

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 Environment Protection Authority (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-and-regulation/licensing> or from regional offices of the EPA, or by contacting by telephone 02 9995 5700.

If you are applying to vary or transfer your Licence, you must still complete and submit this Annual Return.

A1. Licence holder

Licence number : 5875
Licence holder : GRIFFITH CITY COUNCIL
Trading name (if applicable) :
ABN : 81 274 100 792
ACN :
Reporting period : From: 11-9-2017 To: 10-9-2018

A2. Premises to which Licence Applies (if applicable)

Common name (if any) : THARBOGANG RECYCLING AND WASTE DISPOSAL FACILITY
Premises : HILLSIDE DRIVE THARBOGANG 2680 NSW

A3. Activities to which Licence Applies

Extractive activities
Waste disposal (application to land)

A4. Other Activities (if applicable)

A5. Fee-Based Activity Classifications

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

Fee-based activity	Activity scale	Unit of measure
Waste disposal by application to land	> 0.00	capacity
Land-based extractive activity	> 30,000.00 - 50,000.00	T annual capacity to extract, process or store

A6. Assessable Pollutants (if applicable)

Note that the identification of assessable pollutants is used to calculate the **load-based fee**.

The following assessable pollutants are identified for the fee-based activity classifications in the licence:

B. Monitoring and Complaints Summary

B1. Number of Pollution Complaints

Pollution Complaint Category	Complaints
Air	0
Water	0
Noise	0
Waste	0
Other	0
Total complaints recorded by the licensee during the reporting period	0

B2. Concentration Monitoring Summary

For each concentration monitoring point identified in your licence, details are displayed below. If concentration monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

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, Borehole 1 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier', dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					

Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					
Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 3

Groundwater Quality Monitoring, Borehole 3 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier', dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					
Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					

Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					
Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 4

Groundwater Quality Monitoring, Borehole 4 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier' dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					
Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					

Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					
Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 5

Groundwater Quality Monitoring, Borehole 5 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier', dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					
Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					

Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 6

Groundwater Quality Monitoring, Borehole 6 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier', dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					
Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					
Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 7

Groundwater Quality Monitoring, Borehole 7 as shown on map titled 'Tharbogang Landfill boreholes and leachate barrier', dated 27 Sep 2006 on DEC file 235451A1/07.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Total organic carbon	milligrams per litre					
pH	pH					
Fluoride	milligrams per litre					
Chloride	milligrams per litre					
Sulfate	milligrams per litre					
Manganese	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Sodium	milligrams per litre					
Potassium	milligrams per litre					
Ammonia	milligrams per litre					
Conductivity	microsiemens per centimetre					
Calcium	milligrams per litre					

Monitoring Point 8

Surface Water Quality Monitoring, Sedimentation basin as outlined in Appendix 21 of the LEMP.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Iron	milligrams per litre					
Chloride	milligrams per litre					
Sodium	milligrams per litre					
Calcium	milligrams per litre					
Nitrate	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Potassium	milligrams per litre					
Total suspended solids	milligrams per litre					
Fluoride	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Conductivity	microsiemens per centimetre					
Manganese	milligrams per litre					
pH	pH					
Sulfate	milligrams per litre					
Total organic carbon	milligrams per litre					
Ammonia	milligrams per litre					
Magnesium	milligrams per litre					
Total Phenolics	milligrams per litre					

Monitoring Point 9

Leachate runoff, Leachate holding pond as outlined in Appendix 21 of the LEMP.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Total Phenolics	milligrams per litre					
Alkalinity (as calcium carbonate)	milligrams per litre					
Chlorinated volatile compounds	milligrams per litre					
Potassium	milligrams per litre					
Total suspended solids	milligrams per litre					
Ammonia	milligrams per litre					
Calcium	milligrams per litre					
Chloride	milligrams per litre					
Fluoride	milligrams per litre					
Iron	milligrams per litre					
Nitrate	milligrams per litre					
Manganese	milligrams per litre					
pH	pH					
Sodium	milligrams per litre					
Sulfate	milligrams per litre					
Total organic carbon	milligrams per litre					
Magnesium	milligrams per litre					

Name of the uploaded file containing point data ▼

Ground Water Analysis for Tharbogang for Web.pdf

B3. Volume or Mass Monitoring Summary

For each volume or mass monitoring point identified in your licence, details are displayed below. If volume or mass monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

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

C. Statement of Compliance - Licence Conditions

C1. Compliance with Licence Conditions

Were all conditions of the licence complied with (including monitoring and reporting requirements)?	Yes
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D. Statement of Compliance - Load Based Fee Calculation

If you are not required to monitor assessable pollutants by your licence, **no data** will appear below.

If assessable pollutants have been identified on your licence, the following worksheets for each assessable pollutant will 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 EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been already 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.

E. Statement of Compliance - Requirement to Prepare PIRMP

Have you prepared a Pollution Incident Response Management Plan (PIRMP) as required under section 153A of the Protection of the Environment Operations (POEO) Act 1997?	Yes
Is the PIRMP available at the premises?	Yes
Is the PIRMP available in a prominent position on a publicly accessible website?	Yes
Address of the web page where the PIRMP can be accessed ▼	
https://www.griffith.nsw.gov.au/cp_themes/default/page.asp?p=DOC-KCB-52-46-17	
Has the PIRMP been tested?	Yes
The PIRMP was last tested on	20-8-2018
Has the PIRMP been updated?	Yes
The PIRMP was last updated on	20-8-2018
Number of times the PIRMP was activated in this reporting period?	0

The PIRMP was activated on

F. Statement of Compliance - Requirement to Publish Pollution Monitoring Data

Are there any conditions attached to your licence that require pollution monitoring to be undertaken as required under section 66(6) of the Protection of the Environment Operations (POEO) Act 1997?	Yes
Do you operate a website?	Yes
Is the pollution monitoring data published on your website in accordance with the EPA's written requirements for publishing pollution monitoring data?	Yes
Address of the web page where the pollution monitoring data can be accessed ▼	
https://www.griffith.nsw.gov.au/cp_themes/default/page.asp?p=DOC-KCB-52-46-17	

G. Statement of Compliance - Environment Management System and Practices

Do you have an ISO 14001 certified Environmental Management System (EMS) OR any other system that EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 certified EMS?	No
Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?	No
Have you established and implemented an operational maintenance program, including preventative maintenance?	No
Do you keep records of regular inspections and maintenance of plant and equipment?	Yes
Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?	No
Are the audits of documented environmental practices, procedures and systems undertaken by a third party?	No
Have you established and implemented an environmental improvement or management plan?	No
Do you train staff in environmental issues that may arise from your activities and operations and keep records of this	Yes

H. Signature and Certification

This Annual Return may only be signed by person(s) with legal authority to sign it as set out in following categories: an Individual, a Company, a Public authority or a Local council.

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 and \$120,000 for an individual.

I/We

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

Signed by: General Manager

Name	Brett Stonestreet
Position	General Manager Griffith City Council
Email Address	Brett.Stonestreet@griffith.nsw.gov.au
Phone Number	02 6962 8123

Signature	
Name	
Position	
Date	/ /

Declaration

I 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

I certify that the information in the Statement of Compliance in section A,C,D,E,F and G and any pages attached to Section C is correct and not false or misleading in a material respect.



CERTIFICATE OF ANALYSIS

Work Order	: EM1813395	Page	: 1 of 7
Client	: GRIFFITH CITY COUNCIL	Laboratory	: Environmental Division Melbourne
Contact	: JOHN ROSER	Contact	: Customer Services EM
Address	: 40-46 JENSEN ROAD GRIFFITH NSW 2680	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 6962 8100	Telephone	: +61-3-8549 9600
Project	: 152306/284	Date Samples Received	: 22-Aug-2018 10:40
Order number	: ----	Date Analysis Commenced	: 23-Aug-2018
C-O-C number	: ----	Issue Date	: 28-Aug-2018 16:28
Sampler	: CHRIS VELIS		
Site	: ----		
Quote number	: ME/286/10		
No. of samples received	: 1		
No. of samples analysed	: 1		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: **Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

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Work Order : EM1813395
Client : GRIFFITH CITY COUNCIL
Project : 152306/284



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA010-P: Electrical Conductivity @ 25°C was analysed by manual method (EA010).
- EP075(SIM): There are no phenols detected above LOR for sample EM1813395-001.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- Ionic balances were calculated using: major anions - chloride, alkalinity, sulfate and nitrate; and major cations - calcium, magnesium, potassium and sodium for sample #1.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- There are no VHCs detected above the LOR for sample EM1813395-001.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		BH1 Point 7		----	----	----	----
Client sampling date / time				21-Aug-2018 00:00		----	----	----	----	----	
Compound	CAS Number	LOR	Unit	EM1813395-001	-----	-----	-----	-----	-----		
Result				----	----	----	----	----			
EA005P: pH by PC Titrator											
pH Value	----	0.01	pH Unit	7.57	----	----	----	----	----		
EA010P: Conductivity by PC Titrator											
Electrical Conductivity @ 25°C	----	1	µS/cm	9740	----	----	----	----	----		
EA025: Total Suspended Solids dried at 104 ± 2°C											
Suspended Solids (SS)	----	5	mg/L	73	----	----	----	----	----		
ED037P: Alkalinity by PC Titrator											
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1100	----	----	----	----	----		
Total Alkalinity as CaCO3	----	1	mg/L	1100	----	----	----	----	----		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA											
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	438	----	----	----	----	----		
ED045G: Chloride by Discrete Analyser											
Chloride	16887-00-6	1	mg/L	1310	----	----	----	----	----		
ED093F: Dissolved Major Cations											
Calcium	7440-70-2	1	mg/L	275	----	----	----	----	----		
Magnesium	7439-95-4	1	mg/L	456	----	----	----	----	----		
Sodium	7440-23-5	1	mg/L	1030	----	----	----	----	----		
Potassium	7440-09-7	1	mg/L	176	----	----	----	----	----		
EG020T: Total Metals by ICP-MS											
Manganese	7439-96-5	0.001	mg/L	0.217	----	----	----	----	----		
Iron	7439-89-6	0.05	mg/L	0.52	----	----	----	----	----		
EK040P: Fluoride by PC Titrator											
Fluoride	16984-48-8	0.1	mg/L	0.7	----	----	----	----	----		
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	7664-41-7	0.01	mg/L	28.6	----	----	----	----	----		
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	14797-55-8	0.01	mg/L	576	----	----	----	----	----		
EN055: Ionic Balance											
Total Anions	----	0.01	meq/L	109	----	----	----	----	----		
Total Cations	----	0.01	meq/L	100	----	----	----	----	----		
Ionic Balance	----	0.01	%	4.13	----	----	----	----	----		
EP005: Total Organic Carbon (TOC)											

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 Work Order : EM1813395
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 7	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1813395-001	-----	-----	-----	-----
					Result	----	----	----	----
EP005: Total Organic Carbon (TOC) - Continued									
Total Organic Carbon	----	1	mg/L		20	----	----	----	----
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L		<5	----	----	----	----
1,2-Dichloropropane	78-87-5	5	µg/L		<5	----	----	----	----
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L		<5	----	----	----	----
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L		<5	----	----	----	----
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	----	----	----	----
1,1-Dichloroethene	75-35-4	5	µg/L		<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	----	----	----	----
trans-1,2-Dichloroethene	156-60-5	5	µg/L		<5	----	----	----	----
1,1-Dichloroethane	75-34-3	5	µg/L		<5	----	----	----	----
cis-1,2-Dichloroethene	156-59-2	5	µg/L		<5	----	----	----	----
1,1,1-Trichloroethane	71-55-6	5	µg/L		<5	----	----	----	----
1,1-Dichloropropylene	563-58-6	5	µg/L		<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	----	----	----	----
1,2-Dichloroethane	107-06-2	5	µg/L		<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	----	----	----	----
1,1,2-Trichloroethane	79-00-5	5	µg/L		<5	----	----	----	----
1,3-Dichloropropane	142-28-9	5	µg/L		<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	----	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L		<5	----	----	----	----
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L		<5	----	----	----	----
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	----	----	----	----
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L		<5	----	----	----	----
1,2,3-Trichloropropane	96-18-4	5	µg/L		<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	----	----	----	----

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 7	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1813395-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L	<5	----	----	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	----	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	----	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	----	----	----	----	----
1,3-Dichlorobenzene	541-73-1	5	µg/L	<5	----	----	----	----	----
1,4-Dichlorobenzene	106-46-7	5	µg/L	<5	----	----	----	----	----
1,2-Dichlorobenzene	95-50-1	5	µg/L	<5	----	----	----	----	----
1,2,4-Trichlorobenzene	120-82-1	5	µg/L	<5	----	----	----	----	----
1,2,3-Trichlorobenzene	87-61-6	5	µg/L	<5	----	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L	<5	----	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	----	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	----	----	----	----	----
Bromoform	75-25-2	5	µg/L	<5	----	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L	<1.0	----	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	----	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	----	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	----	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	----	----	----	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	----	----	----	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	----	----	----	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	----	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----	----
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	5	%	98.6	----	----	----	----	----
Toluene-D8	2037-26-5	5	%	90.1	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	5	%	110	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 7	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1813395-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%	25.5	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	61.0	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%	69.1	----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%	70.9	----	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%	73.3	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	68.3	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72	132
Toluene-D8	2037-26-5	77	132
4-Bromofluorobenzene	460-00-4	67	131
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2,4,6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127



CERTIFICATE OF ANALYSIS

Work Order	: EM1812255	Page	: 1 of 11
Client	: GRIFFITH CITY COUNCIL	Laboratory	: Environmental Division Melbourne
Contact	: JOHN ROSER	Contact	: Customer Services EM
Address	: 40-46 JENSEN ROAD GRIFFITH NSW 2680	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 6962 8100	Telephone	: +61-3-8549 9600
Project	: 152306/284	Date Samples Received	: 01-Aug-2018 11:10
Order number	: ----	Date Analysis Commenced	: 02-Aug-2018
C-O-C number	: ----	Issue Date	: 07-Aug-2018 15:33
Sampler	: CHRIS VELIS		
Site	: ----		
Quote number	: ME/286/10		
No. of samples received	: 8		
No. of samples analysed	: 8		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: **Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

Page : 2 of 11
Work Order : EM1812255
Client : GRIFFITH CITY COUNCIL
Project : 152306/284



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EA010-P: Electrical Conductivity @ 25°C was analysed by manual method (EA010).
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium, sodium and ammonia for sample #2.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenzo(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time				31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	
Compound	CAS Number	LOR	Unit	EM1812255-001	EM1812255-002	EM1812255-003	EM1812255-004	EM1812255-005	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.26	7.01	7.42	7.22	7.86	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	7150	2040	12600	5600	7080	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	8	66	27	21	11	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	661	478	1330	951	934	
Total Alkalinity as CaCO3	----	1	mg/L	661	478	1330	951	934	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	396	8	434	100	238	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1760	415	3720	1340	1680	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	31	6	104	96	44	
Magnesium	7439-95-4	1	mg/L	176	15	234	164	112	
Sodium	7440-23-5	1	mg/L	1330	308	2970	899	1200	
Potassium	7440-09-7	1	mg/L	98	14	187	64	71	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.018	0.068	0.065	0.468	0.004	
Iron	7439-89-6	0.05	mg/L	0.39	1.32	0.54	1.52	0.09	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	1.1	0.9	0.8	0.9	1.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	38.2	0.48	6.69	0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	0.06	0.02	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	25.5	0.01	0.58	<0.01	0.92	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	25.5	0.01	0.64	0.02	0.92	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EM1812255-001	EM1812255-002	EM1812255-003	EM1812255-004	EM1812255-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Anions	----	0.01	meq/L		71.1	21.4	140	58.9	71.0
Total Cations	----	0.01	meq/L		----	18.0	----	----	----
Total Cations	----	0.01	meq/L		76.4	----	158	59.0	65.4
Ionic Balance	----	0.01	%		----	8.66	----	----	----
Ionic Balance	----	0.01	%		3.59	----	5.98	0.12	4.09
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		17	27	19	15	<1
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1,1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1,1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1,1,1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1,1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1,1,2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1,3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5

Page : 5 of 11
 Work Order : EM1812255
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EM1812255-001	EM1812255-002	EM1812255-003	EM1812255-004	EM1812255-005
					Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	149	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	521	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EM1812255-001	EM1812255-002	EM1812255-003	EM1812255-004	EM1812255-005	
				Result	Result	Result	Result	Result	
EP075(SIM)A: Phenolic Compounds - Continued									
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	5	%	98.7	93.6	90.1	100	97.5	
Toluene-D8	2037-26-5	5	%	94.7	93.8	83.5	93.5	97.0	
4-Bromofluorobenzene	460-00-4	5	%	115	113	102	113	104	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%	33.7	37.1	29.4	37.8	28.6	
2-Chlorophenol-D4	93951-73-6	1.0	%	71.1	68.2	65.6	78.5	66.0	
2,4,6-Tribromophenol	118-79-6	1.0	%	73.3	72.8	64.5	81.4	63.6	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%	81.6	84.6	74.2	83.6	73.5	
Anthracene-d10	1719-06-8	1.0	%	83.3	87.2	78.5	86.8	76.8	
4-Terphenyl-d14	1718-51-0	1.0	%	81.2	90.0	76.0	82.0	73.2	

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	----	----
Client sampling date / time				31-Jul-2018 00:00		31-Jul-2018 00:00	31-Jul-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EM1812255-006	EM1812255-007	EM1812255-008	-----	-----		
				Result	Result	Result	----	----		
EA005P: pH by PC Titrator										
pH Value	----	0.01	pH Unit	8.85	8.78	9.23	----	----		
EA010P: Conductivity by PC Titrator										
Electrical Conductivity @ 25°C	----	1	µS/cm	1770	49700	3560	----	----		
EA025: Total Suspended Solids dried at 104 ± 2°C										
Suspended Solids (SS)	----	5	mg/L	380	900	268	----	----		
ED037P: Alkalinity by PC Titrator										
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	78	977	248	----	----		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	291	2830	338	----	----		
Total Alkalinity as CaCO3	----	1	mg/L	369	3810	586	----	----		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA										
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	66	1800	49	----	----		
ED045G: Chloride by Discrete Analyser										
Chloride	16887-00-6	1	mg/L	365	14800	842	----	----		
ED093F: Dissolved Major Cations										
Calcium	7440-70-2	1	mg/L	22	23	19	----	----		
Magnesium	7439-95-4	1	mg/L	37	408	50	----	----		
Sodium	7440-23-5	1	mg/L	243	9090	552	----	----		
Potassium	7440-09-7	1	mg/L	47	2790	74	----	----		
EG020T: Total Metals by ICP-MS										
Manganese	7439-96-5	0.001	mg/L	0.250	0.191	0.250	----	----		
Iron	7439-89-6	0.05	mg/L	1.93	1.57	3.10	----	----		
EK040P: Fluoride by PC Titrator										
Fluoride	16984-48-8	0.1	mg/L	1.3	0.2	1.7	----	----		
EK055G: Ammonia as N by Discrete Analyser										
Ammonia as N	7664-41-7	0.01	mg/L	0.18	4.52	0.14	----	----		
EK057G: Nitrite as N by Discrete Analyser										
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----		
EK058G: Nitrate as N by Discrete Analyser										
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.01	----	----		
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser										
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.01	----	----		
EN055: Ionic Balance										

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 Work Order : EM1812255
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	---	---
Client sampling date / time					31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	---	---
Compound	CAS Number	LOR	Unit		EM1812255-006	EM1812255-007	EM1812255-008	-----	-----
					Result	Result	Result	---	---
EN055: Ionic Balance - Continued									
Total Anions	---	0.01	meq/L		19.0	531	36.5	----	----
Total Cations	---	0.01	meq/L		15.9	501	31.0	----	----
Ionic Balance	---	0.01	%		8.95	2.87	8.18	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	---	1	mg/L		69	664	111	----	----
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	----	----
1,2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	----	----
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	----	----
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	----	----
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	----	----
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	----	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	----	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	----	----
1,1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	----	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	----	----
trans-1,2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	----	----
1,1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	----	----
cis-1,2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	----	----
1,1,1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	----	----
1,1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	----	----
1,2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	----	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	----	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	----	----
1,1,2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	----	----
1,3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	----	----
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	----	----
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	----	----

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 Work Order : EM1812255
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	---	---
Client sampling date / time					31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	---	---
Compound	CAS Number	LOR	Unit		EM1812255-006	EM1812255-007	EM1812255-008	-----	-----
					Result	Result	Result	---	---
EP074E: Halogenated Aliphatic Compounds - Continued									
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	----	----
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	----	----
1,2,3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	----	----
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	----	----
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	----	----
1,3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	----	----
1,4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	----	----
1,2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	----	----
1,2,4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	----	----
1,2,3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	----	----
Bromoform	75-25-2	5	µg/L		<5	<5	<5	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	----	----

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 Work Order : EM1812255
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

				Client sample ID	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	---	---
				Client sampling date / time	31-Jul-2018 00:00	31-Jul-2018 00:00	31-Jul-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EM1812255-006	EM1812255-007	EM1812255-008	-----	-----
					Result	Result	Result	----	----
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	5	%		101	103	104	----	----
Toluene-D8	2037-26-5	5	%		95.3	107	101	----	----
4-Bromofluorobenzene	460-00-4	5	%		113	115	116	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		31.0	31.2	28.2	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		59.6	59.5	45.1	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		45.5	48.9	32.2	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		79.5	69.7	79.4	----	----
Anthracene-d10	1719-06-8	1.0	%		81.5	76.4	79.3	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		77.0	66.7	74.6	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72	132
Toluene-D8	2037-26-5	77	132
4-Bromofluorobenzene	460-00-4	67	131
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2,4,6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127



CERTIFICATE OF ANALYSIS

Work Order	: EM1805115	Page	: 1 of 11
Client	: GRIFFITH CITY COUNCIL	Laboratory	: Environmental Division Melbourne
Contact	: JOHN ROSER	Contact	: Customer Services EM
Address	: 40-46 JENSEN ROAD GRIFFITH NSW 2680	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 6962 8100	Telephone	: +61-3-8549 9600
Project	: 152306/284	Date Samples Received	: 23-Mar-2018 10:40
Order number	: ----	Date Analysis Commenced	: 23-Mar-2018
C-O-C number	: ----	Issue Date	: 03-Apr-2018 16:42
Sampler	: CHRIS VELIS		
Site	: ----		
Quote number	: ME/286/10		
No. of samples received	: 9		
No. of samples analysed	: 9		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: **Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	ZIC Organic Chemist	Melbourne Organics, Springvale, VIC

Page : 2 of 11
Work Order : EM1805115
Client : GRIFFITH CITY COUNCIL
Project : 152306/284



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EK040P: EM1805140 #13 Poor matrix spike precision for Fluoride by PC titrator due to sample heterogeneity. Confirmed by re-analysis.
- EP074/080: Surrogate recoveries for sample (EM1805115_008) fall outside of published limits as a result of suspected matrix interferences. Surrogate recoveries have been confirmed by re-analysis.
- EA010: EM1805115-8 EC result is greater than the highest calibration point. Scrutinise result accordingly.
- ED093F: EM1805115_006 has been confirmed for major cations by re-preparation and re-analysis.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- Ionic balances were calculated using: major anions - chloride, alkalinity, sulfate and nitrate; and major cations - calcium, magnesium, potassium, sodium for #6.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

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 Work Order : EM1805115
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00
Compound	CAS Number	LOR	Unit		EM1805115-001	EM1805115-002	EM1805115-003	EM1805115-004	EM1805115-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.24	7.17	7.40	7.35	7.85
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		7290	1860	13000	5610	6950
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		----	<5	18	22	34
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		633	331	1300	894	924
Total Alkalinity as CaCO3	----	1	mg/L		633	331	1300	894	924
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		398	26	469	107	242
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		1680	384	3820	1180	1530
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		32	8	103	117	58
Magnesium	7439-95-4	1	mg/L		158	16	204	141	130
Sodium	7440-23-5	1	mg/L		1140	317	2280	681	1170
Potassium	7440-09-7	1	mg/L		77	10	130	48	64
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.020	0.056	0.094	1.11	0.019
Iron	7439-89-6	0.05	mg/L		0.87	0.42	0.57	1.74	0.58
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.9	0.8	0.7	0.7	1.0
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.03	0.36	0.33	16.4	0.03
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		23.4	0.87	0.37	1.49	0.97
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		68.3	18.0	143	53.4	66.6
Total Cations	----	0.01	meq/L		66.2	15.8	124	48.3	66.1

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 Work Order : EM1805115
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
Client sampling date / time				BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Compound				EM1805115-001	EM1805115-002	EM1805115-003	EM1805115-004	EM1805115-005
CAS Number				Result	Result	Result	Result	Result
LOR								
Unit								
EN055: Ionic Balance - Continued								
Ionic Balance	---	0.01	%	1.61	6.60	7.12	5.00	0.40
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	---	1	mg/L	23	<1	17	9	7
EP074D: Fumigants								
2,2-Dichloropropane	594-20-7	5	µg/L	<5	<5	<5	<5	<5
1,2-Dichloropropane	78-87-5	5	µg/L	<5	<5	<5	<5	<5
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	<5	<5	<5
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	<5	<5	<5
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L	<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L	<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L	<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L	<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	<50	<50	<50
1,1-Dichloroethene	75-35-4	5	µg/L	<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	<5	<5	<5	<5
1,1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	<5	<5
1,1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	<5	<5
1,2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	<5	<5
1,3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	<5	<5
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	<5	<5
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	<5	<5

Page : 5 of 11
 Work Order : EM1805115
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00
Compound	CAS Number	LOR	Unit		EM1805115-001	EM1805115-002	EM1805115-003	EM1805115-004	EM1805115-005
					Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued									
1,2,3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1,3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1,4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	5	%		113	109	114	110	111



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1 Point 1	BH3 Point 3	BH4 Point 4	BH5 Point 5	BH6 Point 6
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00
Compound	CAS Number	LOR	Unit		EM1805115-001	EM1805115-002	EM1805115-003	EM1805115-004	EM1805115-005
					Result	Result	Result	Result	Result
EP074S: VOC Surrogates - Continued									
Toluene-D8	2037-26-5	5	%		116	111	113	112	113
4-Bromofluorobenzene	460-00-4	5	%		122	118	128	128	121
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		27.1	23.8	26.1	33.9	26.3
2-Chlorophenol-D4	93951-73-6	1.0	%		54.3	53.4	38.6	71.7	62.1
2,4,6-Tribromophenol	118-79-6	1.0	%		55.5	62.3	33.1	83.9	68.2
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		58.1	65.6	78.8	84.6	75.4
Anthracene-d10	1719-06-8	1.0	%		65.5	75.0	70.4	84.2	79.6
4-Terphenyl-d14	1718-51-0	1.0	%		70.9	83.9	93.9	95.0	89.3

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 Work Order : EM1805115
 Client : GRIFFITH CITY COUNCIL
 Project : 152306/284



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH7 Point 7	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	----
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	----
Compound	CAS Number	LOR	Unit		EM1805115-006	EM1805115-007	EM1805115-008	EM1805115-009	-----
					Result	Result	Result	Result	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.34	9.03	8.74	9.19	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		9930	1290	188000	2640	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		22	108	1050	75	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	78	2930	161	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		1100	215	9670	298	----
Total Alkalinity as CaCO3	----	1	mg/L		1100	293	12600	458	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		425	26	15000	72	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		1360	251	81600	536	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		281	14	32	15	----
Magnesium	7439-95-4	1	mg/L		473	26	543	36	----
Sodium	7440-23-5	1	mg/L		1080	186	47700	401	----
Potassium	7440-09-7	1	mg/L		168	41	12400	68	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.228	0.159	0.117	0.068	----
Iron	7439-89-6	0.05	mg/L		1.12	1.23	1.86	1.63	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.7	1.0	<0.1	1.5	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		23.0	0.07	34.5	0.12	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		791	0.17	0.05	0.26	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		126	----	----	----	----
Total Anions	----	0.01	meq/L		----	13.5	2860	25.8	----
Total Cations	----	0.01	meq/L		104	12.0	2440	22.9	----
Ionic Balance	----	0.01	%		9.34	----	----	----	----

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH7 Point 7	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	----
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	----
Compound	CAS Number	LOR	Unit		EM1805115-006	EM1805115-007	EM1805115-008	EM1805115-009	-----
					Result	Result	Result	Result	----
EN055: Ionic Balance - Continued									
Ionic Balance	----	0.01	%		----	5.89	8.06	5.91	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	50	6250	91	----
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	----
1,2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	----
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	----
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	----
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	----
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	----
1,1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	----
trans-1,2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	----
1,1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	----
cis-1,2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	----
1,1,1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	----
1,1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	----
1,2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	----
1,1,2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	----
1,3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	----
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	----
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	----
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	----
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	----

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 Client : GRIFFITH CITY COUNCIL
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Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				BH7 Point 7	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	----
Client sampling date / time				22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	----
Compound	CAS Number	LOR	Unit	EM1805115-006	EM1805115-007	EM1805115-008	EM1805115-009	-----
				Result	Result	Result	Result	----
EP074E: Halogenated Aliphatic Compounds - Continued								
1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	<5	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	<5	----
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	<5	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	<5	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	<5	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	<5	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	<5	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	<5	----
1,3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	<5	----
1,4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	<5	----
1,2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	<5	----
1,2,4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	<5	----
1,2,3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	<5	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	<5	<5	----
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	<5	----
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	<5	----
Bromoform	75-25-2	5	µg/L	<5	<5	<5	<5	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	111	<1.0	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	1.7	<1.0	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	14.5	<2.0	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	----
EP074S: VOC Surrogates								
1,2-Dichloroethane-D4	17060-07-0	5	%	109	110	152	119	----

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 Client : GRIFFITH CITY COUNCIL
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Analytical Results

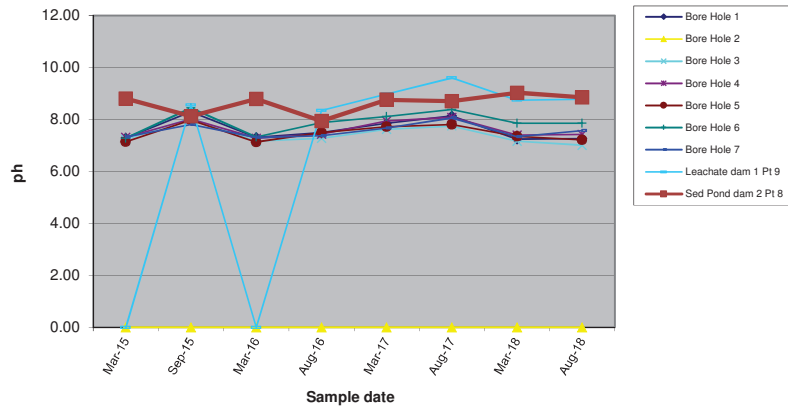
Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH7 Point 7	Sediment Action Pond (SAP) Point 8	Leachate Pond (LP) Point 9	Stormwater Pond	----
Client sampling date / time					22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	22-Mar-2018 00:00	----
Compound	CAS Number	LOR	Unit		EM1805115-006	EM1805115-007	EM1805115-008	EM1805115-009	-----
					Result	Result	Result	Result	----
EP074S: VOC Surrogates - Continued									
Toluene-D8	2037-26-5	5	%		116	109	165	125	----
4-Bromofluorobenzene	460-00-4	5	%		103	117	159	119	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		33.4	29.8	23.9	29.8	----
2-Chlorophenol-D4	93951-73-6	1.0	%		69.1	51.2	51.4	53.6	----
2,4,6-Tribromophenol	118-79-6	1.0	%		86.6	36.1	47.5	34.6	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		85.1	85.4	55.6	89.8	----
Anthracene-d10	1719-06-8	1.0	%		87.3	84.0	56.6	93.3	----
4-Terphenyl-d14	1718-51-0	1.0	%		98.3	94.8	71.9	104	----



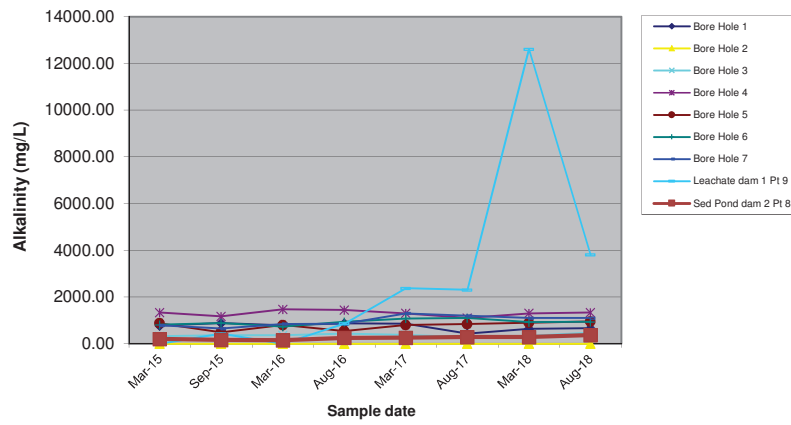
Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72	132
Toluene-D8	2037-26-5	77	132
4-Bromofluorobenzene	460-00-4	67	131
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2,4,6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127

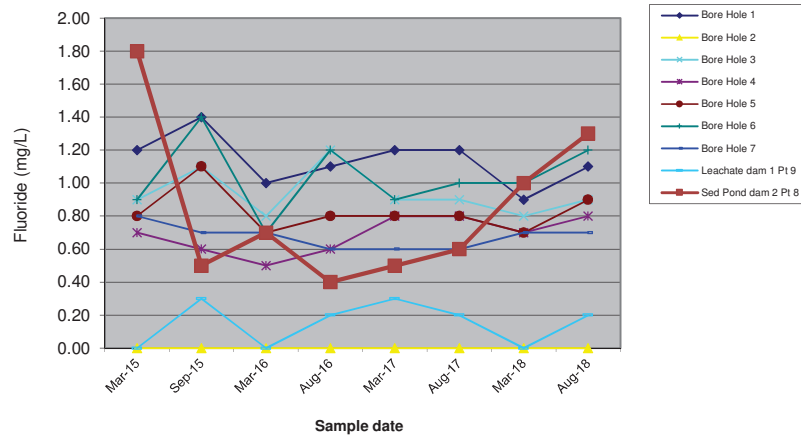
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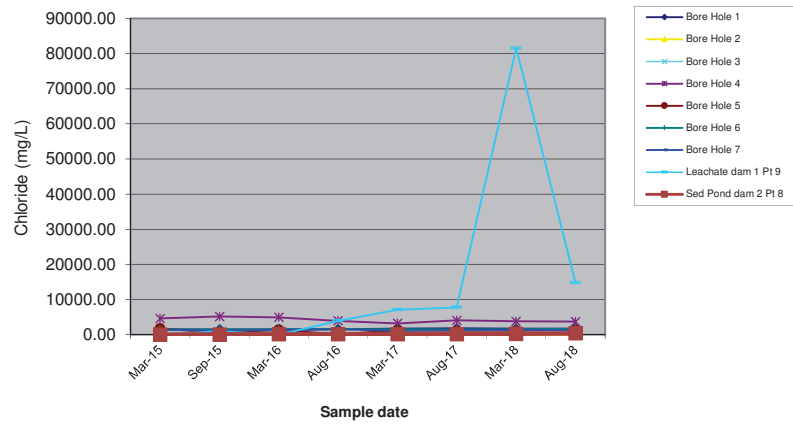
Tharbogang Landfill



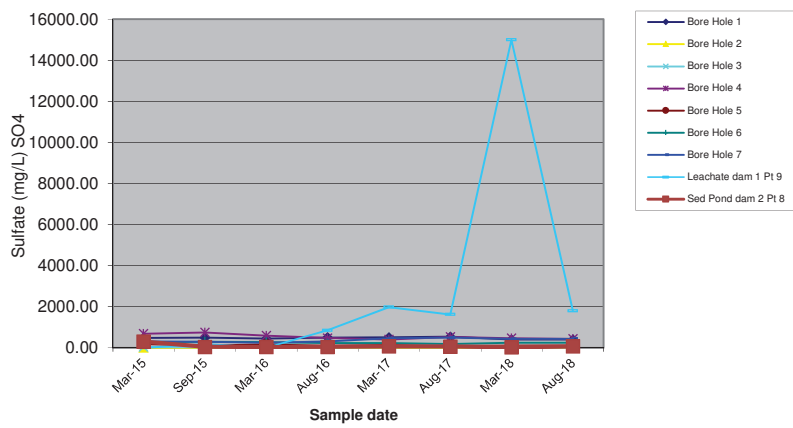
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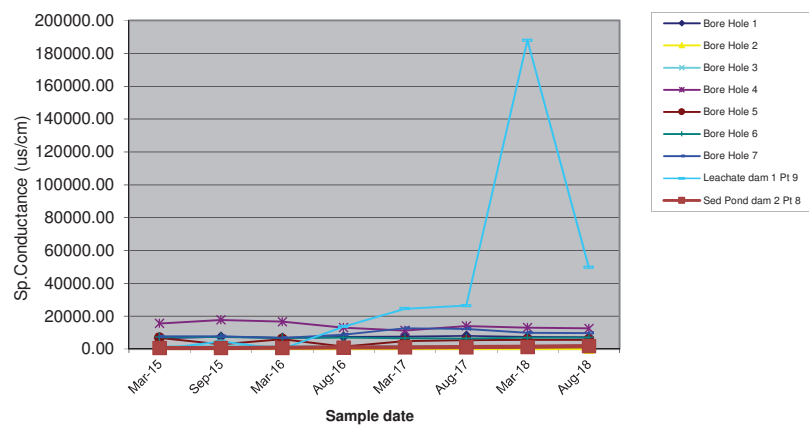
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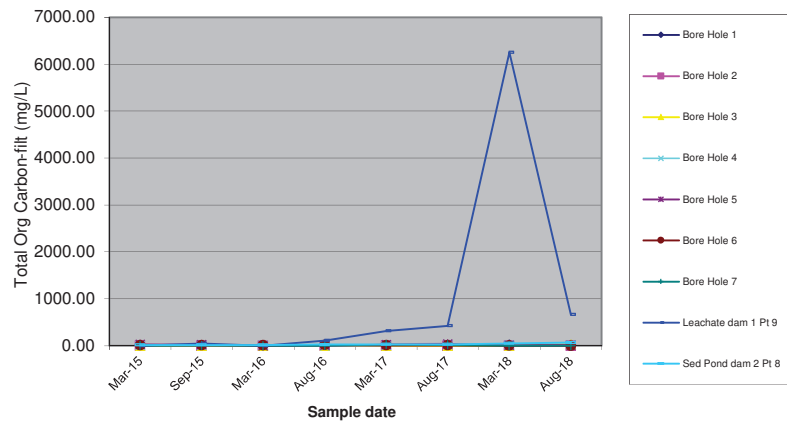
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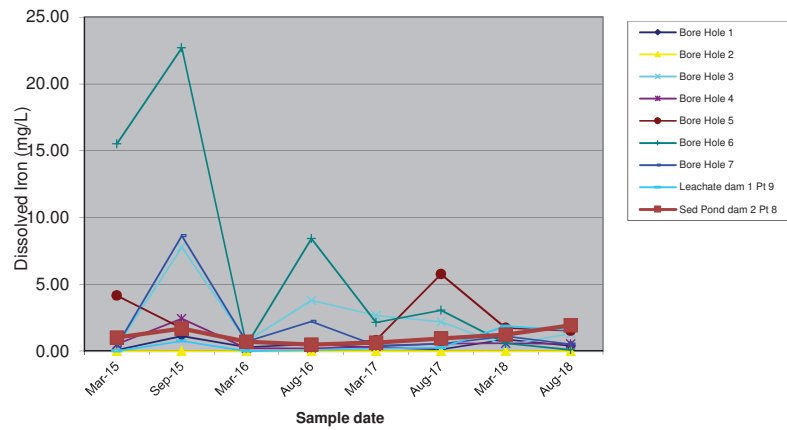
Tharbogang Landfill



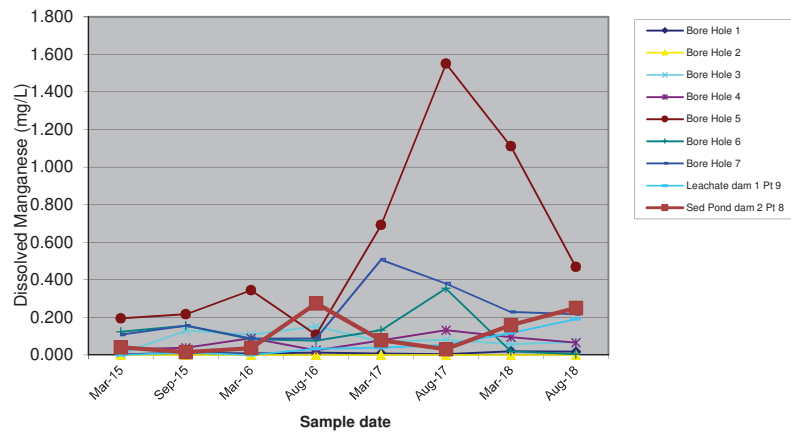
Tharbogang Landfill



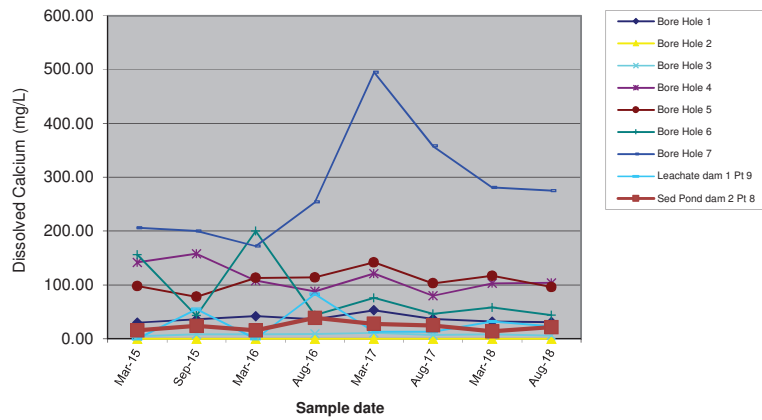
Tharbogang Landfill



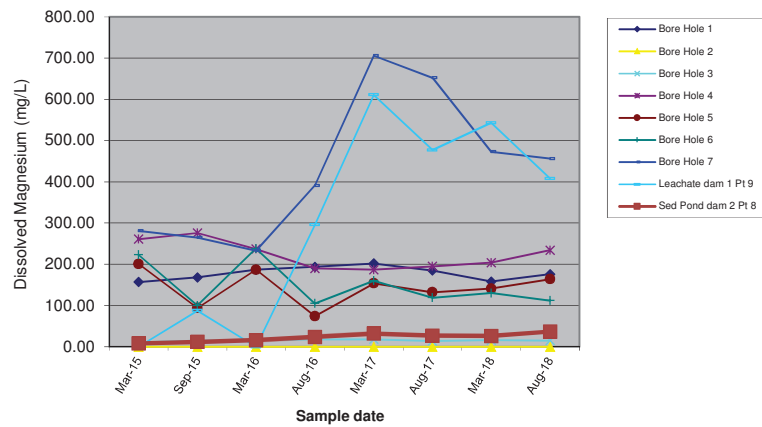
Tharbogang Landfill

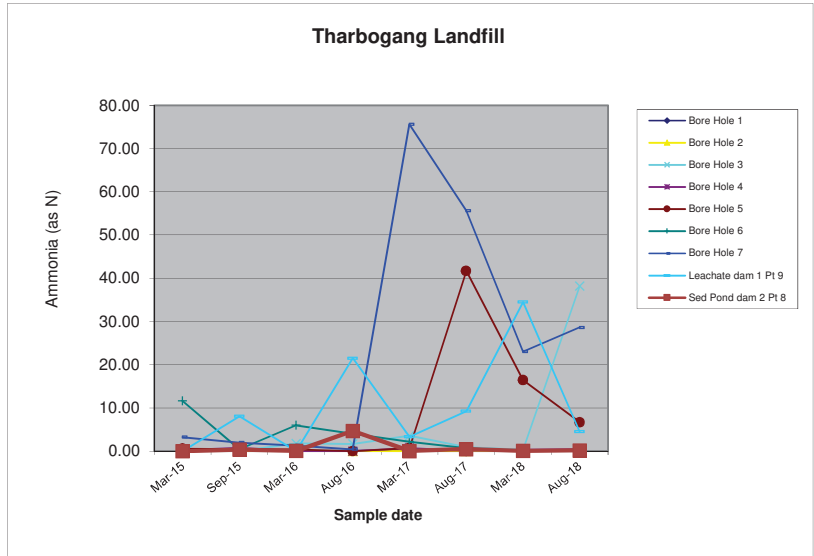
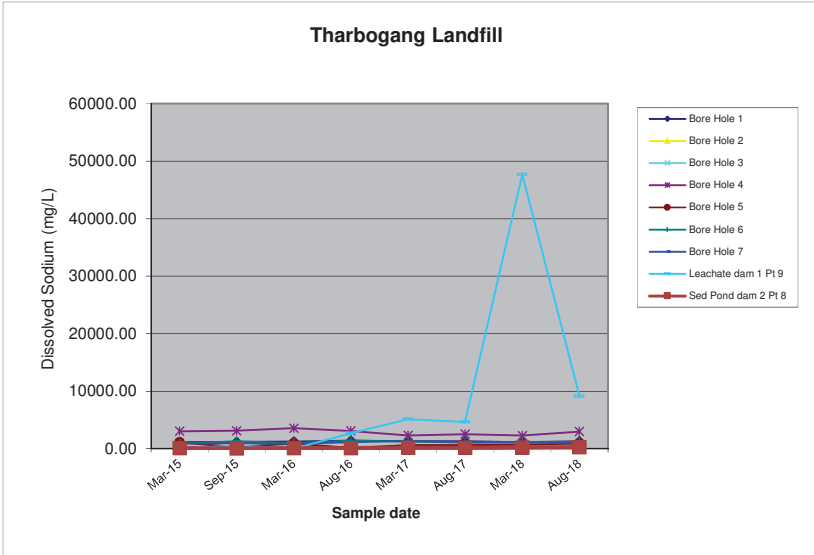
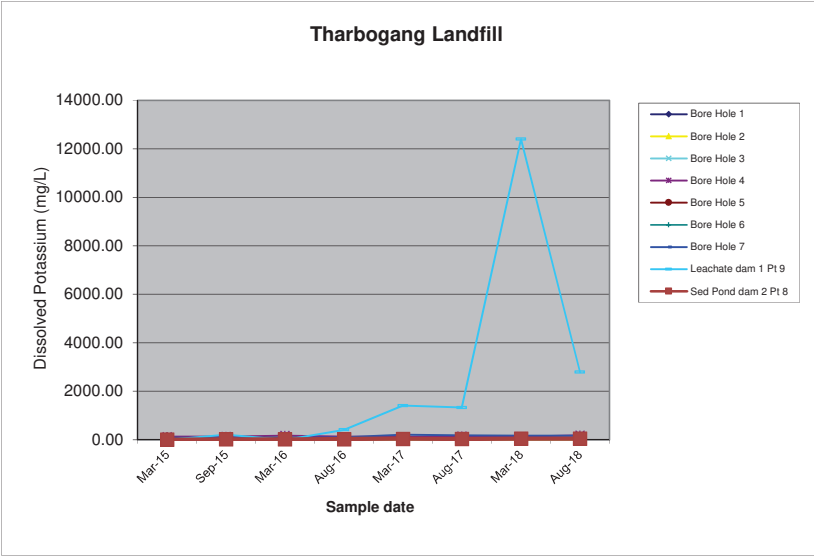


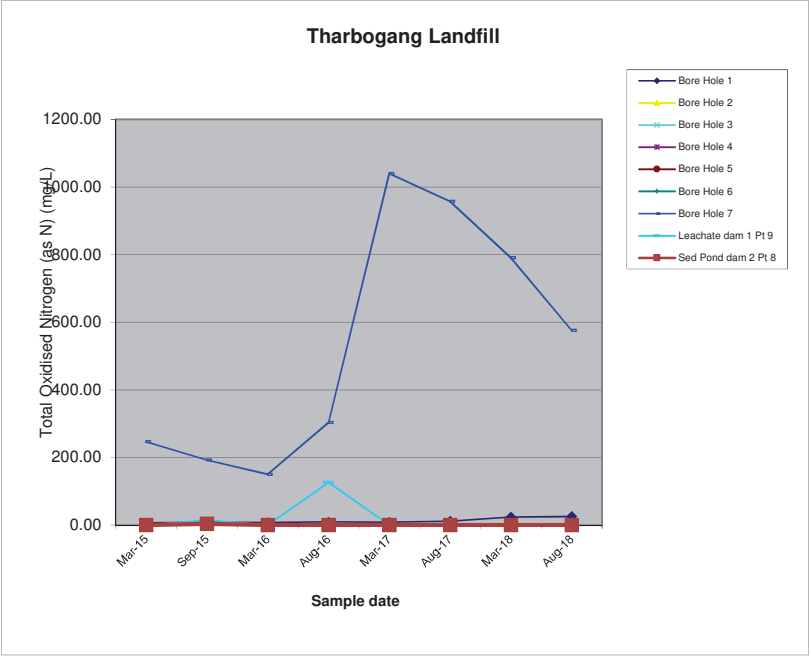
Tharbogang Landfill



Tharbogang Landfill







Annual Report Tharbogang Recycling and Waste disposal Facility Griffith City Council

Statement of Compliance

3 Limit Conditions

L1 Pollution of Waters

All stormwater that falls on the active Landfill and Quarry sites is contained on site.
Leachate is contained on site.

L2 Waste

Total tonnage of waste did not exceed 100,000 tonnes
Total of waste landfilled within the reporting period was 31742 tonnes.

Council still is still committed to removing products off site for recycling where practicable and sustainable. Within this reporting period a total of 766.71tonnes of recyclable materials were removed off site.

L3 Noise Limits

No noise levels have been recorded during the reporting period.

L4 Blasting

All blasting is monitored for vibration and noise at the closest residents to the Quarry, a copy of the following blast related information is kept in Council document management system;

- Explosive Inventory Worksheet;
- Blast Pre Check ;
- Tool Box Talk;
- Dangerous Good Shipping Document;
- Blast Monitor results;
- Photo of monitor;
- Notice of Blast (surrounding neighbours);
- Orica Delivery Docket;
- Blast Pattern.

There was one blast carried out within this reporting period this was on the 11/10/17.

L5 Hours of Operation

Hours of operation not exceeded.

4 Operating Conditions

O2 Maintenance of Plant and Equipment

The landfills operational plant consists of the following items:

- 26 tonne Tana Compactor purchased in 2009;

- 20 tonne Liebherr Traxcavator purchased in 2015;
- 5.5 tonne Liebherr Stereoloader purchased in 2012;
- International ACCO, tipper truck with removal water cart;
- Two 4wd utes;
- Mercedes Benz Actros 8x4 Hook Lift Truck 20015.

Plant and equipment are inspected daily by landfill operational staff. Maintenance such as greasing and air filter checks are also carried out by landfill operational staff. If a breakdown occurs, then council mechanics are called. The mechanics will then decide if the factory service mechanics will be called to rectify the breakdown.

O3 Dust Control

Dust abatement controlled by use of Council water cart. Operations cease when weather conditions, especially in periods of extreme winds conditions, cause low visibility. There has been a dust suppression system installed at the quarry. This was installed at the beginning of 2013.

In early 2015 council established two 22,000lt water tanks (along with water refilling capabilities) these were put in strategic locations around the landfill site so water carts and other water dependant vehicles don't have far to travel to refill.

The pump that services the water tanks and dust suppression in the quarry was replaced in late 2017.

In January 2018 500mtrs of previously gravelled road was sealed, this newly seal section is the access road to the current landfill. There is now a total of 1.8km's of sealed internal road on site at TWMC.

O4 Emergency Response

Fire breaks maintained by landfill operation staff with landfill plant.

If a fire starts in a landfill cell the burning waste will be separated with landfill plant. The water cart will be brought in and used to extinguish the fire.

The landfill has on site a 5,000L water cart that has a hydraulic pump/spray unit. The landfill operations staff can also call on the Rural Fire Service and other council plant available, if required.

The Rural Fire Service responds to any landfill fires and other council departments provide resources when required.

O5 Processes and Management

O5.1 Maintenance of Sedimentation of Leachate Holding Pond

The construction has been completed for the Stormwater, Sedimentation and Leachate ponds. Resulting in a more formalised contaminant system

O5.2 Management of Surface Water

Dry conditions prevailed, contour banks maintained to divert any runoff. As part of the stormwater redesigned and construction project, new cut off drains, culverts and piped drains have been constructed.

The drainage swale that delivers the stormwater runoff in to the Sedimentation Pond was reinstated, the swale outlet was also desilted in the process.

Unauthorised Entry

O5.3 All outer access gates to the Waste Management Site have pad locks on them.

O5.4 The perimeter fence line is kept as a serviceable condition.

O5.5 There is no 1.8m high mesh fence around the active tipping area, due to the fluid nature of the active tipping area Council uses litter fences these are mobile and are able to be relocated when the active tipping area changes.

05.6 All outer access gates are secured and maintained, there is a CCTV system at the Waste Transfer Station, Front Gate and the Weighbridge this is all integrated to a central server.

05.7 The Waste Management Site is secured by the last employee to leave every afternoon.

05.8 Degradation of Local Amenity
Litter on site is collected by staff.

05.9 Control of pests, vermin and weeds

There was no feral animal eradication carried out in this reporting period.

There was a total of 511tn's of Prickly Pear removed for the Waste Management Site and disposed of into Landfill.

There was a total of 19.1tn's of Box Thorne removed for the Waste Management Site and disposed of into Landfill.

05.10 Staff Training

Staff have appropriate licences, permits and signed log books. Council's Human Resources department monitor and implement training as required.

06 Waste Management

Leachate Disposal

There has been no Leachate Disposed, it what leachate is generated is contained and natural evaporation takes place.

06.6 Screening of Waste

When waste is brought to the landfill, loads are checked at the weighbridge by the weighbridge staff. Which waste category the load fall in is determined by the weighbridge operator, the public is then directed to the appropriate areas to unload waste.

06.7 Waste Compaction

Compaction rate is estimated at 630 kg/m³, with the purchase of the new compactor it is thought that greater compaction is being achieved.

06.9 Filling Plan

A filling plan has been design this has been provided to the Local EPA office.

06.10 Completion of Landfill Cells

Compaction rate is estimated at 630 kg/m³, with the purchase of the new compactor it is thought that greater compaction is being achieved.

06.11 Final Capping

Compaction rate is estimated at 630 kg/m³, with the purchase of the new compactor it is thought that greater compaction is being achieved.

06.12 Closure Plan

There is no Closure Plan for the current Landfill.

06.13 Burning of Green Waste

The burning of green waste hasn't occurred for some time. All green waste is now mulched and used for cover material on site.

06.14 Covering of Waste

The full area is not covered daily, but is compacted at the end of each day. Council progressively covers waste maintaining minimum area exposed to 1,000 to 2,000m². The system still appears to meet the goals of preventing fires in the waste, controlling vermin and achieving good compaction.

06.16 & 06.17 Biosolids and Green Waste Pad

The Green waste pad has not been constructed as yet the design has been completed, waiting for suitable material for an impermeable pad.

The majority of the Biosolids are disposed of into Landfill when this can't occur a designated pad has been constructed for this purposes.

5 Monitoring and Recording Conditions

M1 & M2

As a result of the required ground water hydrological investigation, it was deemed that the removal of the Pollution Reduction Program condition (U1) and the removal of BH2 from the biannual ground water monitoring program.

For details of the Licence variation please note; EPA document reference EF 13/3014; Doc15/496225, 15/87918 Council record number.

When the 1st set of ground water samples was taken in early August 2018, it was noticed that the sleeve around BH7 was damaged which made sampling impossible.

A contractor was engaged to repair BH 7. (6/8/18)

BH7 was sampled at the end of August (23/8/18)

M3 Testing Methods

Testing is carried out by Council staff with suitable water and ground water experience.

M4 Recording of Pollution Complaints

All testing results are saved in Councils document management system.

M5 Other Monitoring and Recording Conditions

All complaints are recorded on Councils Complaint Management System

M6 Other Monitoring and Recording Conditions

Surveys are carried out regularly on the current landfill which provides information of the remaining air space of the landfill.

6 Reporting Conditions

R1 Annual Return Documents

The annual return has been completed as required.

R2 Notification of Environmental Harm

Nil

R3 Written Report

Nil

R4 Recording of Fires

There was a fire at Tharbogang Waste Management Centre in the active tipping cell on the 19/2/18; the extreme wind made it challenging to extinguish.

The local EPA office was notified and sent the incident report (18/36079 Council record number) on the 21/2/18.

R6 Annual Report

- ✓ Environmental Performance
- ✓ Tabulated Results
- ✓ Graphical Representation
- ✓ Analysis and Interpretation of Data
- ✓ Analysis of Response and Complaints Received
- ✓ Identify and Deficiencies, Trends or Incidents
- ✓ Recommendations on Improvement

Tabulated Results

Attachments

Graphical Representation

Attachments

Depth (m)

									2017-2018			
									COUNT of samples for period	MIN of samples for period	MAX of samples for period	AVERAGE
	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	15.83	15.54	15.35	15.15	14.51	14.5	14.0	14	2	14.000	14.000	14
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0
Bore Hole 3	15.74	16.03	15.73	15.57	14.96	14.80	12.0	14.40	2	12.000	14.400	13.2
Bore Hole 4	14.12	13.64	11	9.84	7.74	8.35	7.0	8.3	2	7.000	8.300	7.65
Bore Hole 5	21.44	21.27	20.51	19.97	18.35	19.35	19.0	20	2	19.000	20.000	19.5
Bore Hole 6	19.39	19.35	19.05	19.2	17.47	17.68	17.0	12	2	12.000	17.000	14.5
Bore Hole 7	21.67	21.22	21.89	21.65	21.73	21.35	20	20.8	2	20.000	20.800	20.4
Leachate dam 1 Pt 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0
Sed Pond dam 2 Pt 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0
ThAtbogang Swamp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

pH

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	7.29	8.30	7.31	7.50	7.86	8.14	7.24	7.26	2	7.240	7.260	7.25
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	7.24	8.04	7.17	7.28	7.62	7.75	7.17	7.01	2	7.010	7.170	7.09
Bore Hole 4	7.31	8.01	7.28	7.44	7.94	8.08	7.4	7.42	2	7.400	7.420	7.41
Bore Hole 5	7.14	7.98	7.13	7.50	7.72	7.81	7.35	7.22	2	7.220	7.350	7.29
Bore Hole 6	7.28	8.44	7.32	7.88	8.11	8.38	7.85	7.86	2	7.850	7.860	7.86
Bore Hole 7	7.32	7.81	7.31	7.38	7.67	8.06	7.34	7.57	2	7.340	7.570	7.46
Leachate dam 1 Pt 9	0.00	8.56	0.00	8.35	8.98	9.60	8.74	8.78	2	8.740	8.780	8.76
Sed Pond dam 2 Pt 8	8.80	8.13	8.79	7.94	8.76	8.71	9.03	8.85	2	8.850	9.030	8.94
Tharbogang Swamp	0.00	8.25	7.94	8.23	7.62	8.91	0.00	0.00	2	0.000	0.000	0.00

Alkalinity (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	771.00	882.00	782.00	863.00	851.00	434.00	633.00	661.00	2	633.000	661.000	647.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	314.00	367.00	361.00	424.00	369.00	282.00	331.00	478.00	2	331.000	478.000	404.50
Bore Hole 4	1330.00	1170.00	1470.00	1440.00	1300.00	1100.00	1300.00	1330.00	2	1,300.000	1,330.000	1315.00
Bore Hole 5	875.00	492.00	798.00	546.00	799.00	844.00	894.00	951.00	2	894.000	951.000	922.50
Bore Hole 6	813.00	882.00	733.00	936.00	1080.00	1100.00	924.00	934.00	2	924.000	934.000	929.00
Bore Hole 7	783.00	649.00	847.00	853.00	1300.00	1200.00	1100.00	1100.00	2	1,100.000	1,100.000	1100.00
Leachate dam 1 Pt 9	0.00	426.00	0.00	861.00	2370.00	2310.00	12600.00	3810.00	2	3,810.000	12,600.000	8205.00
Sed Pond dam 2 Pt 8	215.00	168.00	157.00	258.00	264.00	290.00	293.00	369.00	2	293.000	369.000	331.00
Tharbogang Swamp	0.00	165.00	158.00	120.00	182.00	125.00	0.00	0.00	2	0.000	0.000	0.00

Fluoride (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	1.20	1.40	1.00	1.10	1.20	1.20	0.90	1.10	2	0.900	1.100	1.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	0.90	1.10	0.80	1.20	0.90	0.90	0.80	0.90	2	0.800	0.900	0.85
Bore Hole 4	0.70	0.60	0.50	0.60	0.80	0.80	0.70	0.80	2	0.700	0.800	0.75
Bore Hole 5	0.80	1.10	0.70	0.80	0.80	0.80	0.70	0.90	2	0.700	0.900	0.80
Bore Hole 6	0.90	1.40	0.70	1.20	0.90	1.00	1.00	1.20	2	1.000	1.200	1.10
Bore Hole 7	0.80	0.70	0.70	0.60	0.60	0.60	0.70	0.70	2	0.700	0.700	0.70
Leachate dam 1 Pt 9	0.00	0.30	0.00	0.20	0.30	0.20	<0.1	0.20	2	0.200	0.200	0.20
Sed Pond dam 2 Pt 8	1.80	0.50	0.70	0.40	0.50	0.60	1.00	1.30	2	1.000	1.300	1.15
Tharbogang Swamp	0.00	0.40	0.30	0.30	0.30	0.20	0.00	0.00	2	0.000	0.000	0.00

Chloride (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	1530.00	1500.00	1510.00	1560.00	1760.00	1800.00	1680.00	1,760.0	2	1,680.000	1,680.000	1680.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	386.00	362.00	363.00	392.00	363.00	392.00	384.00	415.0	2	384.000	384.000	384.00
Bore Hole 4	4620.00	5160.00	4940.00	3950.00	3200.00	4070.00	3820.00	3,720.0	2	3,820.000	3,820.000	3820.00
Bore Hole 5	1740.00	562.00	1400.00	105.00	1270.00	1150.00	1180.00	1,340.0	2	1,180.000	1,180.000	1180.00
Bore Hole 6	1420.00	1580.00	1440.00	1570.00	1510.00	1440.00	1530.00	1,680.0	2	1,530.000	1,530.000	1530.00
Bore Hole 7	1330.00	1290.00	1300.00	1530.00	1100.00	1230.00	1360.00	1310.00	2	1,310.000	1,360.000	1335.00
Leachate dam 1 Pt 9	0.00	980.00	0.00	3930.00	7130.00	7750.00	81600.00	14800.00	2	14,800.000	81,600.000	48200.00
Sed Pond dam 2 Pt 8	36.00	70.00	107.00	125.00	166.00	168.00	251.00	365.00	2	251.000	365.000	308.00
Tharbogang Swamp	0.00	3420.00	15800.00	2900.00	14200.00	24600.00	0.00	0.00	2	0.000	0.000	0.00

Sulphate (mg/L) SO4

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	477.00	492.00	447.00	499.00	508.00	537.00	398.00	396.00	2	396.000	398.000	397.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	30.00	31.00	26.00	16.00	23.00	28.00	26.00	8.00	2	8.000	26.000	17.00
Bore Hole 4	685.00	744.00	595.00	476.00	404.00	528.00	469.00	434.00	2	434.000	469.000	451.50
Bore Hole 5	185.00	102.00	164.00	90.00	130.00	70.00	107.00	100.00	2	100.000	107.000	103.50
Bore Hole 6	266.00	297.00	282.00	225.00	237.00	176.00	242.00	238.00	2	238.000	242.000	240.00
Bore Hole 7	302.00	291.00	239.00	309.00	457.00	488.00	425.00	438.00	2	425.000	438.000	431.50
Leachate dam 1 Pt 9	0.00	180.00	0.00	847.00	1980.00	1620.00	15000.00	1800.00	2	1,800.000	15,000.000	8400.00
Sed Pond dam 2 Pt 8	302.00	38.00	35.00	41.00	59.00	55.00	26.00	66.00	2	26.000	66.000	46.00
Tharbogang Swamp	0.00	1140.00	109.00	1050.00	3920.00	6750.00	0.00	0.00	2	0.000	0.000	0.00

Sp.Conductance (uS/cm)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	6540.00	7520.00	6890.00	7470.00	7590.00	8020.00	7290.00	7150.00	2	7,150.000	7,290.000	7220.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	1620.00	1890.00	1780.00	1760.00	1730.00	1800.00	1860.00	2040.00	2	1,860.000	2,040.000	1950.00
Bore Hole 4	15600.00	17700.00	16700.00	13100.00	11300.00	14100.00	13000.00	12600.00	2	12,600.000	13,000.000	12800.00
Bore Hole 5	6820.00	2920.00	6020.00	1540.00	4900.00	5340.00	5610.00	5600.00	2	5,600.000	5,610.000	5605.00
Bore Hole 6	7170.00	7340.00	6840.00	7040.00	6640.00	6400.00	6950.00	7080.00	2	6,950.000	7,080.000	7015.00
Bore Hole 7	7700.00	7760.00	6860.00	8780.00	12700.00	12300.00	9930.00	9740.00	2	9,740.000	9,930.000	9835.00
Leachate dam 1 Pt 9	0.00	4740.00	0.00	13600.00	24500.00	26400.00	188000.00	49700.00	2	49,700.000	188,000.000	118850.00
Sed Pond dam 2 Pt 8	555.00	587.00	705.00	875.00	1040.00	1110.00	1290.00	1770.00	2	1,290.000	1,770.000	1530.00
Tharbogang Swamp	0.00	11800.00	798.00	9640.00	39400.00	69800.00	0.00	0.00	2	0.000	0.000	0.00

Suspended.Solid (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	24.00	31.00	60.00	23.00	12.00	20.00	0.00	8.00	2	0.000	8.000	4.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	114.00	239.00	686.00	60.00	98.00	160.00	<5	66.00	2	66.000	66.000	66.00
Bore Hole 4	120.00	136.00	32.00	36.00	56.00	81.00	18.00	27.00	2	18.000	27.000	22.50
Bore Hole 5	61.00	60.00	51.00	6.00	9.00	98.00	22.00	21.00	2	21.000	22.000	21.50
Bore Hole 6	61.00	1310.00	94.00	543.00	344.00	446.00	34.00	11.00	2	11.000	34.000	22.50
Bore Hole 7	81.00	344.00	132.00	45.00	30.00	156.00	22.00	73.00	2	22.000	73.000	47.50
Leachate dam 1 Pt 9	0.00	<5	0.00	<5	38.00	27.00	1050.00	900.00	2	900.000	1,050.000	975.00
Sed Pond dam 2 Pt 8	76.00	19.00	27.00	40.00	16.00	22.00	108.00	380.00	2	108.000	380.000	244.00
Tharbogang Swamp	-	<5	72.0	32.0	689.0	78.0	0.00	-	2	0.000	0.000	0.00

Total Org Carbon-filt (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	6.00	7.00	<10	14.00	6.00	9.00	23.00	17.00	2	17.000	23.000	20.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	2.00	2.00	<1.0	<1.0	2.00	2.00	<1	27.00	2	27.000	27.000	27.00
Bore Hole 4	10.00	11.00	12.00	<1.0	12.00	27.00	17.00	19.00	2	17.000	19.000	18.00
Bore Hole 5	31.00	27.00	2.00	12.00	23.00	38.00	9.00	15.00	2	9.000	15.000	12.00
Bore Hole 6	14.00	11.00	14.00	16.00	10.00	10.00	7.00	<1	2	7.000	7.000	7.00
Bore Hole 7	7.00	8.00	<10	5.00	26.00	18.00	<1	<1	2	0.000	0.000	#DIV/0!
Leachate dam 1 Pt 9	0.00	52.00	0.00	114.00	316.00	426.00	6250.00	664.00	2	664.000	6,250.000	3457.00
Sed Pond dam 2 Pt 8	19.00	18.00	16.00	29.00	30.00	32.00	50.00	69.00	2	50.000	69.000	59.50
Tharbogang Swamp	0.00	27.00	174.00	16.00	250.00	304.00	0.00	0.00	2	0.000	0.000	0.00

Total Phenol (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.00	0.00	0.00
Bore Hole 3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Bore Hole 4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Bore Hole 5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Bore Hole 6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Bore Hole 7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Leachate dam 1 Pt 9	0.00	<1.0	0.00	0.00	0.00	0.00	0.00	0.00	2	0.00	<1.0	<1.0
Sed Pond dam 2 Pt 8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0
Tharbogang Swamp	0.00	<1.0	<1.0	<1.0	<1.0	<1.0	0.00	0.00	2	0.00	<1.0	<1.0

Dissolved Iron (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	0.08	1.12	0.3	0.51	0.28	0.12	0.87	0.39	2	0.390	0.870	0.63
Bore Hole 2	0.00	0	0	0	0	0	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	0.35	7.76	0.73	3.79	2.66	2.19	0.42	1.32	2	0.420	1.320	0.87
Bore Hole 4	0.50	2.43	0.2	0.21	0.34	0.55	0.57	0.54	2	0.540	0.570	0.56
Bore Hole 5	4.14	1.7	0.68	0.42	0.79	5.75	1.74	1.52	2	1.520	1.740	1.63
Bore Hole 6	15.50	22.7	0.44	8.41	2.14	3.04	0.58	0.09	2	0.090	0.580	0.34
Bore Hole 7	0.39	8.63	0.7	2.21	0.42	0.54	1.12	0.52	2	0.520	1.120	0.82
Leachate dam 1 Pt 9	0.00	0.76	0.00	0.06	0.2	0.25	1.86	1.57	2	1.570	1.860	1.72
Sed Pond dam 2 Pt 8	1.02	1.68	0.7	0.48	0.64	0.94	1.23	1.93	2	1.230	1.930	1.58
Tharbogang Swamp	0.00	0.32	0.3	0.39	1.42	0.17	0.00	0	2	0.000	0.000	0.00

Dissolved Manganese (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	0.002	0.013	0.008	0.012	0.008	0.004	0.020	0.018	2	0.018	0.020	0.019
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.000
Bore Hole 3	0.008	0.130	0.108	0.152	0.071	0.081	0.056	0.068	2	0.056	0.068	0.062
Bore Hole 4	0.029	0.038	0.089	0.025	0.077	0.132	0.094	0.065	2	0.065	0.094	0.080
Bore Hole 5	0.194	0.217	0.344	0.108	0.691	1.550	1.110	0.468	2	0.468	1.110	0.789
Bore Hole 6	0.123	0.155	0.084	0.076	0.131	0.354	0.019	0.004	2	0.004	0.019	0.012
Bore Hole 7	0.107	0.155	0.088	0.088	0.507	0.380	0.228	0.217	2	0.217	0.228	0.223
Leachate dam 1 Pt 9	0.000	0.013	0.000	0.032	0.038	0.053	0.117	0.191	2	0.117	0.191	0.154
Sed Pond dam 2 Pt 8	0.041	0.015	0.037	0.275	0.078	0.031	0.159	0.250	2	0.159	0.250	0.205
Tharbogang Swamp	0.000	0.028	0.793	0.067	1.350	0.338	0.00	0.000	2	0.000	0.000	0.000

Dissolved Calcium (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	30.00	36.00	42.00	36.00	53.00	37.00	32.00	31.00	2	31.000	32.000	31.50
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	5.00	8.00	8.00	9.00	11.00	7.00	8.00	6.00	2	6.000	8.000	7.00
Bore Hole 4	142.00	158.00	108.00	88.00	121.00	80.00	103.00	104.00	2	103.000	104.000	103.50
Bore Hole 5	98.00	78.00	113.00	114.00	142.00	103.00	117.00	96.00	2	96.000	117.000	106.50
Bore Hole 6	156.00	43.00	200.00	44.00	76.00	46.00	58.00	44.00	2	44.000	58.000	51.00
Bore Hole 7	206.00	200.00	172.00	254.00	495.00	358.00	281.00	275.00	2	275.000	281.000	278.00
Leachate dam 1 Pt 9	0.00	55.00	0.00	83.00	13.00	13.00	32.00	23.00	2	23.000	32.000	27.50
Sed Pond dam 2 Pt 8	16.00	24.00	16.00	39.00	28.00	25.00	14.00	22.00	2	14.000	22.000	18.00
Tharbogang Swamp	0.00	307.00	1550.00	312.00	655.00	1400.00	0.00	0.00	2	0.000	0.000	0.00

Dissolved Magnesium (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	157.00	168.00	187.00	194.00	202.00	185.00	158.00	176.00	2	158.000	176.000	167.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	11.00	15.00	16.00	18.00	18.00	14.00	16.00	15.00	2	15.000	16.000	15.50
Bore Hole 4	261.00	276.00	237.00	190.00	187.00	195.00	204.00	234.00	2	204.000	234.000	219.00
Bore Hole 5	201.00	94.00	187.00	74.00	154.00	132.00	141.00	164.00	2	141.000	164.000	152.50
Bore Hole 6	223.00	100.00	238.00	105.00	160.00	119.00	130.00	112.00	2	112.000	130.000	121.00
Bore Hole 7	281.00	265.00	233.00	391.00	706.00	652.00	473.00	456.00	2	456.000	473.000	464.50
Leachate dam 1 Pt 9	0.00	88.00	0.00	296.00	611.00	477.00	543.00	408.00	2	408.000	543.000	475.50
Sed Pond dam 2 Pt 8	8.00	12.00	16.00	24.00	32.00	27.00	26.00	37.00	2	26.000	37.000	31.50
Tharbogang Swamp	0.00	207.00	1550.00	210.00	957.00	1750.00	0.00	0.00	2	0.000	0.000	0.00

Dissolved Potassium (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	63.00	65.00	69.00	63.00	66.00	72.00	77.00	98.00	2	77.000	98.000	87.50
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	6.00	9.00	12.00	9.00	11.00	9.00	10.00	14.00	2	10.000	14.000	12.00
Bore Hole 4	126.00	132.00	174.00	128.00	115.00	144.00	130.00	187.00	2	130.000	187.000	158.50
Bore Hole 5	66.00	36.00	63.00	18.00	45.00	46.00	48.00	64.00	2	48.000	64.000	56.00
Bore Hole 6	75.00	62.00	86.00	56.00	65.00	58.00	64.00	71.00	2	64.000	71.000	67.50
Bore Hole 7	86.00	84.00	77.00	109.00	212.00	185.00	168.00	176.00	2	168.000	176.000	172.00
Leachate dam 1 Pt 9	0.00	205.00	0.00	409.00	1410.00	1330.00	12400.00	2790.00	2	2,790.000	12,400.000	7595.00
Sed Pond dam 2 Pt 8	7.00	13.00	19.00	24.00	38.00	32.00	41.00	47.00	2	41.000	47.000	44.00
Tharbogang Swamp	0.00	36.00	178.00	30.00	119.00	140.00	0.00	0.00	2	0.000	0.000	0.00

Dissolved Sodium (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	1140.00	1200.00	1270.00	1430.00	1290.00	1320.00	1140.00	1330.00	2	1,140.000	1,330.000	1235.00
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	342.00	332.00	368.00	400.00	349.00	336.00	317.00	308.00	2	308.000	317.000	312.50
Bore Hole 4	3020.00	3120.00	3560.00	3110.00	2300.00	2530.00	2280.00	2970.00	2	2,280.000	2,970.000	2625.00
Bore Hole 5	1090.00	326.00	919.00	128.00	655.00	655.00	681.00	899.00	2	681.000	899.000	790.00
Bore Hole 6	933.00	1300.00	996.00	1420.00	1230.00	1060.00	1170.00	1200.00	2	1,170.000	1,200.000	1185.00
Bore Hole 7	928.00	948.00	854.00	1160.00	1320.00	1150.00	1080.00	1030.00	2	1,030.000	1,080.000	1055.00
Leachate dam 1 Pt 9	0.00	569.00	0.00	2710.00	5140.00	4640.00	47700.00	9090.00	2	9,090.000	47,700.000	28395.00
Sed Pond dam 2 Pt 8	89.00	52.00	99.00	93.00	136.00	131.00	186.00	243.00	2	186.000	243.000	214.50
Tharbogang Swamp	0.00	1760.00	10100.00	1740.00	8520.00	13800.00	0.00	0.00	2	0.000	0.000	0.00

Ammonia (as N) (mg/L) N

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	0.03	0.04	0.04	0.09	0.04	<.01	0.03	0.07	2.000	0.030	0.070	0.050
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.000	0.000	0.000	0.000
Bore Hole 3	0.03	0.09	1.80	1.72	3.58	0.93	0.36	38.20	2.000	0.360	38.200	19.280
Bore Hole 4	0.28	0.78	0.03	<.01	0.72	0.14	0.33	0.48	2.000	0.330	0.480	0.405
Bore Hole 5	0.59	0.49	0.42	<.01	0.73	41.70	16.40	6.69	2.000	6.690	16.400	11.545
Bore Hole 6	11.60	0.46	6.01	4.05	2.21	0.70	0.03	0.07	2.000	0.030	0.070	0.050
Bore Hole 7	3.25	1.99	1.30	0.41	75.60	55.60	23.00	28.60	2.000	23.000	28.600	25.800
Leachate dam 1 Pt 9	0.00	8.06	0.00	21.50	3.32	9.22	34.50	4.52	2.000	4.520	34.500	19.510
Sed Pond dam 2 Pt 8	0.00	0.38	0.04	4.68	0.03	0.47	0.07	0.18	2.000	0.070	0.180	0.125
Tharbogang Swamp	0.00	0.41	0.43	0.10	0.80	0.73	0.00	0.00	2.000	0.000	0.000	0.000

Total Oxidised Nitrogen (as N) (mg/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	6.30	8.29	7.69	9.19	9.01	11.90	23.40	25.50	2	23.400	25.500	24.45
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.000	0.000	0.00
Bore Hole 3	1.14	0.75	0.49	0.01	0.01	1.18	0.87	0.01	2	0.010	0.870	0.44
Bore Hole 4	0.68	0.56	0.59	0.56	0.88	0.40	0.37	0.64	2	0.370	0.640	0.51
Bore Hole 5	0.36	0.12	0.70	0.60	0.59	0.03	1.49	0.02	2	0.020	1.490	0.76
Bore Hole 6	0.49	1.17	0.19	0.05	0.14	0.12	0.97	0.92	2	0.920	0.970	0.95
Bore Hole 7	246.00	192.00	150.00	303.00	1040.00	957.00	791.00	576.00	2	576.000	791.000	683.50
Leachate dam 1 Pt 9	0.00	15.40	0.00	126.00	0.54	0.07	0.05	<.01	2	0.050	0.050	0.05
Sed Pond dam 2 Pt 8	0.18	4.24	0.02	0.17	<.01	0.49	0.17	<.01	2	0.170	0.170	0.17
Tharbogang Swamp	0.00	0.01	0.00	1.98	0.02	0.02	0.00	0.00	2	0.000	0.000	0.00

Volatile Organics (ug/L)

	Mar-15	Sep-15	Mar-16	Aug-16	Mar-17	Aug-17	Mar-18	Aug-18				
Bore Hole 1	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Bore Hole 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2			
Bore Hole 3	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Bore Hole 4	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Bore Hole 5	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Bore Hole 6	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Bore Hole 7	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Leachate dam 1 Pt 9	0	0	0	<50	<50	<50	<50	<50	0	<50	<50	<50
Sed Pond dam 2 Pt 8	<50	<50	<50	<50	<50	<50	<50	<50	0	<50	<50	<50
Tharbogang Swamp	0	0	0	<50	<50	<50	0.00	0.00	0	<50	<50	<50



Annual Environmental Performance Report

**11 September 2017 to
10 September 2018**

Environmental Protection Licence 5875

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1. Introduction

1.1. Project Background

Griffith City Council (Council) operates the Tharbogang Waste Management Centre (TWMC), located at Lot 202 DP 756035 Hillside Drive, Tharbogang. The Facility has been in operation since 1984.

Expansion of the landfilling and quarrying operations received Ministerial approval in July 2010, but it has not yet commenced. The approval allows Council to extract up to 315,000 tonnes per year of gravel and landfill 35,000 tonnes per year of general solid waste. The project approval has been modified twice. These modifications are detailed later in this plan. The quarry and landfill operation will also require an updated Environmental Protection Licence (EPL) from the Environment Protection Authority (EPA).

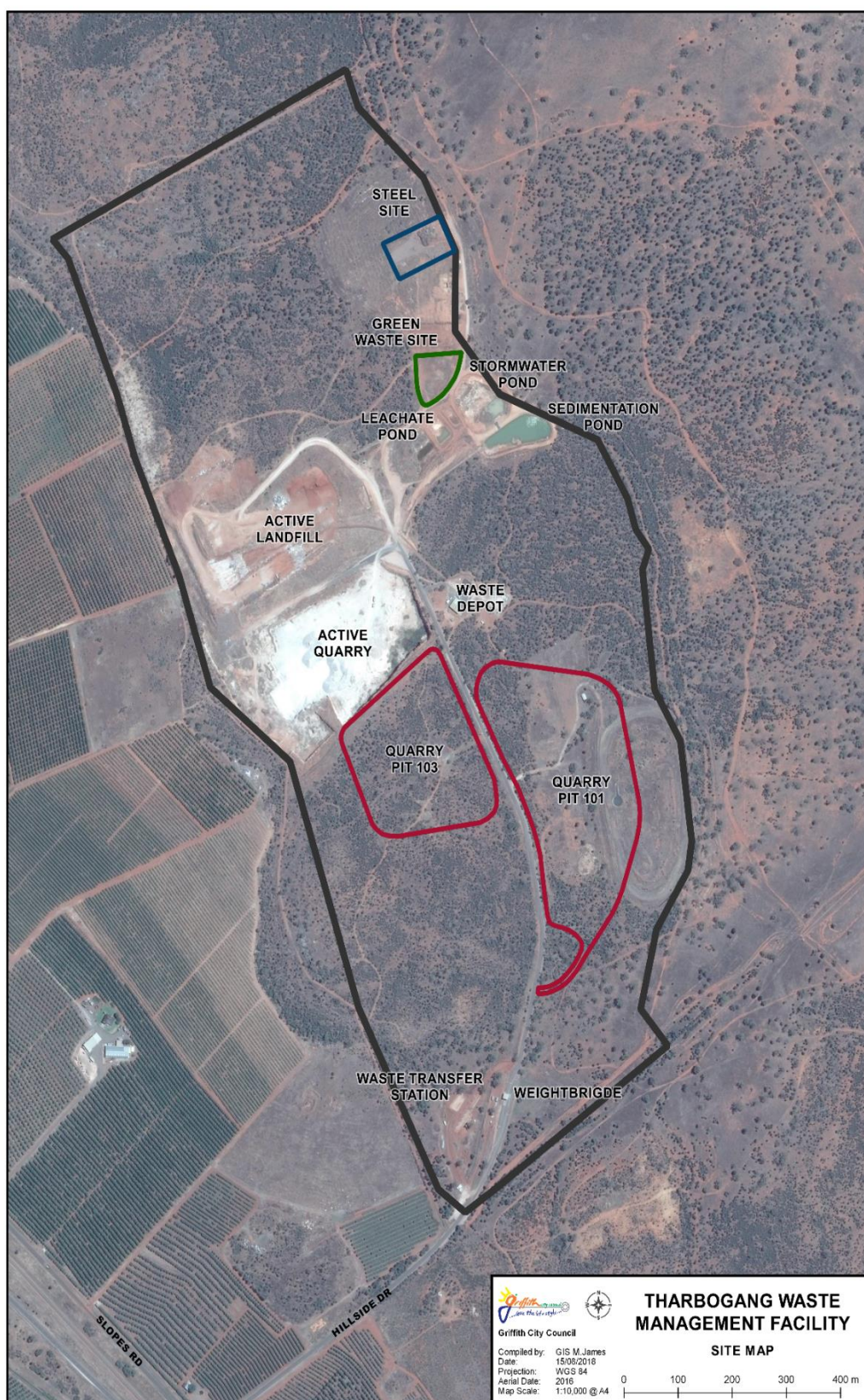
1.2. Purpose of the Report

This report summaries the Environment Performance of Tharbogang Waste Management Centre for the reporting period 11 September 2017 to 10 September 2018.

Figure 1-1 Location of Tharbogang Waste Management Centre in relation to the City Centre



Figure 1-2 Tharbogang Waste Management Centre Site Layout



2. Landfill Operation

2.1. Tharbogang Landfill Disposal

Table 2.1 shows the waste disposal rate (in tonnes) and the amount of waste diverted from landfill over a four year period within the same reporting term (11 September 2017 to 10 September 2018).

Table 2-1

Year EPA Reporting Period	Waste to Landfill	Waste Recycled
17/18	31742	767
16/17	31185	544
15/16	33512	424
14/15	27024	242

Rainfall

Table 2.2 shows the rainfall for in the Griffith Region over the past four year period.

Table 2.2:

Year EPA Reporting Period	Fain fall (mm)
17/18	289
16/17	423
15/16	581
14/15	412

Between the sampling dates March 2018 and August 2018, there was a total of 76mm of rain fall.

As you can see, there is very little rainfall over the last 4 years and even less fall in between the groundwater sampling dates.

Note: Data obtained from the CSIRO Web Site.

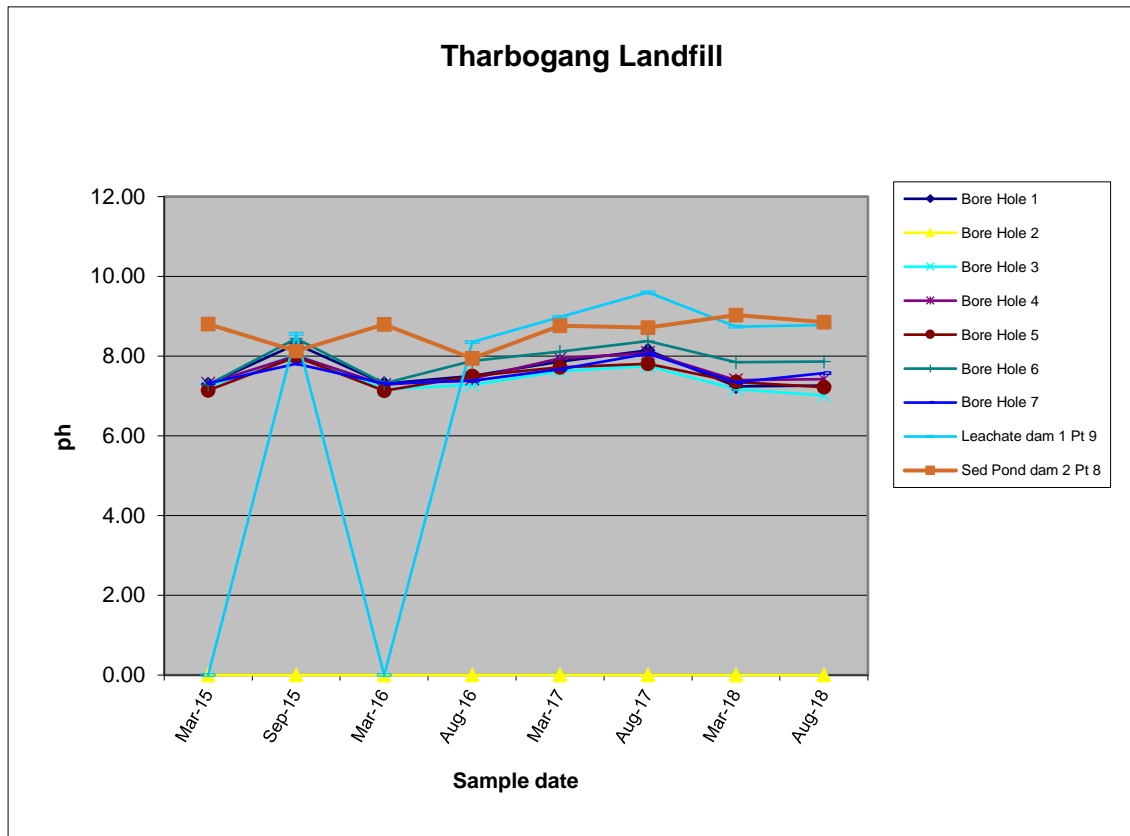
Figure 2-1 Groundwater Monitoring Bore Locations as at September 2018



The following graphs are a four year summary of the ground water testing analysis

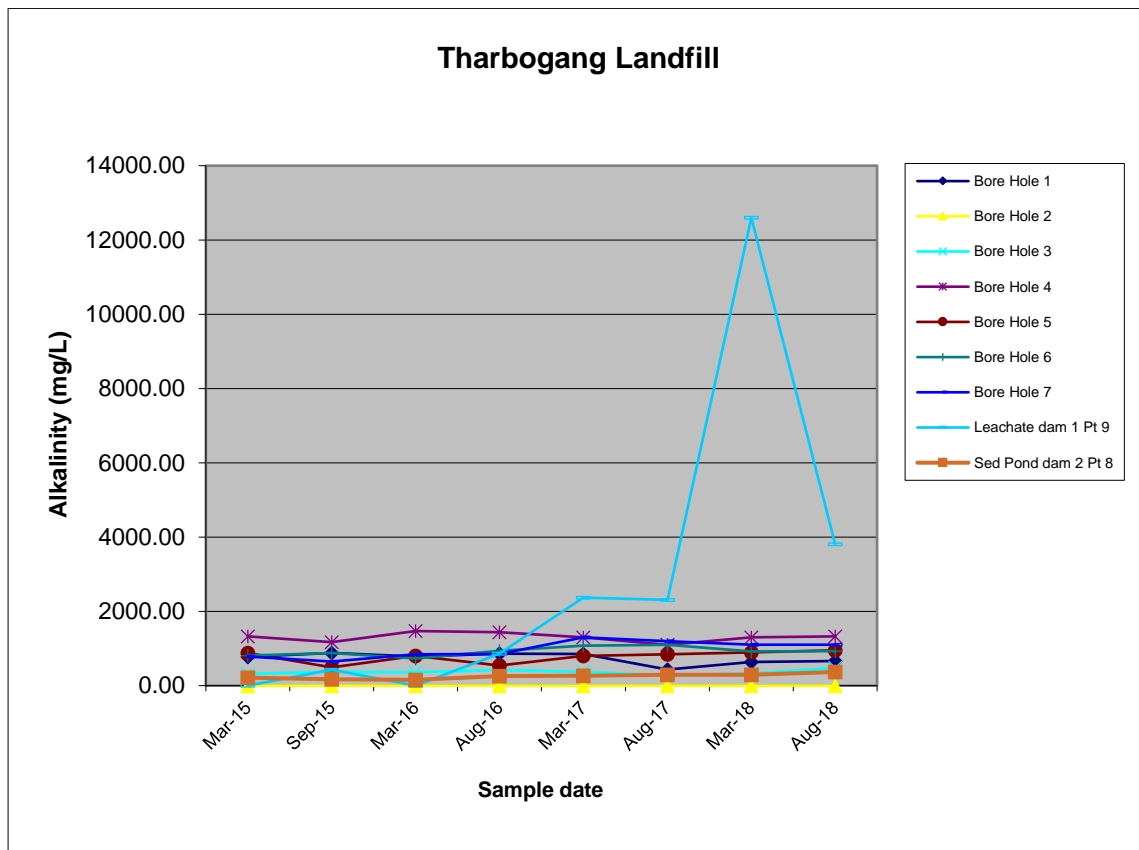
- The TWMC environmental performance was compliant in all aspects relevant to the licence conditions.
- Tabulated data has been submitted as part of the Annual Return.
- Below is the graphical presentation of the data for the past three years

Graph 2-1 pH



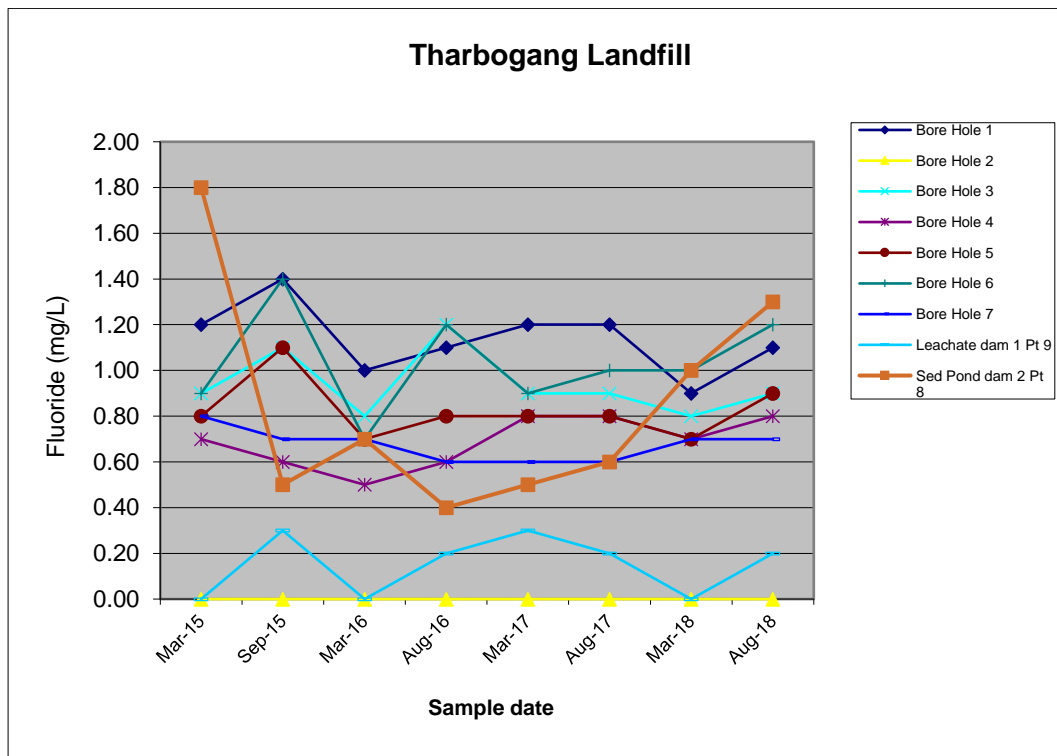
Comments: None

Graph 2-2 Alkalinity



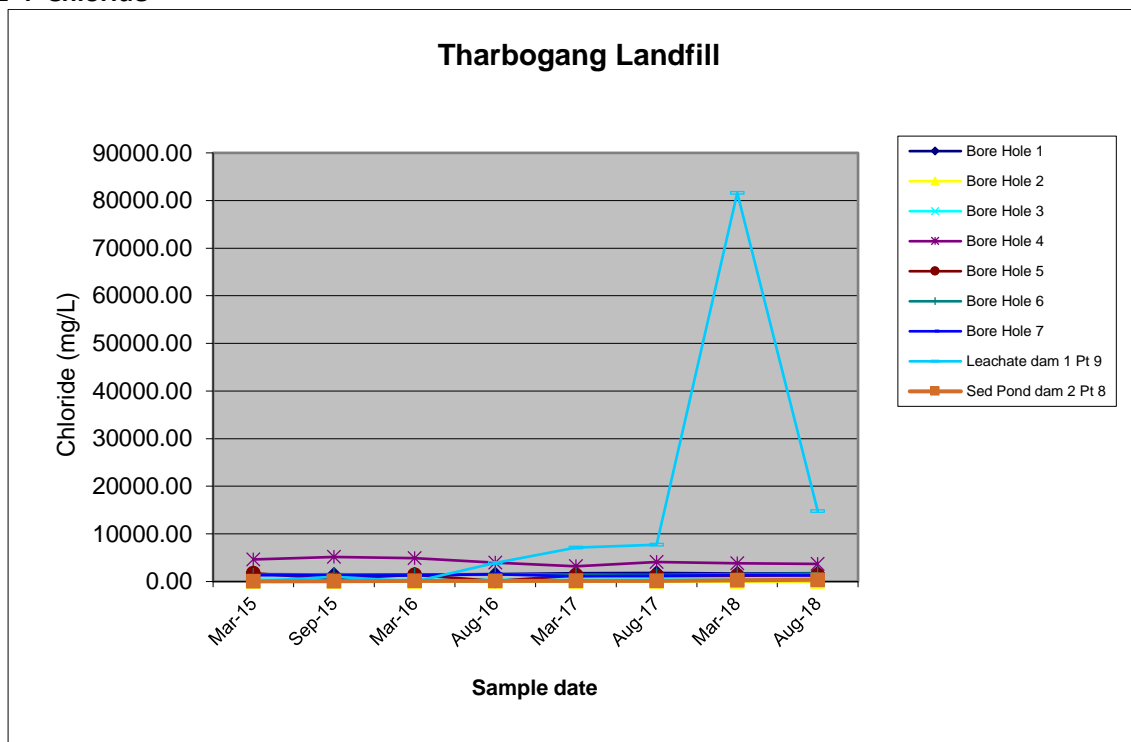
Comments: Alkalinity rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-3 Fluoride



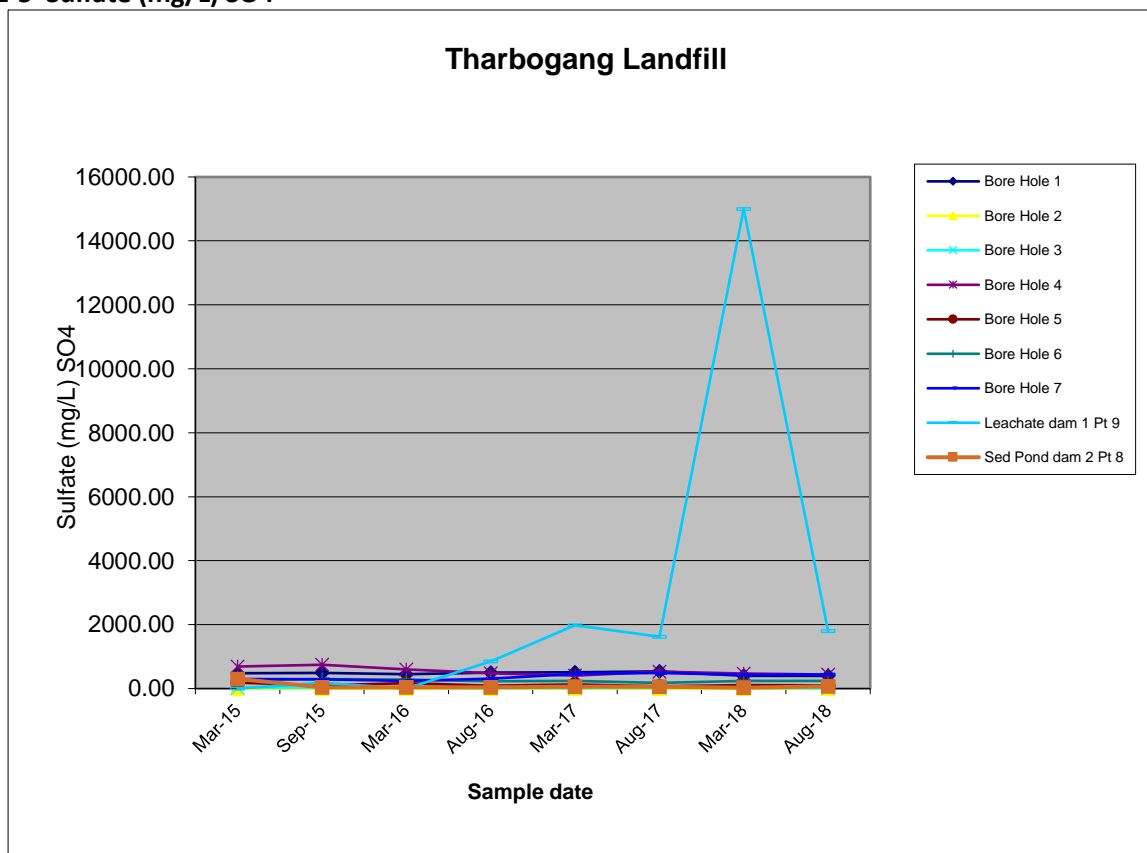
Comments: None

Graph 2-4 Chloride



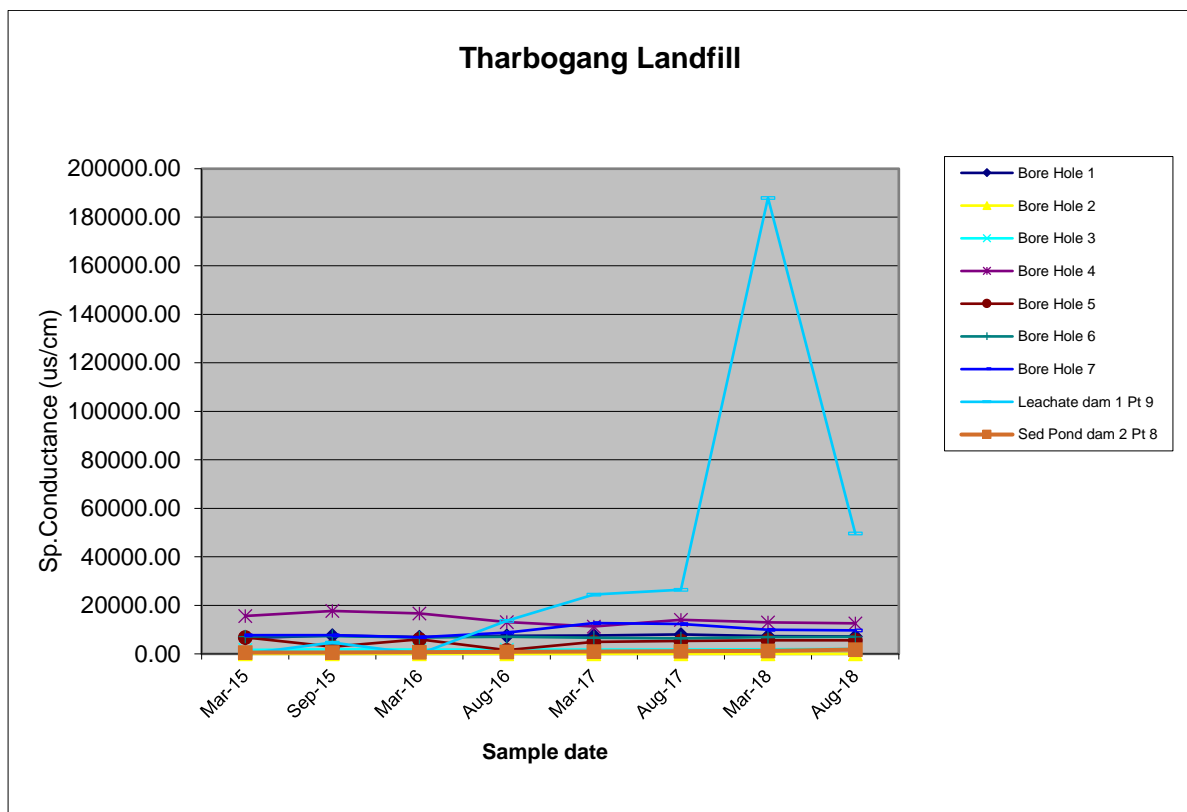
Comments: Chloride rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-5 Sulfate (mg/L) SO₄



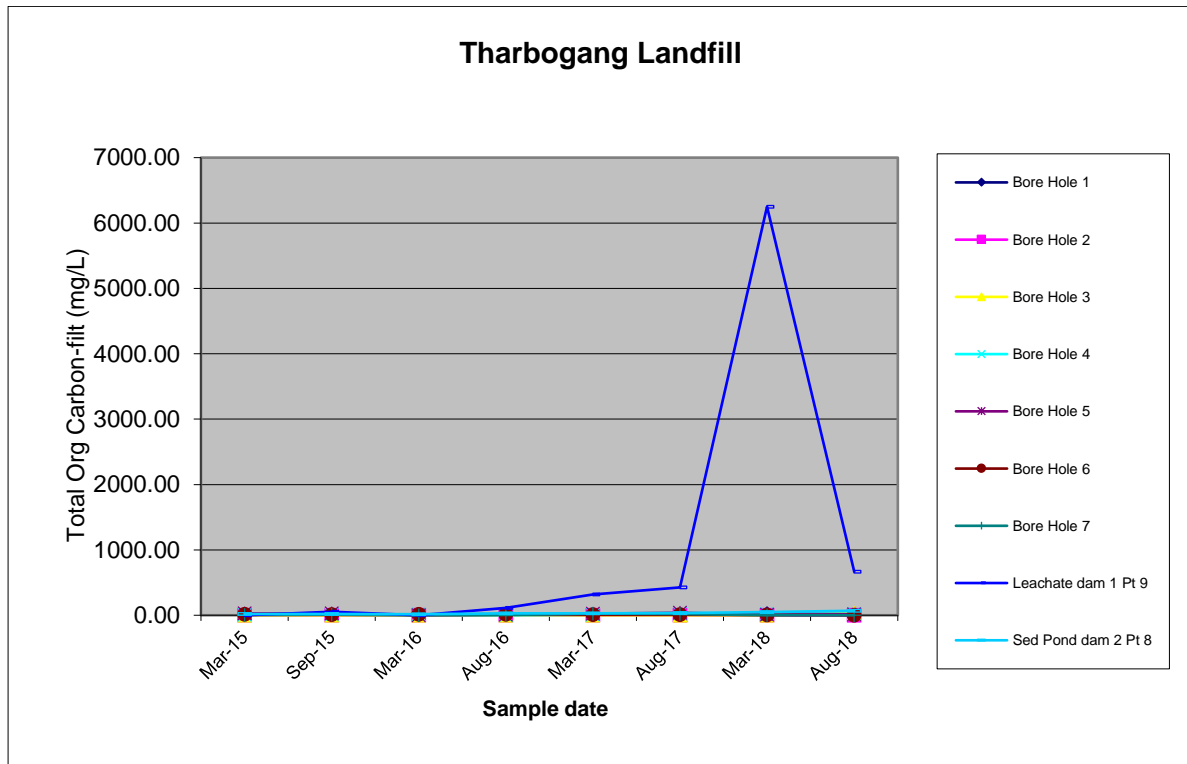
Comments: Sulphate rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-6 Sp. Conductance (us/cm)



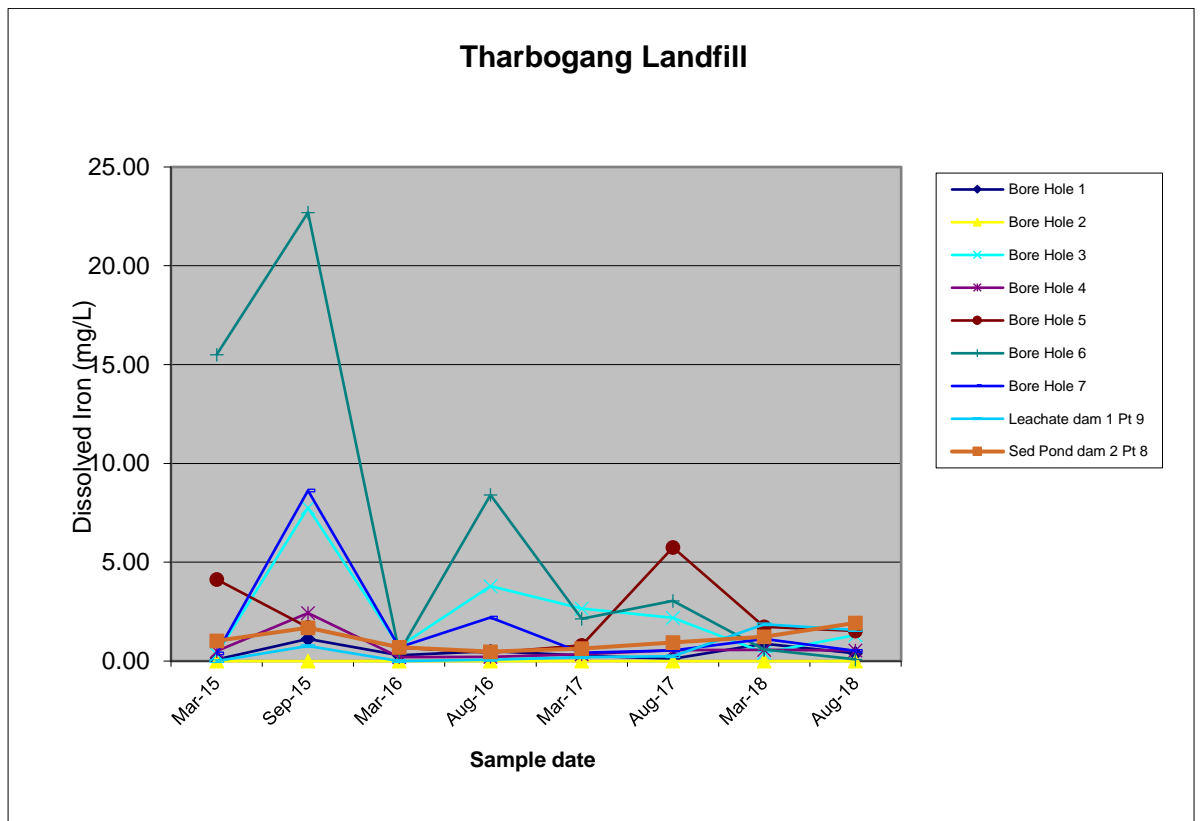
Comments: Conductivity rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-7 Total Org Carbon-filt



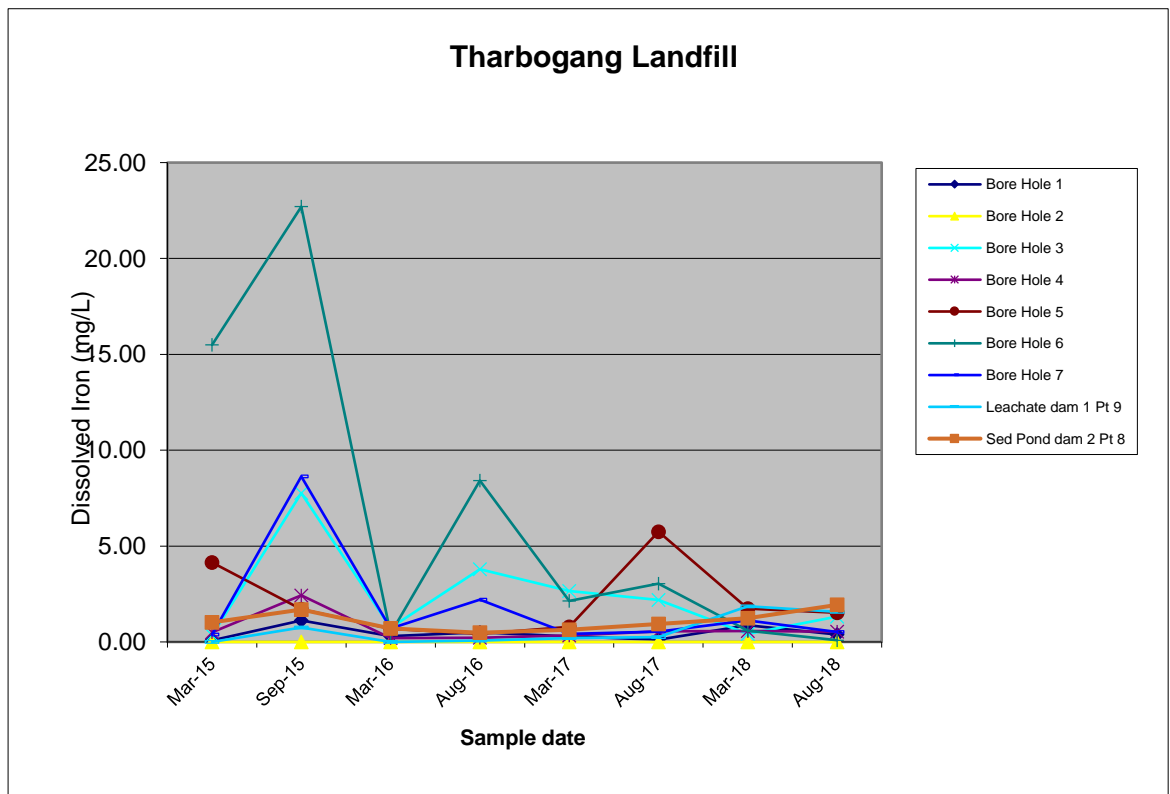
Comments: TOC rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-8 Dissolved Iron



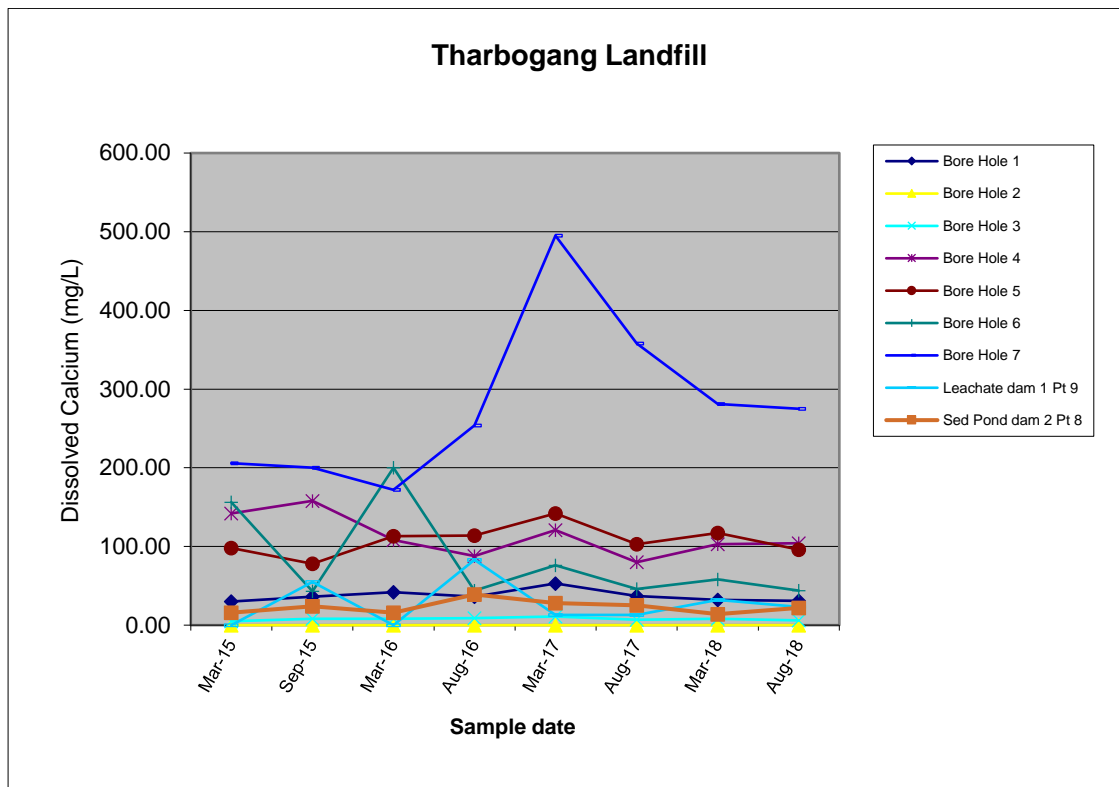
Comments: None

Graph 2-9 Dissolved Iron



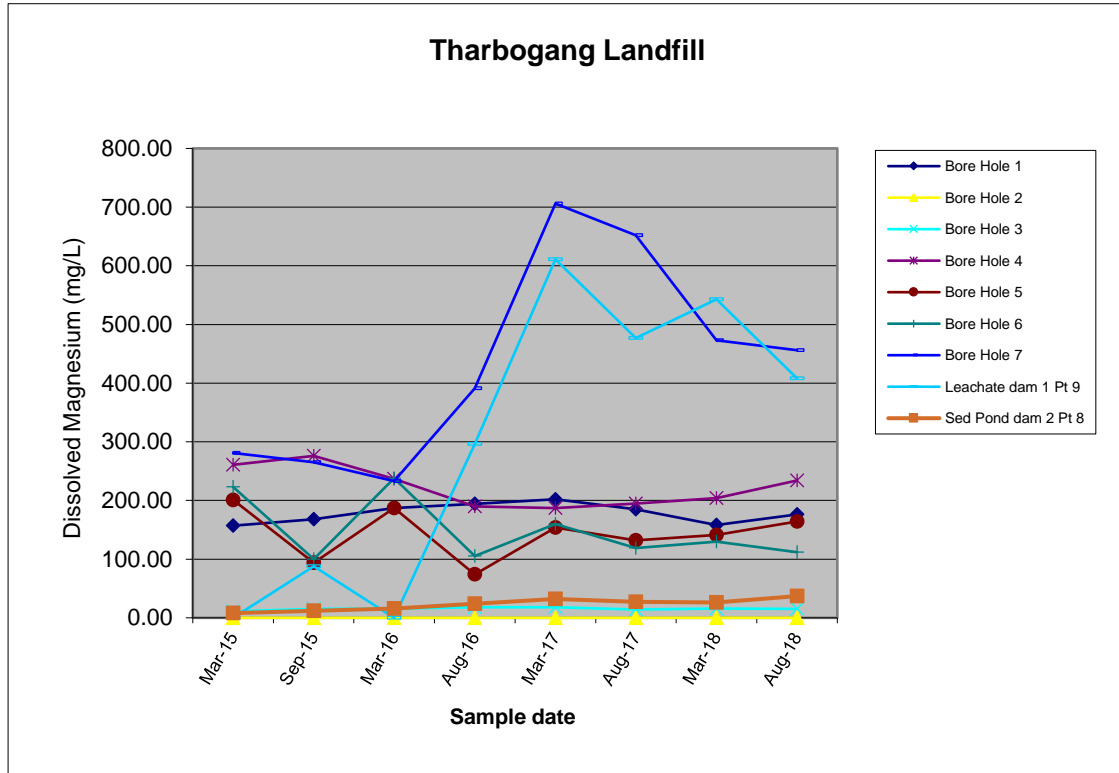
Comments: None

Graph 2-10 Dissolved Calcium



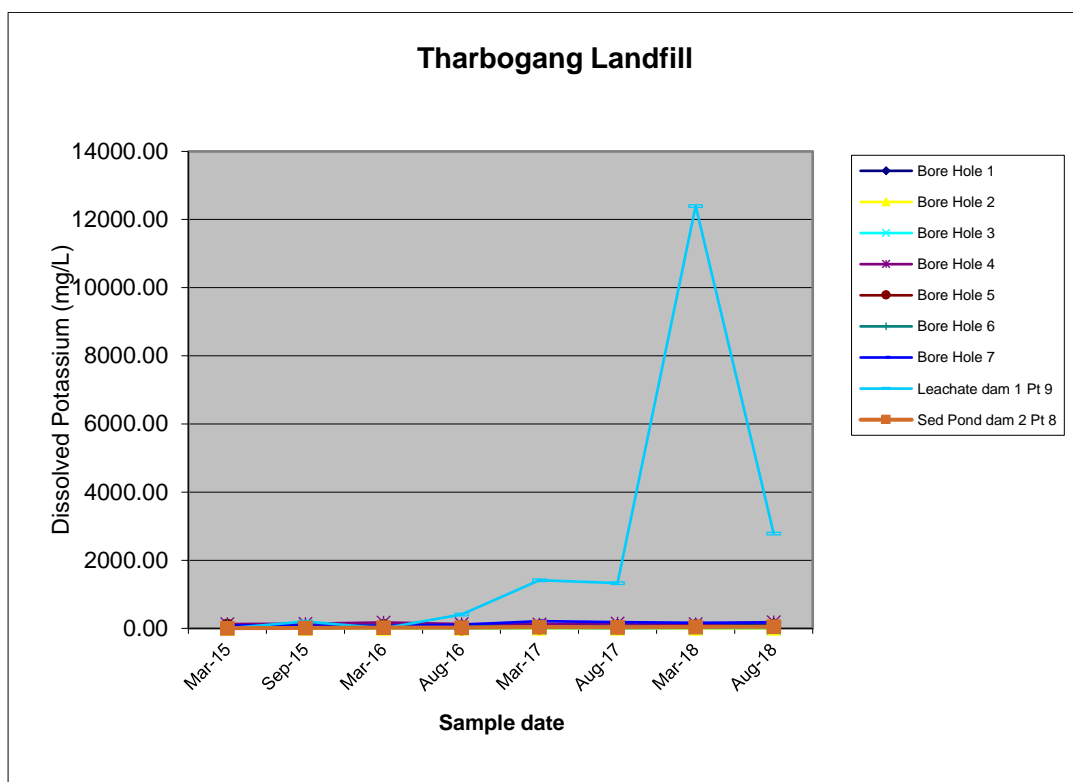
Comment: Dissolved calcium in EPA points 7 and 9 continued to reduce from highs in 2017.

Graph 2-11 Dissolved Magnesium



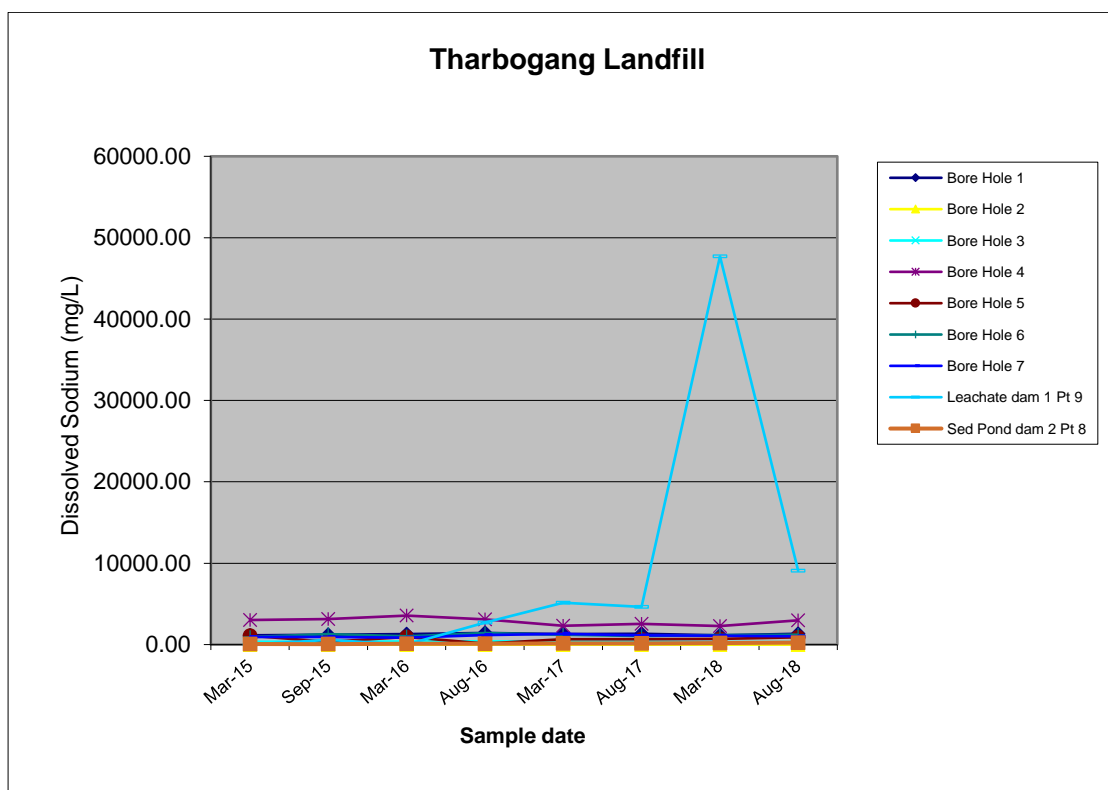
Comment: Dissolved magnesium in EPA points 7 and 9 continued to reduce from highs in 2017.

Graph 2-12 Dissolved Potassium



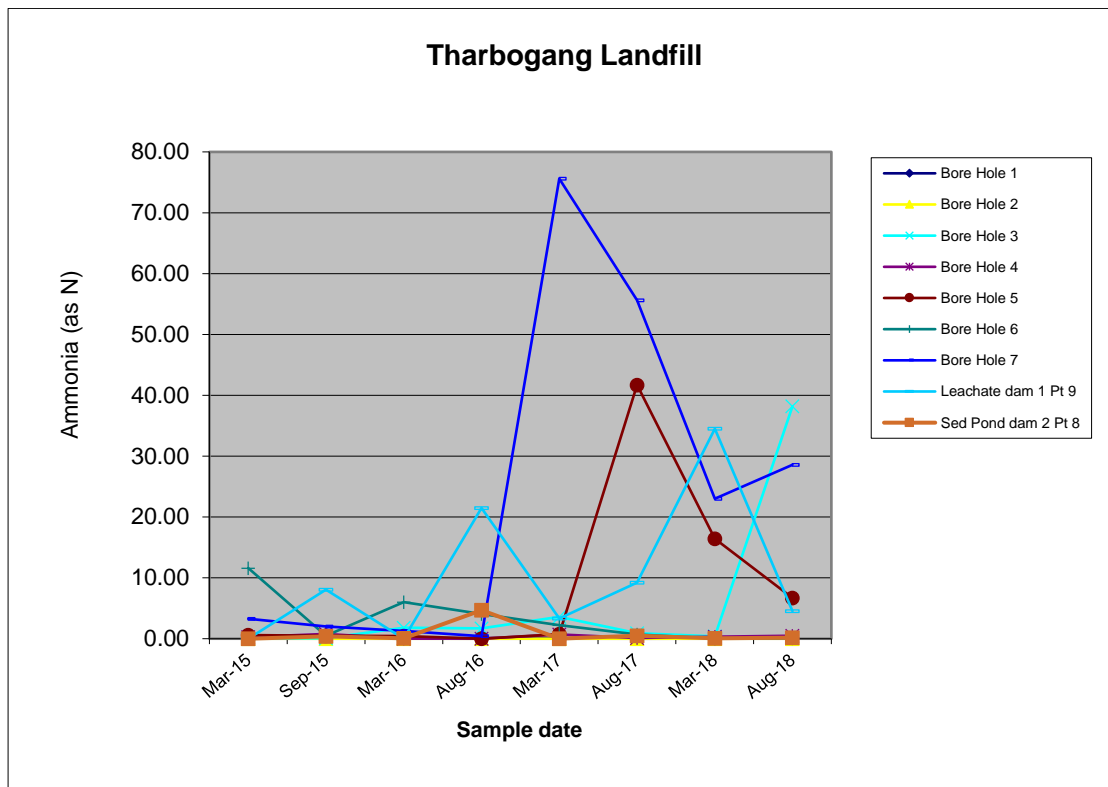
Comment: Dissolved potassium rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-13 Dissolved Sodium



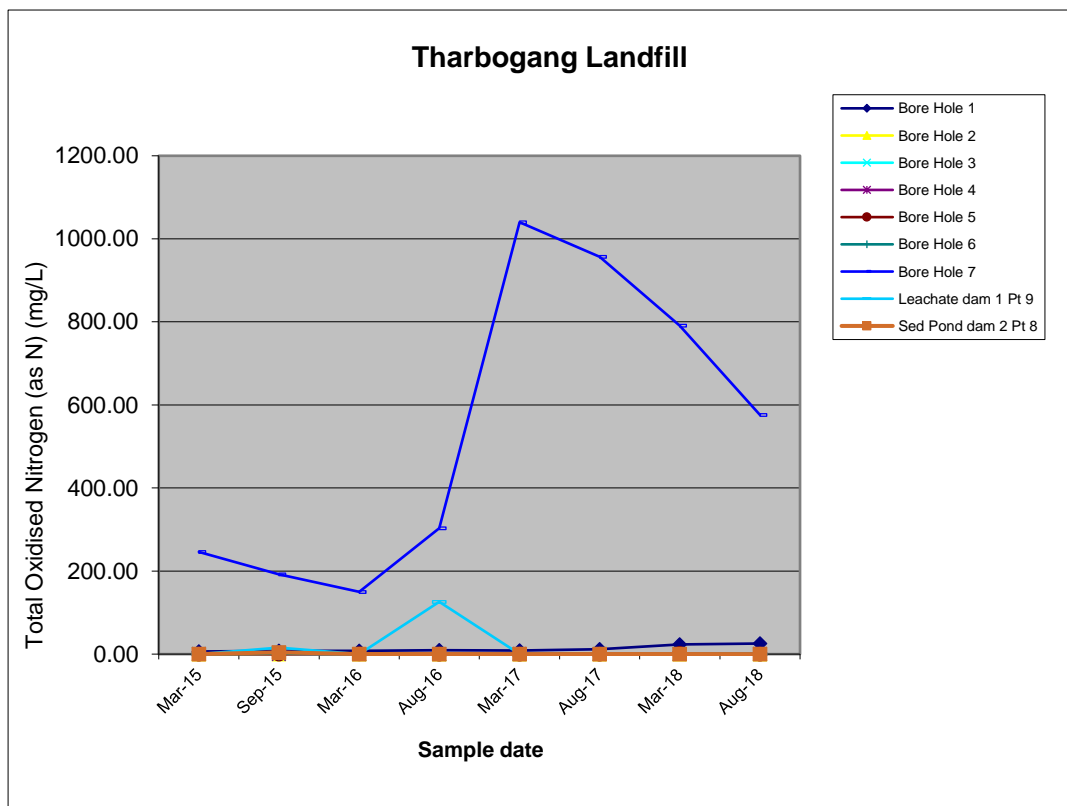
Comment: Dissolved sodium rose in March 2018 at EPA point 9 and returned closer to typical levels in August. There was no specific event that caused this.

Graph 2-14 Ammonia



Comment: Ammonia rose in August 2018 at EPA point 9 there was no specific event that caused this.

Graph 2-15 Total Oxidised Nitrogen



Comment: Total oxidized nitrogen continued to reduce during 2018 at EPA point 9.

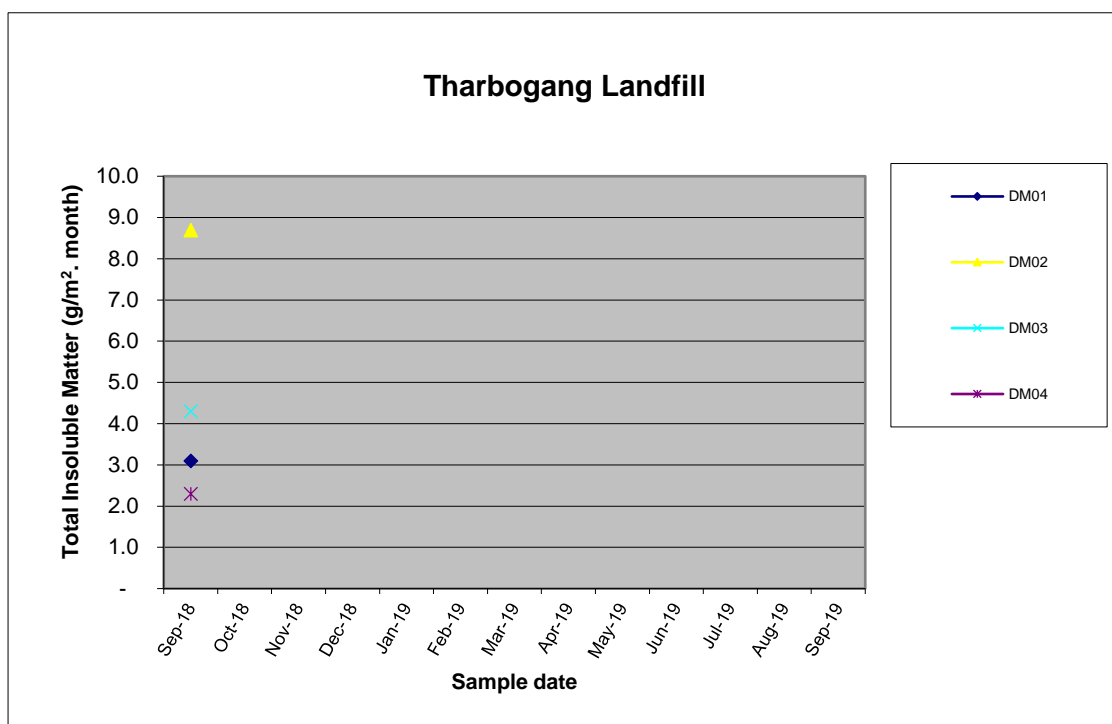
- d) See comments above.
- e) There were no complaints received during the reporting period.
- f) There were no environmental performance deficiencies identified in the data.
- g) Based on the results, there are no specific recommendations.

3. Air Quality Monitoring

As part of the Development Approval 06_0334, it is a requirement that the quality of the air is tested at 4 sites which are across TWMC. (See map below, Figure 3.3, showing monitor location).

The first testing commenced in September 2018. Please see the graphical representation of the testing results.

Graph 3-1 Total Insoluble Matter (g/m².month)



Graph 3-2 Total Insoluble Matter (gm)

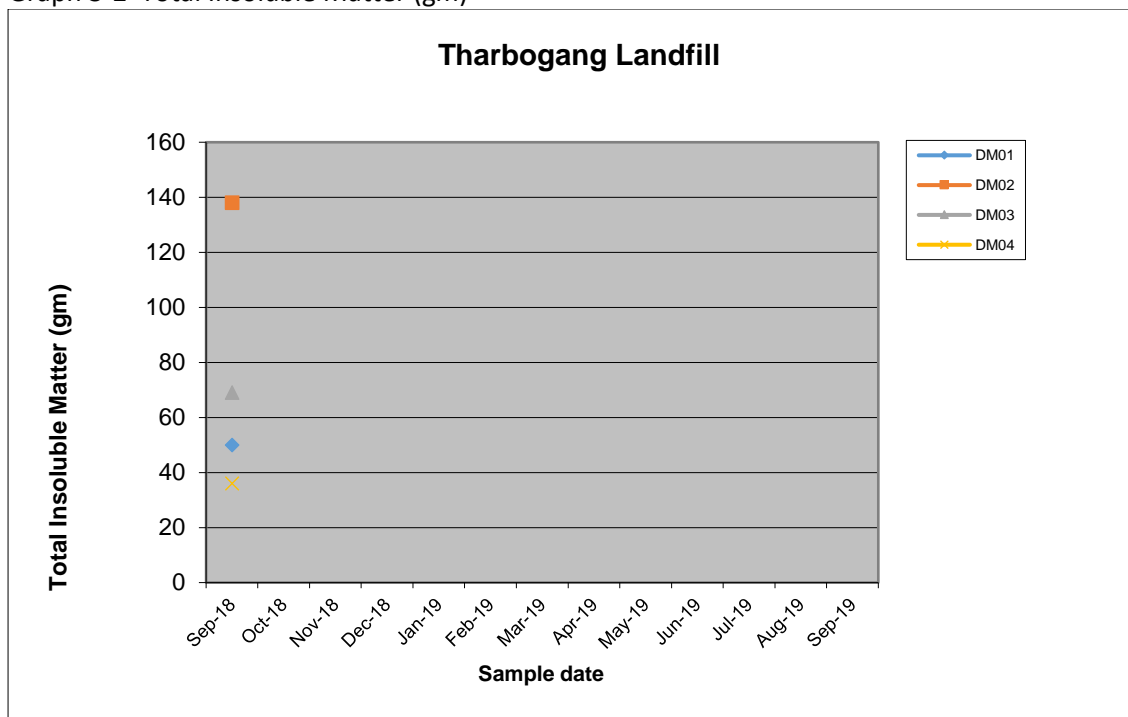
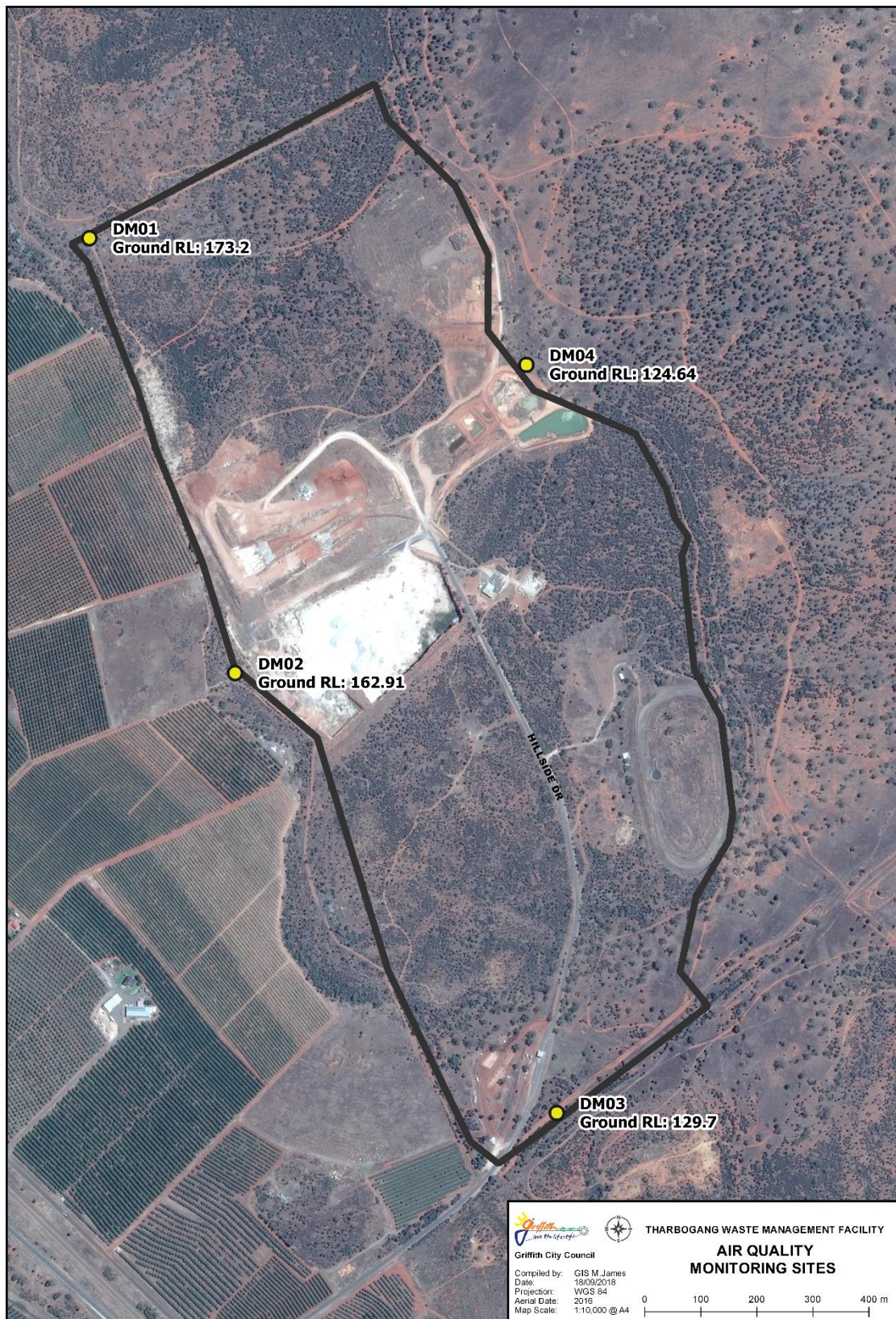


Figure 3-1 Air Quality Monitoring Sites

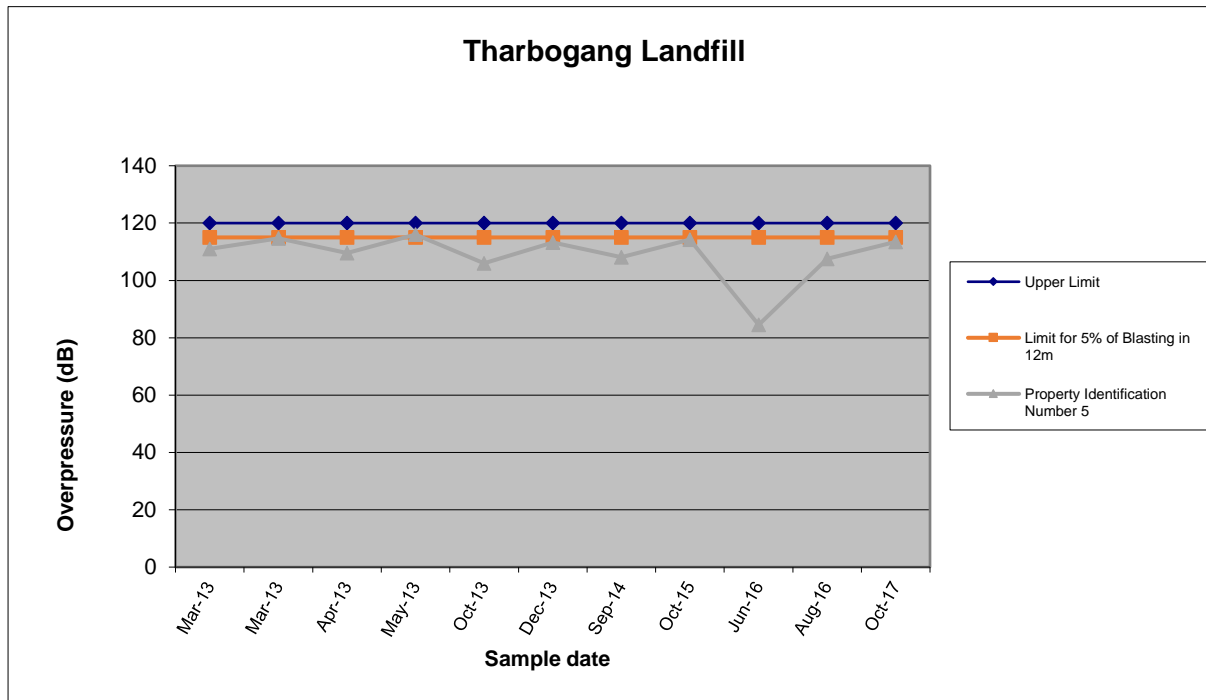


4. Blast Monitoring Results

Every time there is a blast in the quarry the Over Pressure and Ground Vibration is monitored at the closes receptor (nearest property).

The results of this monitoring is graphed below. It is important to note that none of the blast exceed the 120dB (Lin Peak) limit for Over Pressure and the 5mm/second for ground vibration.

Graph 4-1 Overpressure



Graph 4-2 Ground Pressure

