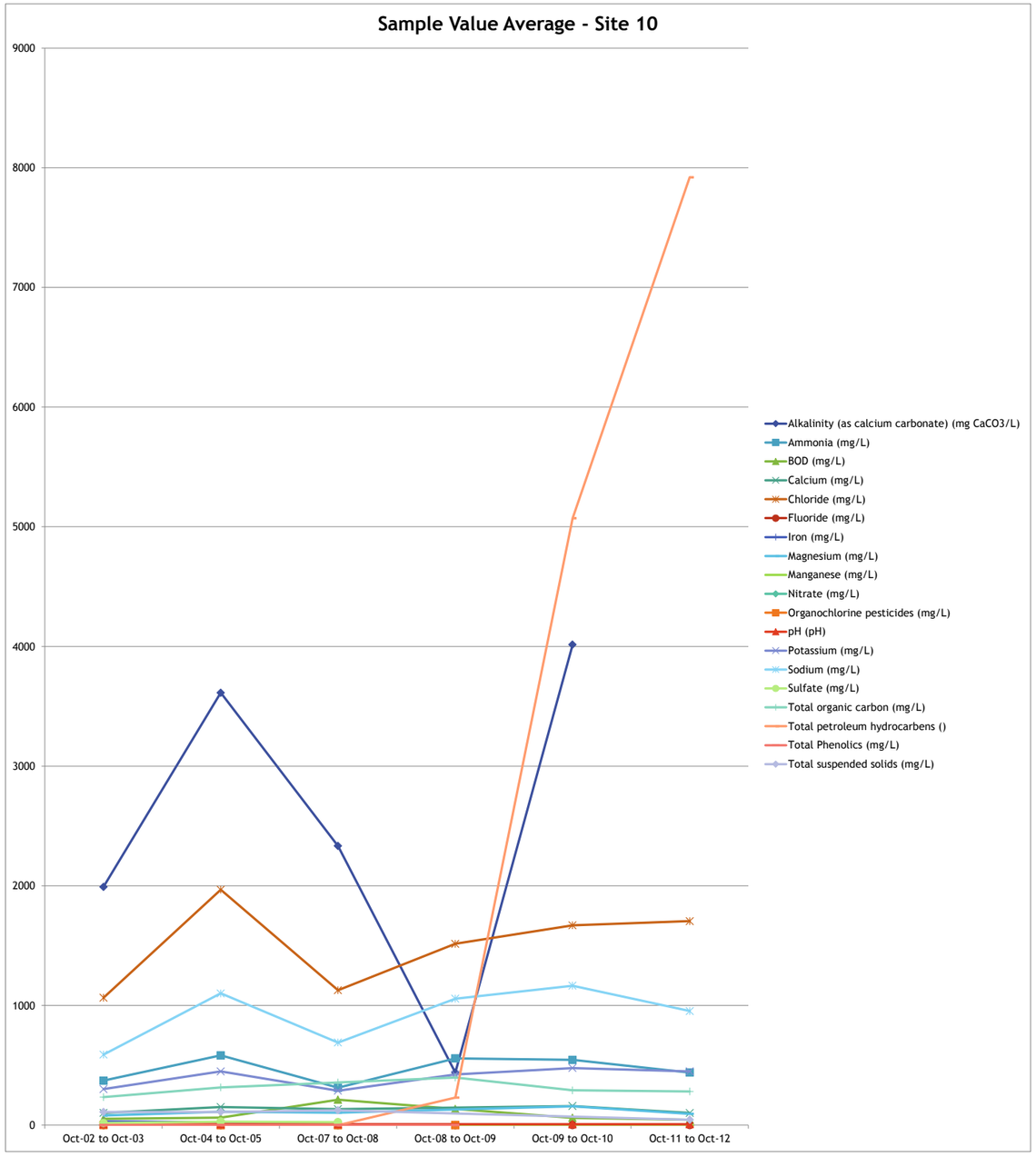

Sample Value Average
18
16
14
12
10
8
6
4
2
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Aluminium (mg/L)
Ammonia (mg/L)
Arienic (mg/L)
Barium (mg/L)
Benzene (mg/L)
BOD (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chlorinated volatile compounds (mg/L)
Chromium (hexavalent) (mg/L)
Chromium (total) (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Ethyl benzene (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Lead (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
Organophosphate pesticides (mg/L)
PCBs (mg/L)
pH (pH)
Phosphate (mg/L)
Polycyclic aromatic hydrocarbons (mg/L)
Potassium (mg/L)

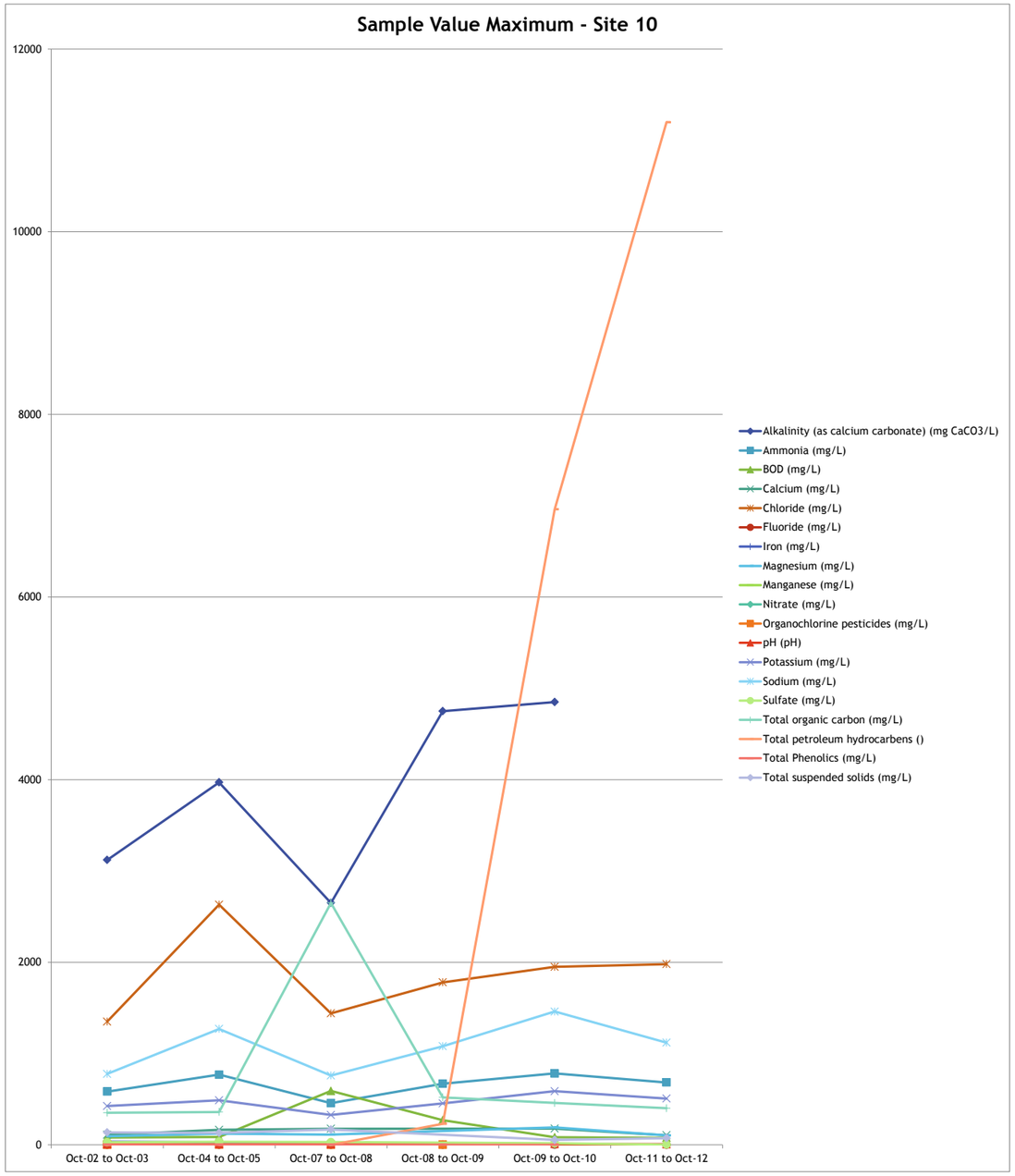
Monitoring Site 10 with Charts

Groundwater quality monitoring bore located north of landfill cell 1

Date			Oct-02 to Oct-03				Oct-04 to Oct-05				Oct-07 to Oct-08				Oct-08 to Oct-09				Oct-09 to Oct-10				Oct-11 to Oct-12			
Pollutant	Unit of measure	No. of Samples required by Licence	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum	No. of samples collected and analysed	Sample Value Minimum	Sample Value Mean	Sample Value Maximum
Alkalinity (as calcium carbonate)	mg CaCO3/L	4	3	491	1990.33	3120	4	3330	3613	3970	4	2050	2333	2650	4	4180	440	4750	4	2680	4015	4850	4	<LOR	NC	<LOR
Ammonia	mg/L	4	3	151	371.66	584	4	414	583	769	3	218	313	457	4	484	557.75	670	4	460	545.25	782	4	1.34	439.84	684
BOD	mg/L	4	3	8	53	82	4	41	62	87	4	26	213	591	4	69	135	271	4	44	61.25	83	4	16	44.75	77
Calcium	mg/L	4	3	99	103	111	4	140	152	164	4	87	134	177	0	N/A	N/A	N/A	4	110	160	179	4	91	101.5	106
Chloride	mg/L	4	3	585	1065	1350	4	1530	1967	2630	4	969	1127.3	1440	4	1350	1515	1780	4	1330	1670	1950	4	1540	1705	1980
Fluoride	mg/L	4	3	0.3	0.4	0.5	4	0.4	0.45	0.5	4	0.4	0.475	0.6	4	0.28	0.76	1.4	4	0.42	0.97	2.04	4	0.7	0.73	0.8
Iron	mg/L	4	3	24.6	31.66	34.5	4	23.7	25.7	29.1	4	4.09	5.88	7.7	3	2.48	4.8	7.27	4	0.14	3.34	5.43	3	0.18	3.39	5.76
Magnesium	mg/L	4	3	50	81	94	4	100	113	124	4	94	104.5	113	0	N/A	N/A	N/A	4	96	157.75	192	4	86	93.75	104
Manganese	mg/L	4	3	0.57	0.83	1.13	4	0.6	0.706	0.872	4	0.545	1.18	2	4	1.03	1.47	2.45	4	0.015	0.53	0.836	3	0.127	0.41	0.627
Nitrate	mg/L	4	3	<0.01	0.55	1.64	4	0.015	0.044	0.072	4	0.005	0.145	0.5	4	0.02	0.042	0.05	4	<LOR	NC	0.06	4	<LOR	NC	<LOR
Organochlorine pesticides	mg/L	4	3	<0.2	<0.5	<0.5	4	<0.5	0	<2	4	0.00025	0.00033	0.001	4	0.00025	0.00025	0.00025	4	<LOR	NC	<LOR	4	<LOR	NC	<LOR
pH	pH	4	3	6.79	6.99	7.08	4	7.11	7.28	7.55	4	7.55	7.86	8.1	0	N/A	N/A	N/A	4	7.44	7.85	8.56	4	8.1	8.22	8.38
Potassium	mg/L	4	3	149	301.66	426	4	384	449	488	4	260	288	328	4	403	424	455	4	418	477.75	588	4	384	450	508
Sodium	mg/L	4	3	278	589.33	777	4	964	1101	1270	4	649	690.25	760	4	1030	1057.5	1080	4	963	1165.75	1460	4	787	953.25	1120
Sulfate	mg/L	4	3	5	18.33	28	4	27	30	35	4	24	26.33	30	0	N/A	N/A	N/A	4	<LOR	NC	16.8	4	c	NC	3
Total organic carbon	mg/L	4	3	143	234.33	352	4	137	315	361	4	21.6	356.5	2650	4	220	397.75	520	4	29	290.75	459	4	4	281.25	401
Total petroleum hydrocarbens		4													1	230	230	230	4	1420	5070	6960	4	4490	7920	11200
Total Phenolics	mg/L	4	3	<0.05	<0.05	<0.05	4	<0.05	0.023	0.093	4	0.11	0.2107	0.295	4	0.025	0.208	0.54	4	<LOR	NC	0.11	4	<LOR	NC	<LOR
Total suspended solids	mg/L	4	3	96	110.66	136	4	96	111	130	4	50	124.75	168	0	N/A	N/A	N/A	4	<LOR	NC	54	4	22	45.25	74

NC Not calculated
LOR Limit of reporting
N/A No sample


Sample Value Average - Site 10
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Ammonia (mg/L)
BOD (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
pH (pH)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbens ()
Total Phenolics (mg/L)
Total suspended solids (mg/L)


Sample Value Maximum - Site 10
12000
10000
8000
6000
4000
2000
0
Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
Ammonia (mg/L)
BOD (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Iron (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Nitrate (mg/L)
Organochlorine pesticides (mg/L)
pH (pH)
Potassium (mg/L)
Sodium (mg/L)
Sulfate (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbens ()
Total Phenolics (mg/L)
Total suspended solids (mg/L)

Data for charts
This data has been copied and pasted values, then>>>>

Replace < with <blank>
Replace N/A with =NA()

Replace LOR with =NA()
Replace NC with =NA()

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	1990.33	3613	2333	440	4015	NC	3120	3970	2650	4750	4850	<LOR
Ammonia (mg/L)	371.66	583	313	557.75	545.25	439.84	584	769	457	670	782	684
BOD (mg/L)	53	62	213	135	61.25	44.75	82	87	591	271	83	77
Calcium (mg/L)	103	152	134	N/A	160	101.5	111	164	177	N/A	179	106
Chloride (mg/L)	1065	1967	1127.3	1515	1670	1705	1350	2630	1440	1780	1950	1980
Fluoride (mg/L)	0.4	0.45	0.475	0.76	0.97	0.73	0.5	0.5	0.6	1.4	2.04	0.8
Iron (mg/L)	31.66	25.7	5.88	4.8	3.34	3.39	34.5	29.1	7.7	7.27	5.43	5.76
Magnesium (mg/L)	81	113	104.5	N/A	157.75	93.75	94	124	113	N/A	192	104
Manganese (mg/L)	0.83	0.706	1.18	1.47	0.53	0.41	1.13	0.872	2	2.45	0.836	0.627
Nitrate (mg/L)	0.55	0.044	0.145	0.042	NC	NC	1.64	0.072	0.5	0.05	0.06	<LOR
Organochlorine pesticides (mg/L)	<0.5	0	0.00033	0.00025	NC	NC	<0.5	<2	0.001	0.00025	<LOR	<LOR
pH (pH)	6.99	7.28	7.86	N/A	7.85	8.22	7.08	7.55	8.1	N/A	8.56	8.38
Potassium (mg/L)	301.66	449	288	424	477.75	450	426	488	328	455	588	508
Sodium (mg/L)	589.33	1101	690.25	1057.5	1165.75	953.25	777	1270	760	1080	1460	1120
Sulfate (mg/L)	18.33	30	26.33	N/A	NC	NC	28	35	30	N/A	16.8	3
(mg/L)	234.33	315	356.5	397.75	290.75	281.25	352	361	2650	520	459	401
Total petroleum hydrocarbens ()	0	0	0	230	5070	7920	0	0	0	230	6960	11200
Total Phenolics (mg/L)	<0.05	0.023	0.2107	0.208	NC	NC	<0.05	0.093	0.295	0.54	0.11	<LOR
Total suspended solids (mg/L)	110.66	111	124.75	N/A	NC	45.25	136	130	168	N/A	54	74

	Sample Value Mean						Sample Value Maximum					
Pollutant	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12	Oct-02 to Oct-03	Oct-04 to Oct-05	Oct-07 to Oct-08	Oct-08 to Oct-09	Oct-09 to Oct-10	Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)	1990.33	3613	2333	440	4015	#N/A	3120	3970	2650	4750	4850	#N/A
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Calcium (mg/L)	103	152	134	#N/A	160	101.5	111	164	177	#N/A	179	106
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Manganese (mg/L)	0.83	0.706	1.18	1.47	0.53	0.41	1.13	0.872	2	2.45	0.836	0.627
Nitrate (mg/L)	0.55	0.044	0.145	0.042	#N/A	#N/A	1.64	0.072	0.5	0.05	0.06	#N/A
Organochlorine pesticides (mg/L)	0.5	0	0.00033	0.00025	#N/A	#N/A	0.5	2	0.001	0.00025	#N/A	#N/A
pH (pH)	6.99	7.28	7.86	#N/A	7.85	8.22	7.08	7.55	8.1	#N/A	8.56	8.38
Potassium (mg/L)	301.66	449	288	424	477.75	450	426	488	328	455	588	508
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Sulfate (mg/L)	18.33	30	26.33	#N/A	#N/A	#N/A	28	35	30	#N/A	16.8	3
(mg/L)	234.33	315	356.5	397.75	290.75	281.25	352	361	2650	520	459	401
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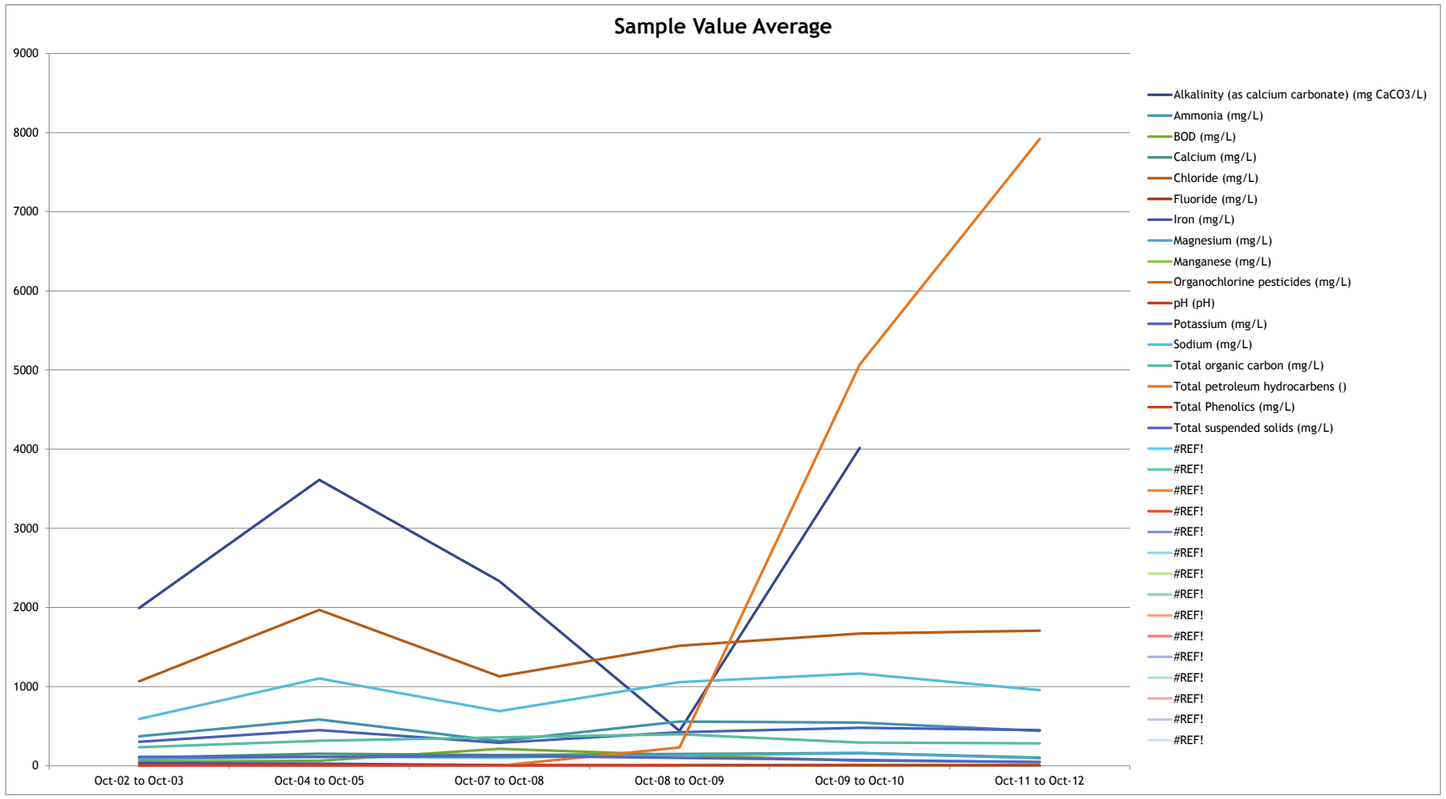
Total Phenolics (mg/L)	0.05	0.023	0.2107	0.208	#N/A	#N/A	0.05	0.093	0.295	0.54	0.11	#N/A
Total suspended solids (mg/L)	110.66	111	124.75	#N/A	#N/A	45.25	136	130	168	#N/A	54	74


Sample Value Average
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3000
2000
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Oct-02 to Oct-03
Oct-04 to Oct-05
Oct-07 to Oct-08
Oct-08 to Oct-09
Oct-09 to Oct-10
Oct-11 to Oct-12
Alkalinity (as calcium carbonate) (mg CaCO3/L)
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Magnesium (mg/L)
Manganese (mg/L)
Organochlorine pesticides (mg/L)
pH (pH)
Potassium (mg/L)
Sodium (mg/L)
Total organic carbon (mg/L)
Total petroleum hydrocarbens ()
Total Phenolics (mg/L)
Total suspended solids (mg/L)
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