



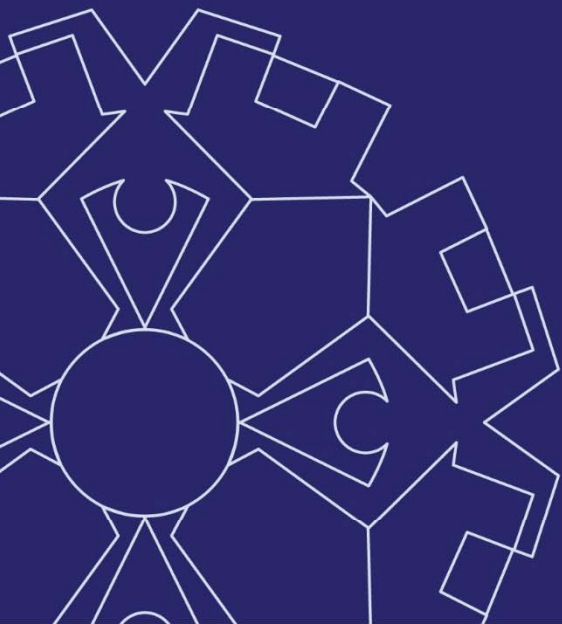
GEOLYSE

**ANNUAL ENVIRONMENTAL MONITORING REPORT
26 AUGUST 2016 – 25 AUGUST 2017**

OBERON WASTE FACILITY – EPL 20289

**PREPARED FOR
OBERON COUNCIL**

OCTOBER 2017



• Civil, Environmental & Structural Engineering • Surveying • Environmental • Planning • Architecture

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

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Introduction

1.1 BACKGROUND

The Oberon Waste Facility (OWF) is located in the Oberon Local Government Area and is owned by Oberon Council. The 11 hectare property exists approximately 4 km north of the town of Oberon and comprises Lot 1 DP 350774, Lot 1 DP 598525, Lot 1 DP 844887 and Lot 36 DP 263034. The OWF is accessed via Lowes Mount Road.

The landfill site is approximately 620 metres north-south by 430 metres east-west, with the northern extent of the site narrower than the south (refer **Drawing 05C_EV02**).

The landfill is currently screened by rows of established native trees. The established trees provide visual screening on the northern, eastern and southern boundaries of the landfill. Rows of native trees are also being established on the western side of the site.

The land adjacent to the site is predominantly rural land used for grazing and some cropping, with timber processing also conducted approximately 2.5 km to the south-east.

Landfilling operations at the site are known to have commenced prior to the 1960s, and anecdotal evidence would suggest the site may have been established in the 1940s.

Whilst it is speculated that landfilling at this location extends as far back as the 1940s, the formal paper trail extends only to the 1960s.

The OWF services the town of Oberon, which has a population of approximately 2,500 people. The landfill receives municipal kerbside waste, municipal delivered waste, commercial and industrial waste and building and demolition waste. It also has facilities for recycling drop off and green waste separation.

1.2 LICENCE REQUIREMENTS

The OWF currently operates under Environment Protection Licence 20289 (EPL 20289), issued under Section 55 of the Protection of the Environment Operations Act 1997 (The Act). This licence governs the design, construction, operation, monitoring and rehabilitation of the facility in accordance with The Act.

Management and operation of the centre is also undertaken in accordance with the Landfill Environmental Management Plan (LEMP) (OSC, 2013).

Section 5 of EPL 20289 provides instructions on environmental monitoring requirements. Specifically, Condition M2.1 describes the requirements to monitor the concentration of pollutants discharged to groundwater, surface water and accumulated building gas.

Annual reporting requirements that are outlined in Condition R1.1 state:

R1.1 “The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

a) a Statement of Compliance; and

b) a Monitoring and Complaints Summary.

The deadline for the Annual Return that is outlined in Condition R1.5 states:

The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

Condition R1.9 'Monitoring Report' states:

The licensee must supply, with the Annual Return, a report which provides:

- a) an analysis and interpretation of monitoring results from samples collected at the premises over the reporting period;*
- b) actions to correct any identified adverse trends;*
- c) a summary of the results of landfill gas monitoring undertaken at the premises in accordance with condition M2.2.*
- d) a summary of pollution complaints resulting from activities undertaken at the premises during the reporting period.*
- e) a statement regarding the attainment of the achieved compaction rate of landfilled waste (excluding cover material) in accordance with condition O6.9.*
- f) a statement regarding the remaining disposal capacity (in cubic metres) of the landfill in accordance with condition M6.1.*

This Annual Environmental Management Report (AEMR) is a response to Condition R1.9. The reporting period for this AEMR is from 26 August 2015 to 25 August 2016. Collection of environmental data by Geolyse began at the OWF in November 2013.

1.3 REPORT STRUCTURE

Section 1 presents a brief introduction and background to the report;

Section 2 provides an overview of the environmental monitoring program undertaken at the facility during the reporting period;

Section 3 presents the data and discussion of data collected during the reporting period;

Section 4 presents all monitoring data that falls outside of the scope of environmental monitoring for the annual return year, including records of public complaints and quantities of waste deposited;

Section 5 presents a summary of all monitoring undertaken as described in detail in Section 3 and Section 4; and

Section 6 presents the conclusions and recommendations resulting from monitoring undertaken during the reporting period.

Environmental Monitoring Program

2.1 OVERVIEW

Environmental monitoring undertaken at the OWF during the reporting period included that required for groundwater and surface water. The requirement for accumulated building gas was identified in August 2014 and subsequently commenced in September 2014. This section summarises all environmental monitoring undertaken during the reporting period (**Table 2.1**).

Table 2.1 – 2016-2017 Schedule of Environmental Monitoring

Date	Groundwater (Biannually)	Surface Water (Monthly During Discharge)	Accumulated Building Gas
Sep 2016	✓	✓	✓
Oct 2016		✓	✓
Nov 2016	✓	✓	✓
Dec 2016			✓
Jan 2017			✓
Feb 2017			✓
Mar 2017			✓
Apr 2017			✓
May 2017	✓		✓
Jun 2017			✓
Jul 2017			✓
Aug 2017			✓

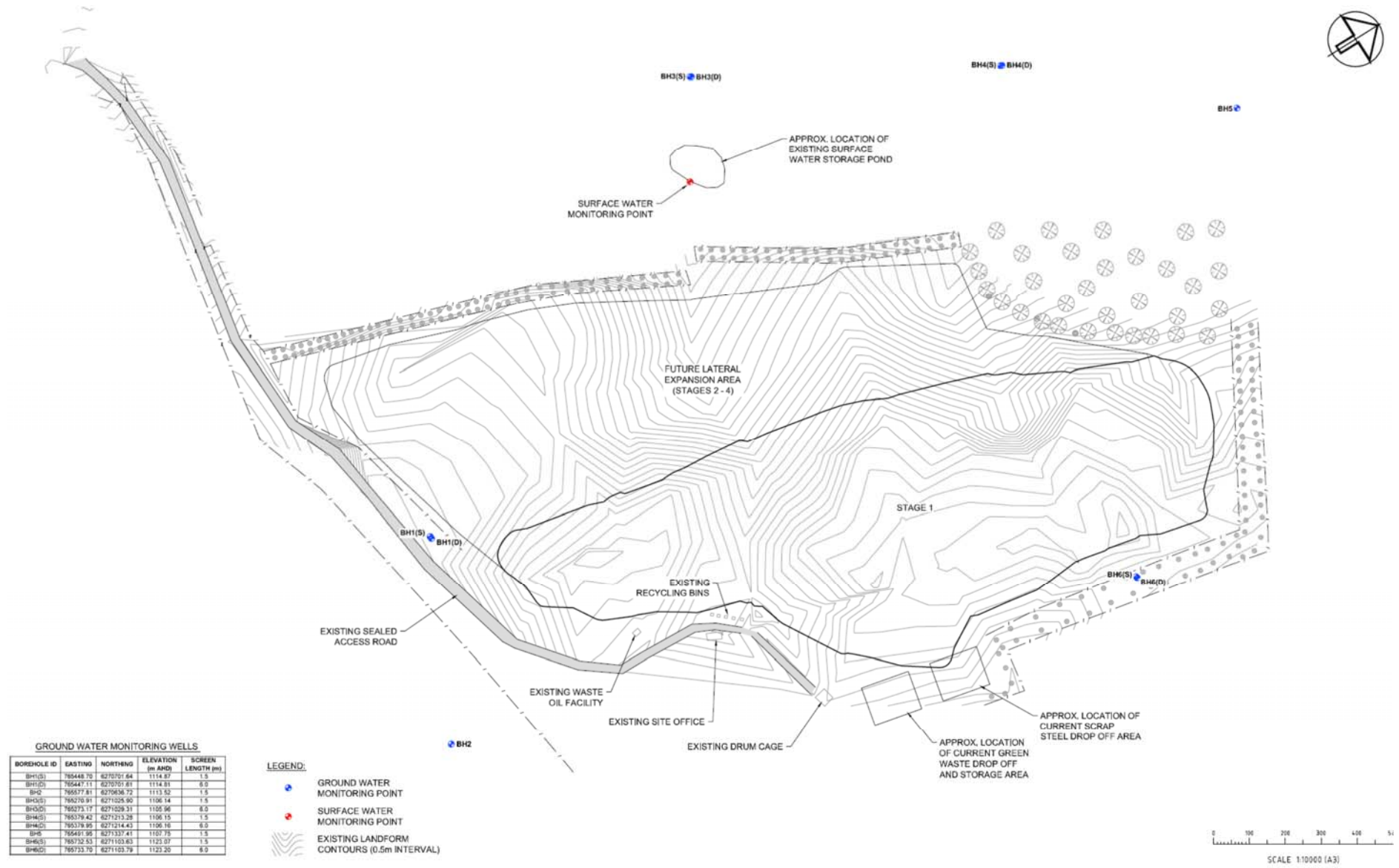
2.2 SURFACE WATER

Surface water monitoring is conducted at EPL Point 1, identified as SW1. The monitoring point is illustrated in **Drawing 05C_EV02**. In accordance with EPL 20289, this point is required to be sampled monthly during discharge. A rising stage sampler is installed to assist with event sample collection.

Table 2.2 identifies the list of surface water parameters and their analysis frequency during the reporting period.

Table 2.2 – Surface Water Monitoring Parameters and Frequency

Discharge Parameter	September 2016	October 2016	November 2016
Conductivity	✓	✓	✓
Oil & Grease	✓	✓	✓
pH	✓	✓	✓
Total Suspended Solids	✓	✓	✓


Drawing 05C_EV02 – Oberon Landfill Monitoring Points

2.3 GROUNDWATER

The groundwater monitoring network was designed by CMJA (2012) and comprises six shallow (screened 3.5 – 5.0 m) and four deep (screened 24 – 30 m) monitoring wells. **Drawing 05C_EV02** shows the configuration of the groundwater monitoring network. The four deep monitoring wells are installed as pairs to the correspondingly numbered shallow wells.

The groundwater monitoring points are identified as BH1S, BH1D, BH2, BH3S, BH3D, BH4S, BH4D, BH5, BH6S and BH6D, corresponding to EPL Points 2 through 11.

Groundwater level measurement and sampling are undertaken on a biannual basis in accordance with EPL 20289. Monitoring commenced in November 2013. The four deep piezometers are sampled annually and the six shallow piezometers are sampled biannually. Samples were unable to be collected in the May 2016 biannual sampling round, and accordingly an additional sampling round was conducted in September 2016 when 3 piezometers yielded sufficient groundwater for sampling.

The November 2016 biannual monitoring round was able to collect samples from eight piezometers, whilst only one sample was able to be collected from the May 2017 monitoring round.

Monitoring for the following analytes was able to be undertaken for sample collected throughout the reporting period:

- Alkalinity
- Aluminium
- Arsenic
- Barium
- Benzene
- Cadmium
- Calcium
- Chloride
- Chromium (total)
- Cobalt
- Conductivity
- Copper
- Ethylbenzene
- Fluoride
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Nitrogen (Ammonia)
- Nitrogen (Nitrate)
- Nitrogen (Nitrite)
- Organochlorine Pesticides
- Organophosphorus Pesticides
- pH
- Phosphorus (total)
- Polycyclic Aromatic Hydrocarbons
- Potassium
- Sodium
- Standing Water Level
- Sulfate
- Toluene
- Total Dissolved Solids
- Total Organic Carbon
- Total Petroleum Hydrocarbons
- Total Phenolics
- Xylene
- Zinc

Environmental Monitoring Results

3.1 INTRODUCTION

Monitoring results are presented in this section for all environmental monitoring undertaken during the reporting period. The laboratory data are presented, along with an interpretation of trends, variability and anomalies for groundwater and surface water. Any deficiencies in monitoring, environmental incidents and remedial actions undertaken to correct any problems or deficiencies are also discussed.

Monitoring data is summarised in the following figures and in the tables of **Appendix A**. All laboratory reports and chain-of-custody documentation are included in **Appendix B**.

3.2 SURFACE WATER

EPL 20289 requires surface water quality monitoring monthly during discharge from the surface water monitoring point SW1 (EPL point 1). The first discharge event in the reporting period was recorded in September 2016. Subsequent discharge events were recorded in October 2016 and November 2016.

Samples are collected by Council contractors via rising stage samplers prior to overland flow and any off-site discharge, receiving further filtration through vegetation. All results are presented in **Appendix A, Table A1**.

3.2.1 QUALITY

Surface water pH concentrations are presented in **Figure 1**.

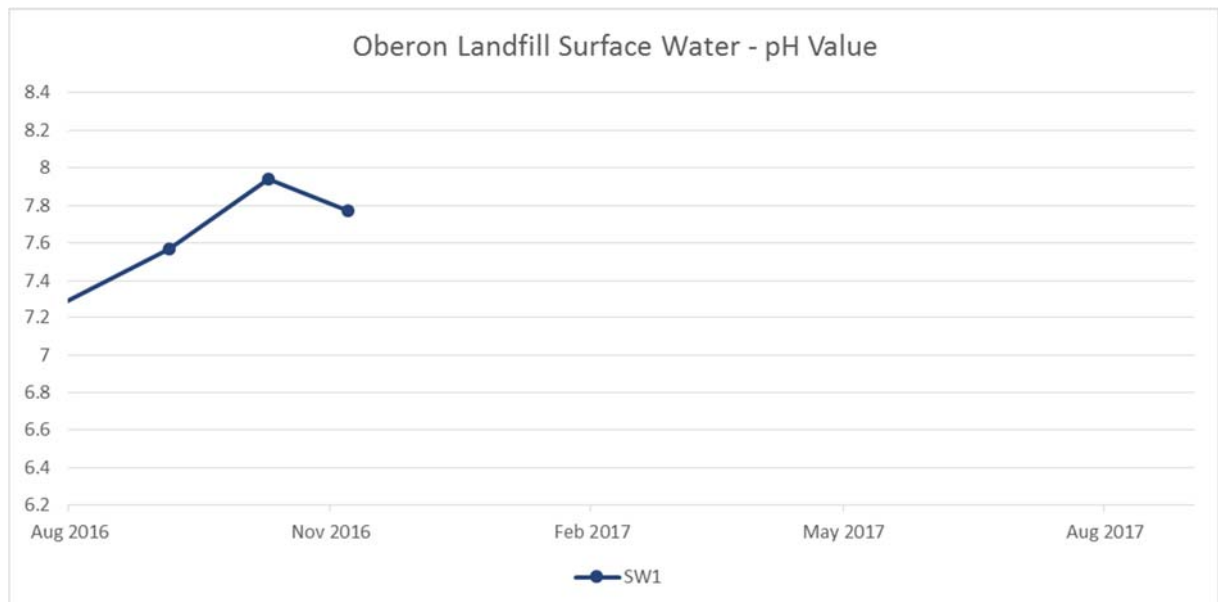


Figure 1: Surface Water pH – OWF, 2016 – 2017

Surface water pH was slightly alkaline during the measurements recorded in the reporting period, with levels ranging from 7.57 in September 2016 to 7.94 in October 2016. All values were within EPL 100 percentile discharge limit range of 6.5 – 8.5.

Surface water electrical conductivity levels are presented in **Figure 2**.

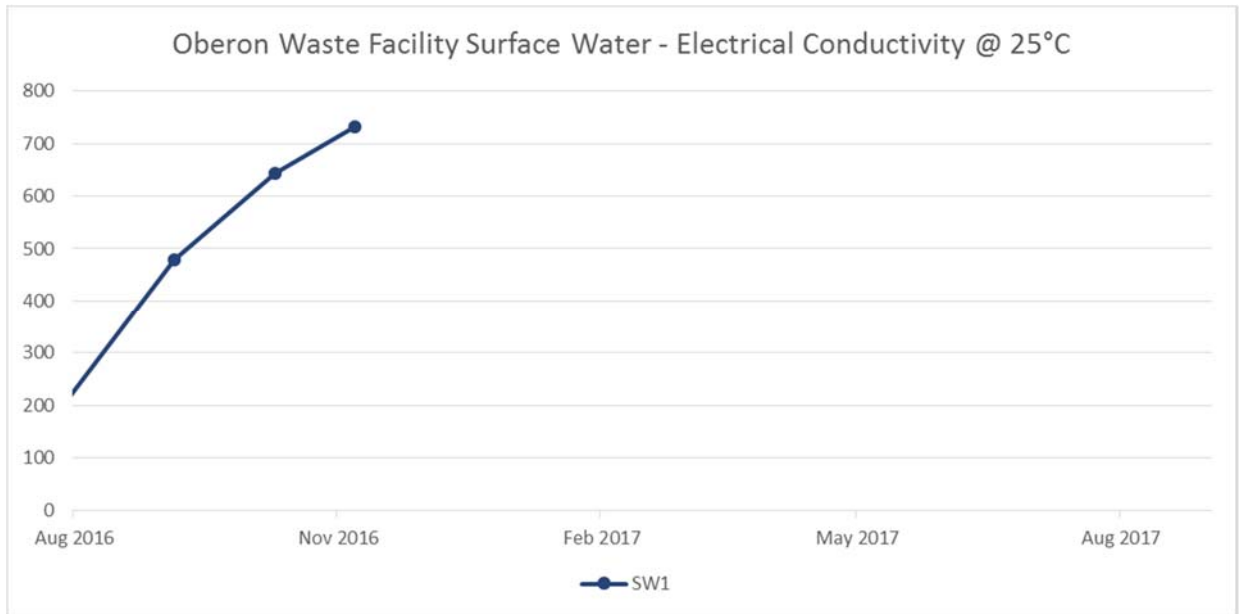


Figure 2: Surface Water EC – OWF, 2016 – 2017

EC levels in the reporting period ranged from 478 µS/cm in September 2016 to 733 µS/cm in November 2016. Corresponding TDS concentrations ranged from 320 mg/L to 491 mg/L, and were considered suitable for consumption by the most susceptible livestock category, poultry (<3000 mg/L, ANZECC & ARMCANZ, 2000).

Surface water total suspended solid (TSS) concentrations are presented in **Figure 3**.

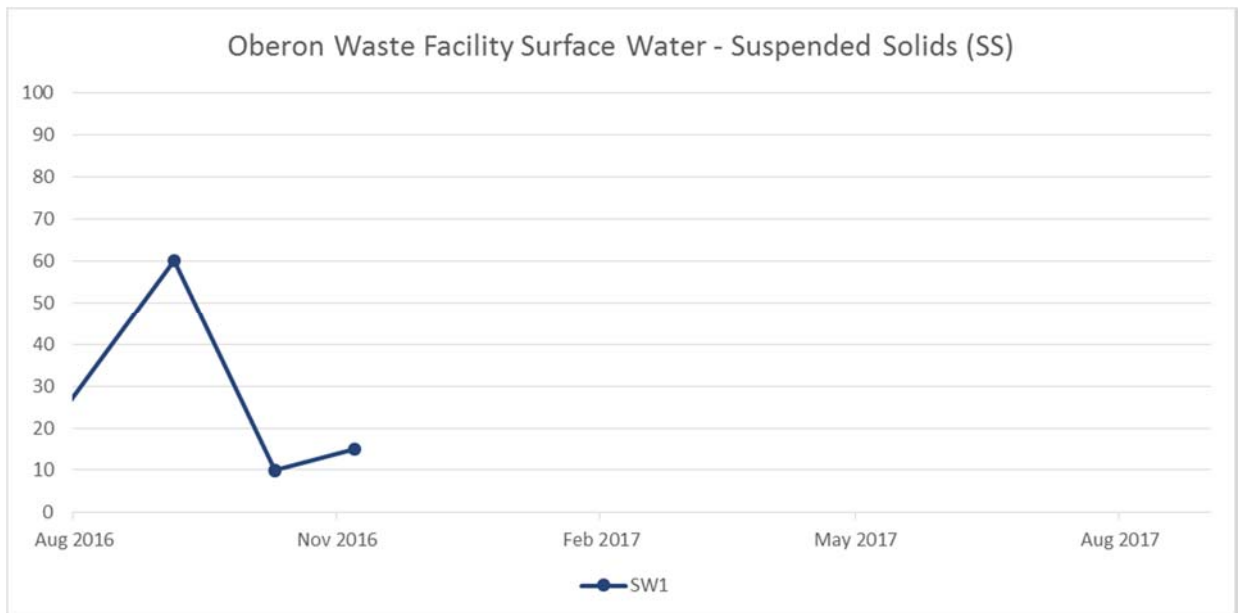


Figure 3: Surface Water TSS – OWF, 2015 – 2016

Total suspended solid results ranged from 10 mg/L in October 2016 to 60 mg/L in September 2016. The EPL 100 percentile limit of 50 mg/L was exceeded in September 2016.

Surface water oil and grease levels are presented in **Figure 4**.

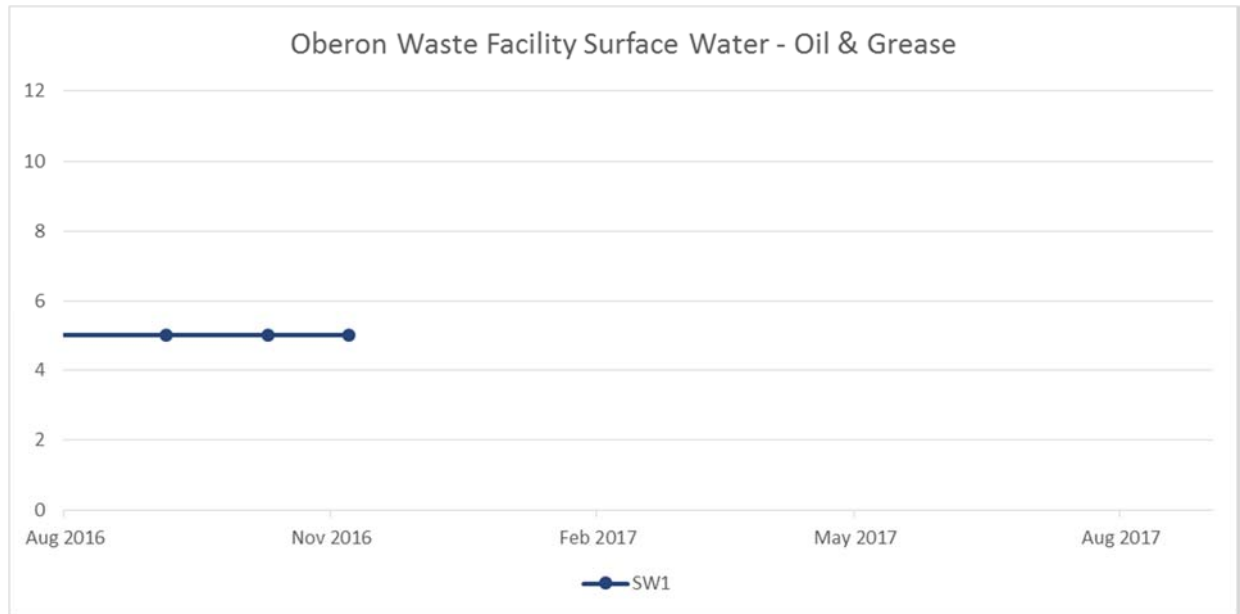


Figure 4: Surface Water Oil & Grease – OWF, 2015 – 2016

Oil and grease was below the laboratory LOR of 5 mg/L in all surface water samples collected in September 2016, October 2016 and November 2016. The EPL 100 percentile discharge limit of 10 mg/L was not exceeded for any sample collected.

3.3 GROUNDWATER

Groundwater monitoring is to consist of biannual water level measurements at all 10 piezometers, with samples being collected twice annually from the shallow piezometers and once annually from the deep piezometers. Samples were unable to be collected in the May 2016 biannual sampling round (prior to the reporting period), and accordingly an additional sampling round was conducted in September 2016 when 3 piezometers yielded sufficient groundwater for sampling.

The November 2016 biannual monitoring round was able to collect samples from eight piezometers, whilst only one sample was able to be collected from the May 2017 monitoring round

3.3.1 GROUNDWATER LEVELS

Groundwater level measurements are presented for all monitoring stations in **Appendix A, Table A2** and are illustrated below in **Figure 5**.

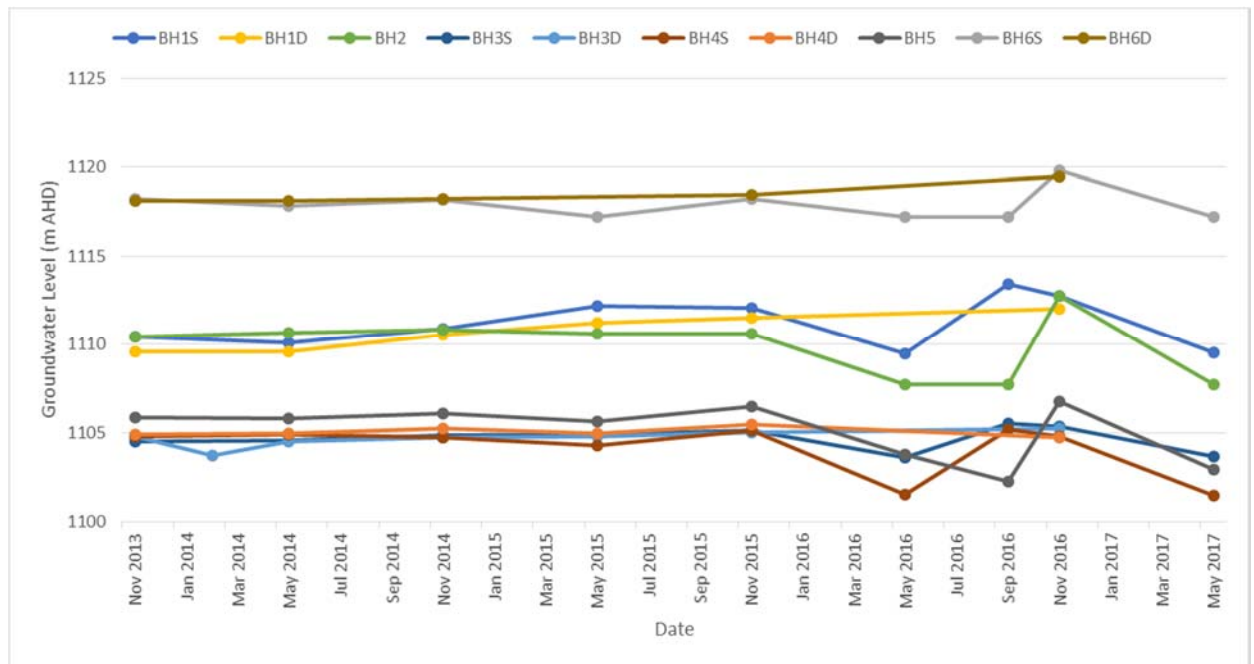


Figure 5: Groundwater Levels – OWF, 2016 – 2017

Comparative reduced groundwater levels indicated that the eastern piezometer pair at BH6 are the most up-gradient monitoring points and the western pair at BH4 are the most down-gradient. The range across the site in November 2016 was observed to be 15.14 m and the range across the site in May 2017 was observed to be 15.78 m. The largest variation recorded between the 2 monitoring rounds in the reporting period (i.e. from November 2016 to May 2017) was a decrease of 5.06 m at BH2, noting that no water was present in piezometers BH1D, BH3D, BH4D and BH6D in May 2017.

It is noted that monitoring piezometer BH3D (EPL Point 6) was re-established in January 2014 following an inability to sample in November 2013. The piezometer has not been resurveyed following re-establishment and as such the reduced standing water level may be slightly inaccurate.

3.3.2 GROUNDWATER QUALITY

Analytical results for each groundwater monitoring station sampled in the reporting period are presented in **Appendix A, Table A3**.

Physical Parameters

Laboratory measured pH ranged from 6.36 pH units at BH1D (November 2016) to 7.70 pH units at BH5 (November 2016). The pH values of groundwater were considered suitable for livestock drinking water; within the guideline range of 6.5 to 8.5 pH units (Markwick, 2007).

Electrical conductivity ranged from 113 $\mu\text{S}/\text{cm}$ at BH1S (September 2016) to 1,280 $\mu\text{S}/\text{cm}$ at BH5 (November 2016).

Total dissolved solids were found to range from 73 mg/L at BH1S (November 2016) to 832 mg/L at BH5 (November 2016), and within previously recorded ranges. All values were considered suitable for consumption by the most susceptible livestock category, poultry (<3000 mg/L, ANZECC & ARMCANZ, 2000).

Total alkalinity concentrations ranged from 27 mgCaCO₃/L at BH1D (November 2016) to 564 mgCaCO₃/L at BH6S (November 2016). All values were consistent with historical results, however alkalinity recorded at BH4S (September 2016), BH5 (November 2016) and BH6S (November 2016) exceeded the guideline hardness value for potential fouling of waters (350 mg/L, ANZECC & ARMCANZ, 2000).

Chemical Properties

Exchangeable Ions

Chloride concentrations ranged from 4 mg/L at BH4D (November 2016) to 154 mg/L at BH4S (September 2016). All concentrations were significantly lower than the guideline value for irrigation to moderately tolerant crops (700 mg/L, ANZECC & ARMCANZ, 2000).

Sulfate concentrations ranged from 2 mg/L at BH6S (November 2016), to 152 mg/L at BH5 (November 2016). All concentrations were significantly lower than the 1000 mg/L guideline value for livestock drinking water (ANZECC & ARMCANZ, 2000).

Fluoride concentrations ranged from below the laboratory limit of reporting of 0.1 mg/L at BH1S (September 2016) to 1.5 mg/L at BH5. These values are lower than the livestock drinking water guideline value (2.0 mg/L, ANZECC & ARMCANZ, 2000).

Calcium concentrations ranged from 1 mg/L at BH2 (November 2016) to 13 mg/L at BH5 (November 2016). All concentrations were significantly lower than the livestock drinking water guideline value of 1000 mg/L (ANZECC & ARMCANZ, 2000).

Magnesium concentrations ranged from below the laboratory LOR of 1 mg/L at BH1S (September 2016) to 74 mg/L at BH5 (November 2016).

Potassium concentrations ranged from below the laboratory LOR of <1 mg/L at BH1S, BH2, BH3S, BH5, ad BH6S, to 3 mg/L at BH1D (November 2016).

Sodium concentrations were recorded to be highest at BH6S at 178 mg/L (November 2016), whilst BH1D recoded the lowest sodium concentration in groundwater at 10 mg/L (November 2016). These values are below the guideline for irrigation of moderately tolerant crops (460 mg/L, ANZECC & ARMCANZ, 2000), and the conservative aesthetic guideline for human drinking water (180 mg/L, NHMRC & NRMMC, 2011).

Nutrients

Ammonia was low across the facility, ranging from below the LOR of 0.01 mg/L at BH1D, BH1S, BH2, BH3D, BH5, BH6S and BH6D, to 0.09 mgN/L at BH3S (May 2017). All values were below the conservative aesthetic guideline for ammonia in human drinking water (0.41 mgN/L, NHMRC & NRMMC, 2011).

Nitrite was recorded at or below the laboratory LOR (<0.01 mg/L) in all groundwater samples. Results were significantly lower than the livestock drinking water guideline value of 9.12 mgN/L (ANZECC & ARMCANZ, 2000).

Nitrate was lowest at BH6D, below the laboratory LOR of 0.01 mgN/L (November 2016) and most elevated at BH2 at 16.6 mgN/L (November 2016). These results are lower than the livestock drinking water guideline value for nitrate (90.29 mg/L, ANZECC & ARMCANZ, 2000).

Reactive phosphorus was only detected above the LOR at BH2 and BH3D (0.04 and 0.08 mg/L, respectively) in November 2016. Total phosphorus was recorded up to 3.22 mg/L at BH3S (September 2016). While all values were below the upper limit of the short-term crop irrigation range, only groundwater sampled from BH1D and BH5 was considered suitable for long-term irrigation (ANZECC & ARMCANZ, 2000).

Organics

Total organic carbon in groundwater was recorded to range from below the laboratory LOR of 1 mg/L at BH4D (November 2016), to 7 mg/L at BH4S (September 2016).

Total phenolics were not detected in any groundwater sample collected during the reporting period (<0.014 mg/L).

Organochlorine and organophosphorus pesticides were not detected in any annual sample (<0.010 mg/L and <0.014 mg/L respectively).

Polychlorinated biphenyls (PCBs) were not detected in any annual sample (<0.001 mg/L).

Polynuclear aromatic hydrocarbons (PAHs) were not detected in any annual sample (<0.0005 mg/L).

Total petroleum (TPH) and total recoverable hydrocarbons (TRH) were not detected in any annual sample (<0.2 mg/L).

Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN) were not detected in any annual sample (BTEX <0.001 mg/L and naphthalene <0.005 mg/L).

Metals

Manganese concentrations ranged from 0.001 mg/L at BH3D (November 2016) to 1.34 mg/L at BH3S (November 2016). Samples collected from monitoring stations BH3S, BH4D, BH6S and BH6D exceeded the long-term (<100 years) crop irrigation guideline value of 0.2 mg/L. All concentrations were below the short-term (<20 years) guideline value of 10 mg/L (ANZECC & ARMCANZ, 2000).

Iron was observed to range from below the LOR of 0.05 mg/L at multiple piezometers to 7.99 mg/L at BH6S (November 2016). While all values were below the short-term irrigation guideline value of 10 mg/L, groundwater at piezometers BH1D, BH2, BH3D and BH5 were considered suitable for long-term irrigation (ANZECC & ARMCANZ, 2000) based on iron concentrations being below 0.3 mg/L.

Mercury was below the LOR (<0.0001mg/L) in all groundwater samples and below relevant guideline values.

Aluminium was observed to range from below the LOR of 0.01 mg/L at multiple piezometers to 4.2 mg/L at BH3S (November 2016). All concentrations were below the long-term crop irrigation value and livestock drinking water guideline value (5 mg/L, ANZECC & ARMCANZ, 2000).

Arsenic concentrations ranged from below the LOR of 0.001 mg/L at multiple piezometers, to 0.012 mg/L at BH4D (November 2016). No exceedances of the long-term crop irrigation and livestock drinking water guidelines (respectively 0.2 mg/L and 0.5 mg/L, ANZECC & ARMCANZ, 2000) were recorded for arsenic in groundwater.

Barium concentrations in groundwater ranged from 0.011 mg/L at BH6D (November 2016) to 0.589 mg/L at BH3S (November 2016). This was lower than the conservative health guideline for human drinking water (2 mg/L, NHMRC & NRMMC, 2011).

Cadmium was only detected above the laboratory LOR in groundwater at BH2 at a of 0.0001 mg/L (November 2016),, which was below the conservative human health drinking water guideline (0.002 mg/L, NHMRC & NRMMC, 2011) and the long-term crop irrigation and livestock drinking water guidelines (0.01 mg/L, ANZECC & ARMCANZ, 2000).

Chromium was only detected above the laboratory LOR in groundwater at BH3S at a concentration of 0.006 mg/L (November 2016) and was below the conservative human health drinking water guideline (0.05 mg/L, NHMRC & NRMMC, 2011) and the long-term crop irrigation and livestock drinking water guidelines (respectively 0.1 mg/L and 1 mg/L, ANZECC & ARMCANZ, 2000).

Copper in groundwater was detected up to 0.121 mg/L at BH3S (November 2016), which was below the conservative human health drinking water guideline (2 mg/L, NHMRC & NRMMC, 2011), however exceeded and the long-term crop irrigation and livestock drinking water guidelines (respectively 0.2 mg/L and 0.4 mg/L, ANZECC & ARMCANZ, 2000).

Cobalt ranged from below the LOR of 0.001 mg/L at BH3D, BH4D and BH5, to 0.093 mg/L at BH3S (November 2016). All recorded concentrations of cobalt in groundwater were below the long-term crop irrigation and livestock drinking water guidelines (respectively 0.5 mg/L and 1 mg/L, ANZECC & ARMCANZ, 2000) with the exception of BH3S.

Nickel in groundwater was detected up to a concentration of 0.013 mg/L at BH2 (November 2016). This value was below the conservative human health drinking water guideline (0.02 mg/L, NHMRC & NRMMC, 2011) and the long-term crop irrigation and livestock drinking water guidelines (respectively 0.2 mg/L and 1 mg/L, ANZECC & ARMCANZ, 2000).

Lead was not detected in groundwater at all piezometers with the exception of BH3S where a concentration of 0.024 mg/L was recorded (November 2016). All recorded concentrations of lead in groundwater were below the long-term crop irrigation and livestock drinking water guidelines (respectively 2 mg/L and 0.1 mg/L, ANZECC & ARMCANZ, 2000) and (with the exception of BH3S) below the conservative human health drinking water guideline (0.01 mg/L, NHMRC & NRMMC, 2011).

Zinc concentrations in groundwater ranged from below the laboratory LOR of 0.005 mg/L at BH5, BH6D and BH6S, to 0.066 mg/L at BH3S. All recorded zinc concentrations in groundwater were below the conservative human health aesthetic guideline (3 mg/L, NHMRC & NRMMC, 2011) and the long-term crop irrigation and livestock drinking water guidelines (respectively 2 mg/L and 20 mg/L, ANZECC & ARMCANZ, 2000).

3.4 LANDFILL GAS

Monitoring of accumulated building gas was conducted monthly throughout the reporting period. No gas in buildings was detected in any monitoring event.

Other Monitoring Data

4.1 PUBLIC CONCERNS AND COMPLAINTS

There were no environmental, operational or pollution complaints received for the Oberon Waste Facility during the annual reporting period.

4.2 SOLID WASTE QUANTITIES

The Oberon Waste Facility is licensed to receive general solid waste (non-putrescible and putrescible), waste tyres, and asbestos waste. The total quantity of waste received into the landfill for the reporting period was 12,271.80 tonnes. This quantity marginally exceeds the limits set under Licence Condition L3.1, which states that the total amount of general solid waste (putrescible and non-putrescible), asbestos and waste tyres disposed of at the premises must not exceed 10,000 tonnes per annum.

4.3 EFFECTIVE COMPACTION

The licence for Oberon Waste Facility requires a minimum waste compaction of 0.65 t/m³ (EPL Condition O6.9), and is calculated by dividing the tonnage received by the volume utilised. As a volumetric survey of the facility at the end of the reporting period was not completed, the average waste compaction for the landfill in the reporting period was unable to be calculated.

All exposed landfilled waste is generally covered daily to a minimum depth of 150 mm and compacted at the end of each day prior to ceasing operations. Compaction is achieved using a 28 tonne bulldozer and/or a 25 tonne excavator, and is anticipated to be greater than the EPL requirement of 0.65 t/m³.

Summary

This section provides a summary of the monitoring results presented in **Section 3** and **Section 4**.

5.1 MONITORING

5.1.1 SURFACE WATER

Discharge samples from SW1 as required by to be collected by EPL occurred in September, October and November 2016.

Total suspended solids in samples collected in September 2016 exceeded the EPL 100 percentile discharge limit (licence condition L2.4) of 50 mg/L.

EC and pH were generally consistent throughout the reporting period.

Oil and grease was consistently below the laboratory LOR. No exceedances of the oil and grease EPL 100 percentile discharge limit were recorded in the reporting period.

5.1.2 GROUNDWATER

Comparative reduced groundwater levels indicated that the eastern piezometer pair at BH6 are the most up-gradient monitoring points and the western pair at BH4 are the most down-gradient. The range across the site in November 2016 was observed to be 15.14 m and the range across the site in May 2017 was observed to be 15.78 m. The largest variation recorded between the 2 monitoring rounds in the reporting period (i.e. from November 2016 to May 2017) was a decrease of 5.06 m at BH2, noting that no water was present in piezometers BH1D, BH3D, BH4D and BH6D in May 2017.

It was noted that monitoring piezometer BH3D (EPL Point 6) was re-established in January 2014 following an inability to sample in November 2013. The piezometer has not been resurveyed following re-establishment and as such the reduced standing water level may be slightly inaccurate.

All piezometers with the exception of BH3S provided insufficient recharge following purging in May 2017, resulting in samples being unable to be obtained from these locations.

Organic contaminants, including PCBs, pesticides, phenolics, PAHs and petroleum hydrocarbons, were not detected in any groundwater sample. No significant changes were observed between the monitoring rounds.

5.1.3 LANDFILL GAS

Monitoring of accumulated building gas was conducted monthly throughout the reporting period. No gas in buildings was detected in in any monitoring event.

5.1.4 COMPLAINTS

There were no environmental, operational or pollution complaints received for the Oberon Waste Facility during the annual reporting period.

5.2 SOLID WASTE QUANTITIES

The total quantity of waste received into the landfill for the reporting period was 12,271.80 tonnes. This quantity is marginally above the limit set under Licence Condition L3.1.

5.3 WASTE COMPACTION

The average waste compaction for the landfill in the reporting period was unable to be calculated.

All exposed landfilled waste is generally covered daily to a minimum depth of 150 mm and compacted at the end of each day prior to ceasing operations. Compaction is achieved using a 28 tonne bulldozer and/or a 25 tonne excavator, and is anticipated to be greater than the EPL requirement of 0.65 t/m³.

Conclusion and Recommendations

6.1 CONCLUSION

The results of the groundwater sampling indicated relatively consistent groundwater conditions at the Oberon Waste Facility, indicating little to no evidence of adverse impact arising from the landfill.

Surface water sampling indicated a single exceedance of the EPL discharge limit for suspended solids. Oil and grease was not recorded above the laboratory LOR in any surface water sample.

The waste quantity landfilled was marginally above the EPL limit, and the average compaction rate was unable to be calculated.

6.2 RECOMMENDATIONS

It is recommended that environmental monitoring be continued at the Oberon Waste Facility in accordance with existing monitoring requirements of EPL 20289 and the Oberon Waste Facility LEMP.

References

Australia and New Zealand Environment and Conservation Council and the Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ) 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Markwick, G 2007, '*Water requirements for sheep and cattle*', Primefact 326, New South Wales Department of Primary Industries, Australia.

National Health and Medical Research Council and the Natural Resource Management Ministerial Council (NHMRC & NRMMC) 2011, *National Water Quality Management Strategy: Australian Drinking Water Guidelines*, updated 2015.

Oberon Shire Council 2013, *Landfill Environmental Management Plan – Oberon Waste Facility*, Australia.

Appendix A

MONITORING DATA

TABLE A1: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS

SURFACE WATER



	Sample ID	Sample Date			SW1	SW1	SW1
		SW1	SW1	SW1	5/09/2016	10/10/2016	7/11/2016
Group	Analyte	LOR	Units	PS	PS	PS	
Physical Parameters	pH	-	pH Unit	7.57	7.94	7.77	
	Electrical Conductivity	1	µS/cm	478	643	733	
	Total Dissolved Solids (Calc.)	1	mg/L	311	-	-	
	Total Suspended Solids	5	mg/L	60	10	15	
Gross Pollutants	Oil & Grease	5	mg/L	< 5	< 5	< 5	

mg/L milligrams per litre
 µg/L micrograms per litre
 LOR limit of reporting
 PS primary sample

TABLE A2 - EPL 20289 OBERON WASTE FACILITY- GROUNDWATER GAUGING RESULTS

Definitions:

- Stickup: Height of piezometer pipe above ground surface.
- Ground Elev: Actual elevation of ground at the piezometer relative to an arbitrary datum. All ground elevations are measured to the same datum, hence Piezo GWLs are relative to each other.
- GWL: Actual elevation of groundwater at the piezometer relative to an arbitrary datum.
- Measured: Depth of groundwater measured from the top of the piezometer pipe.
- WLNMM: *Water Level Not Measured*

Date	BH1S		BH1D		BH2		BH3S		BH3D		BH4S		BH4D		BH5		BH6S		BH6D	
	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)
19-Nov-13	4.41	1110.46	5.20	1109.61	3.06	1110.46	1.63	1104.51	1.18	1104.78	1.40	1104.75	1.27	1104.89	1.89	1105.86	4.83	1118.24	5.06	1118.14
25-Feb-14	-		-		-		-		2.28	1103.68	-		-		-					
12-May-14	4.80	1110.07	5.20	1109.61	2.85	1110.67	1.58	1104.56	1.48	1104.48	1.26	1104.89	1.23	1104.93	1.97	1105.78	5.20	1117.87	5.07	1118.13
5-Nov-14	3.99	1110.88	4.28	1110.53	2.72	1110.80	1.31	1104.83	1.24	1104.72	1.43	1104.72	0.92	1105.24	1.66	1106.09	4.90	1118.17	4.94	1118.26
6-May-15	2.67	1112.20	3.58	1111.23	2.90	1110.62	1.27	1104.87	1.18	1104.78	1.91	1104.24	1.21	1104.95	2.11	1105.64	5.87	1117.20	WLNMM	
23-Nov-15	2.82	1112.05	3.33	1111.48	2.90	1110.62	1.04	1105.10	0.94	1105.02	1.05	1105.10	0.70	1105.46	1.30	1106.45	4.83	1118.24	4.73	1118.47
19-May-16	5.42	1109.45	WLNMM		5.80	1107.72	2.55	1103.59	WLNMM		4.65	1101.50	WLNMM		3.97	1103.78	5.87	1117.20	WLNMM	
5-Sep-16	1.46	1113.41	WLNMM		5.80	1107.72	0.61	1105.53	WLNMM		0.97	1105.18	WLNMM		5.50	1102.25	5.87	1117.20	WLNMM	
7-Nov-16	2.14	1112.73	2.80	1112.01	0.74	1112.78	0.82	1105.32	0.76	1105.20	1.35	1104.80	1.45	1104.71	0.99	1106.76	3.22	1119.85	3.72	1119.48
17-May-17	5.37	1109.50	WLNMM		5.80	1107.72	2.51	1103.63	WLNMM		4.73	1101.42	WLNMM		4.87	1102.88	5.87	1117.20	WLNMM	

TABLE A3: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS

GROUNDWATER



Group	Analyte	LOR	Units	Sample ID											
				Sample Date	BH1D	BH1S	BH2	BH3D	BH3S	BH3S	BH3S	BH4D	BH4S	BH5	BH6D
				7/11/2016	5/09/2016	7/11/2016	7/11/2016	5/09/2016	7/11/2016	13/05/2017	7/11/2016	5/09/2016	7/11/2016	7/11/2016	7/11/2016
Physical Parameters	pH	-	pH Unit	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS
	Electrical Conductivity	1	µS/cm	6.36	6.38	6.41	6.58	6.63	6.73	7.1	7.12	7.04	7.7	7.1	7.46
	Total Dissolved Solids (Calc.)	1	mg/L	120	113	440	179	415	359	525	229	1160	1280	221	1140
	Sodium Adsorption Ratio	0.01	-	78	73	286	116	270	233	341	149	754	832	144	741
Alkalinity	Bicarbonate Alkalinity as CaCO3	1	mg/L	0.84	3.34	0.57	0.72	2.98	2.58	4.96	0.56	5.12	3.77	0.47	5.12
	Carbonate Alkalinity (as CaCO3)	1	mg/L	27	29	53	63	141	121	187	101	366	453	82	564
	Hydroxide Alkalinity as CaCO3	1	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total Hardness as CaCO3	1	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total Alkalinity as CaCO3	1	mg/L	26	7	151	62	72	71	71	88	185	337	84	228
Anions	Chloride	1	mg/L	27	29	53	63	141	121	187	101	366	453	82	564
	Fluoride	0.1	mg/L	11	6	55	11	40	32	41	4	154	33	16	35
	Sulfate (SO4)	1	mg/L	0.1	<0.1	0.2	0.3	0.6	0.6	0.7	0.3	0.7	1.5	0.1	0.6
Cations	Calcium (Ca)	1	mg/L	9	12	<1	6	8	7	9	4	12	152	4	2
	Magnesium (Mg)	1	mg/L	4	3	1	5	4	2	2	12	8	13	4	9
	Potassium (K)	1	mg/L	4	<1	36	12	15	16	16	14	40	74	18	50
	Sodium (Na)	1	mg/L	3	<1	<1	2	<1	<1	<1	1	1	<1	2	<1
Forms of Carbon	Total Organic Carbon	1	mg/L	10	21	16	13	58	50	96	12	160	159	10	178
Ionic Balance	Ionic Balance	0.01	%	4	2	2	1	2	2	2	<1	7	2	1	5
	Total Anions	0.01	meq/L	-	-	0.62	-	1.97	1.78	4.8	-	5.49	1.9	-	0.04
	Total Cations	0.01	meq/L	1.04	1.06	3.71	1.85	3.96	3.59	5.59	2.3	10.7	13.6	2.17	12.3
Nutrients	Ammonia (NH3) as N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.06	0.04	0.09	0.01	0.06	<0.01	<0.01	<0.01
	Nitrate & Nitrite (as N)	0.01	mg/L	0.12	1.43	16.6	0.12	0.08	0.03	0.04	0.02	0.06	3.91	<0.01	0.03
	Nitrate (NO3) as N	0.01	mg/L	0.12	1.43	16.6	0.12	0.08	0.03	0.04	0.02	0.06	3.91	<0.01	0.03
	Nitrite (NO2) as N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Reactive Phosphorus as PO4	0.01	mg/L	0.01	<0.01	0.04	0.08	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen	0.1	mg/L	0.2	0.6	<0.1	<0.1	4.2	3.3	3.7	<0.1	2.2	0.6	0.1	0.3
	Total Nitrogen	0.1	mg/L	0.3	2	16.6	0.1	4.3	3.3	3.7	<0.1	2.3	4.5	0.1	0.3
	Total Phosphorus	0.01	mg/L	0.02	0.22	0.13	0.09	3.22	2.38	2.55	0.27	0.48	0.02	0.41	0.06
Trace Metals	Aluminium (Al)	0.01	mg/L	<0.01	-	<0.01	0.01	-	4.2	-	<0.01	-	0.04	<0.01	<0.01
	Arsenic (As)	0.001	mg/L	<0.001	-	<0.001	<0.001	-	0.009	-	0.012	-	<0.001	0.01	0.005
	Barium (Ba)	0.001	mg/L	0.14	-	0.33	0.052	-	0.589	-	0.018	-	0.033	0.011	0.444
	Cadmium (Cd)	0.0001	mg/L	<0.0001	-	0.0001	<0.0001	-	0.0002	-	<0.0001	-	<0.0001	<0.0001	<0.0001
	Chromium (Cr)	0.001	mg/L	<0.001	-	<0.001	<0.001	-	0.006	-	<0.001	-	<0.001	<0.001	<0.001
	Cobalt (Co)	0.001	mg/L	0.001	-	0.001	<0.001	-	0.093	-	<0.001	-	<0.001	0.001	0.004
	Copper (Cu)	0.001	mg/L	0.002	-	<0.001	<0.001	-	0.121	-	<0.001	-	<0.001	<0.001	<0.001
	Iron (Fe)	0.05	mg/L	<0.05	-	<0.05	<0.05	-	3.75	-	3.02	-	<0.05	2.97	7.99
	Lead (Pb)	0.001	mg/L	<0.001	-	<0.001	<0.001	-	0.024	-	<0.001	-	<0.001	<0.001	<0.001
	Manganese (Mn)	0.001	mg/L	0.022	-	0.041	0.001	-	1.34	-	0.547	-	0.01	0.722	0.595
	Mercury (Hg)	0.0001	mg/L	<0.0001	-	<0.0001	<0.0001	-	<0.0001	-	<0.0001	-	<0.0001	<0.0001	<0.0001
	Nickel (Ni)	0.001	mg/L	0.005	-	0.013	0.002	-	0.009	-	0.002	-	<0.001	<0.001	<0.001
	Zinc (Zn)	0.005	mg/L	0.026	-	0.011	0.006	-	0.066	-	0.009	-	<0.005	<0.005	<0.005

TABLE A3: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS

GROUNDWATER



Group	Analyte	LOR	Units	Sample ID											
				Sample Date	BH1D	BH1S	BH2	BH3D	BH3S	BH3S	BH3S	BH4D	BH4S	BH5	BH6D
				7/11/2016	5/09/2016	7/11/2016	7/11/2016	5/09/2016	7/11/2016	13/05/2017	7/11/2016	5/09/2016	7/11/2016	7/11/2016	7/11/2016
OC Pesticides	Aldrin	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Alpha BHC	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Alpha Chlordane	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Alpha Endosulfan	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Beta BHC	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Beta Endosulfan	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Delta BHC	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Dieldrin	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Endosulfan sulphate	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Endrin	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Endrin aldehyde	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Endrin ketone	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Heptachlor	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Heptachlor epoxide	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Hexachlorobenzene (HCB)	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Lindane (gamma BHC)	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Methoxychlor	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	p,p'-DDD	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	p,p'-DDE	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	p,p'-DDT	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	Sum of Aldrin + Dieldrin	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Sum of DDD + DDE + DDT	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Total Chlordane (sum)	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	trans-Chlordane	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
OP Pesticides	Azinphos Methyl	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Bromophos-ethyl	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Carbophenothion	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Chlorfenvinphos	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Chlorpyrifos	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Chlorpyrifos-methyl	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Demeton-S-methyl	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Diazinon	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Dichlorvos	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Dimethoate	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Ethion	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Fenamiphos	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Fenthion	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Malathion	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Monocrotophos	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	Parathion	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	Parathion-methyl	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	Pirimphos-ethyl	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
	Prothiofos	0.5	µg/L	< 0.5	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
Phenolics	2,4,5-Trichlorophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2,4,6-Trichlorophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2,4-Dichlorophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2,4-Dimethylphenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2,6-Dichlorophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2-Chlorophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2-Methylphenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	2-Nitrophenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	3- & 4-Methylphenol	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	4-Chloro-3-methylphenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
	Pentachlorophenol	2	µg/L	< 2	-	< 2	< 2	-	< 2	-	< 2	-	< 2	< 2	< 2
	Phenol	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1
Polychlorinated biphenyls	Total Polychlorinated biphenyls	1	µg/L	< 1	-	< 1	< 1	-	< 1	-	< 1	-	< 1	< 1	< 1

TABLE A3: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS

GROUNDWATER



Group	Analyte	LOR	Units	Sample ID												
				Sample Date	BH1D	BH1S	BH2	BH3D	BH3S	BH3S	BH3S	BH4D	BH4S	BH5	BH6D	BH6S
				7/11/2016	5/09/2016	7/11/2016	7/11/2016	5/09/2016	7/11/2016	13/05/2017	7/11/2016	5/09/2016	7/11/2016	7/11/2016	7/11/2016	
				PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	
Polynuclear Aromatic Hydrocarbons	Acenaphthene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Acenaphthylene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Anthracene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Benzo(a)anthracene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Benzo(a)pyrene	0.5	µg/L	<0.5	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	
	Benzo(a)pyrene TEQ (zero)	0.5	µg/L	<0.5	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	
	Benzo(b&j)fluoranthene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Benzo(ghi)perylene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Benzo(k)fluoranthene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Chrysene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Dibenzo(ah)anthracene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Fluoranthene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Fluorene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Indeno(1,2,3-cd)pyrene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Naphthalene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Phenanthrene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Pyrene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
	Sum of polycyclic aromatic hydrocarbons	0.5	µg/L	<0.5	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	
	BTEXN Analytes	Benzene	1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1
		Ethylbenzene	2	µg/L	<2	-	<2	<2	-	<2	-	<2	-	<2	<2	<2
meta- & para-Xylene		2	µg/L	<2	-	<2	<2	-	<2	-	<2	-	<2	<2	<2	
Naphthalene		5	µg/L	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	<5	
ortho-Xylene		2	µg/L	<2	-	<2	<2	-	<2	-	<2	-	<2	<2	<2	
Sum of BTEX		1	µg/L	<1	-	<1	<1	-	<1	-	<1	-	<1	<1	<1	
Toluene		2	µg/L	<2	-	<2	<2	-	<2	-	<2	-	<2	<2	<2	
Total Xylenes		2	µg/L	<2	-	<2	<2	-	<2	-	<2	-	<2	<2	<2	
Total Petroleum Hydrocarbons	C10 - C14 Fraction	50	µg/L	<50	-	<50	<50	-	<50	-	<50	-	<50	<50	<50	
	C10 - C36 Fraction (sum)	50	µg/L	<50	-	<50	<50	-	<50	-	<50	-	<50	<50	<50	
	C15 - C28 Fraction	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	C29 - C36 Fraction	50	µg/L	<50	-	<50	<50	-	<50	-	<50	-	<50	<50	<50	
	C6 - C9 Fraction	20	µg/L	<20	-	<20	<20	-	<20	-	<20	-	<20	<20	<20	
Total Recoverable Hydrocarbons	>C10 - C16 Fraction	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	>C10 - C40 Fraction (sum)	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	>C16 - C34 Fraction	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	>C34 - C40 Fraction	100	µg/L	<100	-	<100	<100	-	<100	-	<100	-	<100	<100	<100	
	C6 - C10 Fraction	20	µg/L	<20	-	<20	<20	-	<20	-	<20	-	<20	<20	<20	
	C6 - C10 Fraction minus BTEX (F1)	20	µg/L	<20	-	<20	<20	-	<20	-	<20	-	<20	<20	<20	

mg/L milligrams per litre
 µg/L micrograms per litre
 LOR limit of reporting
 PS primary sample

Appendix B

LABORATORY REPORTS

CERTIFICATE OF ANALYSIS

Work Order : **ES1619837**
Client : **OBERON COUNCIL**
Contact : BRENDON STUART
Address : 137-139 OBERON STREET
 OBERON NSW,AUSTRALIA 2787
Telephone : +61 02 6393 5000
Project : 213337
Order number : ----
C-O-C number : ----
Sampler : Dean Lavers
Site : ----
Quote number : ----
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 6
Laboratory : Environmental Division Sydney
Contact :
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 07-Sep-2016 09:30
Date Analysis Commenced : 07-Sep-2016
Issue Date : 13-Sep-2016 19:41



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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW



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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EA006: Sodium absorption ratio for sample ES1619837 #004 could not be calculated as Ca and Mg results are below the detection limits.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1s	BH3s	BH4s	W9001	W9003
Client sampling date / time				[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	
Compound	CAS Number	LOR	Unit	ES1619837-001	ES1619837-002	ES1619837-003	ES1619837-004	ES1619837-005	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.38	6.63	7.04	5.72	6.63	
EA006: Sodium Adsorption Ratio (SAR)									
Sodium Adsorption Ratio	----	0.01	-	3.34	2.98	5.12	----	2.85	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	113	415	1160	<1	416	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	73	270	754	<1	270	
Total Dissolved Solids (Calc.)	----	10	mg/L	----	----	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	----	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	7	72	185	<1	76	
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	29	141	366	<1	146	
Total Alkalinity as CaCO3	----	1	mg/L	29	141	366	<1	146	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	12	8	12	<1	8	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	6	40	154	<1	40	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	3	4	8	<1	4	
Magnesium	7439-95-4	1	mg/L	<1	15	40	<1	16	
Sodium	7440-23-5	1	mg/L	21	58	160	<1	57	
Potassium	7440-09-7	1	mg/L	<1	<1	1	<1	<1	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.6	0.7	<0.1	0.6	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.06	0.06	<0.01	0.05	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1s	BH3s	BH4s	W9001	W9003
Client sampling date / time				[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	[05-Sep-2016]	
Compound	CAS Number	LOR	Unit	ES1619837-001	ES1619837-002	ES1619837-003	ES1619837-004	ES1619837-005	
				Result	Result	Result	Result	Result	
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L	1.43	0.08	0.06	0.01	0.06	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	1.43	0.08	0.06	0.01	0.06	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	4.2	2.2	<0.1	4.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.0	4.3	2.3	<0.1	4.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.22	3.22	0.48	<0.01	2.94	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	1.00	4.11	11.9	<0.01	4.21	
Total Cations	----	0.01	meq/L	1.06	3.96	10.7	<0.01	4.00	
Ionic Balance	----	0.01	%	----	1.97	5.49	----	2.68	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	2	7	<1	2	
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L	----	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			SW1	----	----	----	----
Client sampling date / time		[05-Sep-2016]			----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1619837-006	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.57	----	----	----	----	----
EA006: Sodium Adsorption Ratio (SAR)									
Sodium Adsorption Ratio	----	0.01	-	----	----	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	478	----	----	----	----	----
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	----	----	----	----	----	----
Total Dissolved Solids (Calc.)	----	10	mg/L	311	----	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	60	----	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	----	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	----	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	----	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	----	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	----	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	----	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	----	----	----	----
Client sampling date / time				[05-Sep-2016]	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1619837-006	-----	-----	-----	-----	
				Result	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L	----	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
[^] Total Nitrogen as N	----	0.1	mg/L	----	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	----	----	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	----	----	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	----	----	----
Total Cations	----	0.01	meq/L	----	----	----	----	----	----
Ionic Balance	----	0.01	%	----	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	----	----	----	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L	<5	----	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order	: ES1625572	Page	: 1 of 21
Client	: OBERON COUNCIL	Laboratory	: Environmental Division Sydney
Contact	: BRENDON STUART	Contact	: Customer Services ES
Address	: 137-139 OBERON STREET OBERON NSW, AUSTRALIA 2787	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6393 5000	Telephone	: +61-2-8784 8555
Project	: 213337	Date Samples Received	: 10-Nov-2016 16:00
Order number	: ----	Date Analysis Commenced	: 10-Nov-2016
C-O-C number	: ----	Issue Date	: 16-Nov-2016 17:11
Sampler	: Dean Lavers		
Site	: ----		
Quote number	: ----		
No. of samples received	: 11		
No. of samples analysed	: 11		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP080: Positive Benzene of W9001 has been confirmed by re-analysis.
- EA006: Sodium absorption ratio for sample ES1625572 - #009 could not be calculated as Ca and Mg results are below the detection limits.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1d	BH2	BH3s	BH3d	BH4d
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-001	ES1625572-002	ES1625572-003	ES1625572-004	ES1625572-005	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.36	6.41	6.73	6.58	7.12	
EA006: Sodium Adsorption Ratio (SAR)									
Sodium Adsorption Ratio	----	0.01	-	0.84	0.57	2.58	0.72	0.56	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	120	440	359	179	229	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	78	286	233	116	149	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	----	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	26	151	71	62	88	
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	27	53	121	63	101	
Total Alkalinity as CaCO3	----	1	mg/L	27	53	121	63	101	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	<1	7	6	4	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	11	55	32	11	4	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	4	1	2	5	12	
Magnesium	7439-95-4	1	mg/L	4	36	16	12	14	
Sodium	7440-23-5	1	mg/L	10	16	50	13	12	
Potassium	7440-09-7	1	mg/L	3	<1	<1	2	1	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	4.20	0.01	<0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.009	<0.001	0.012	
Barium	7440-39-3	0.001	mg/L	0.140	0.330	0.589	0.052	0.018	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0001	0.0002	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.006	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	0.002	<0.001	0.121	<0.001	<0.001	
Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.093	<0.001	<0.001	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1d	BH2	BH3s	BH3d	BH4d
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-001	ES1625572-002	ES1625572-003	ES1625572-004	ES1625572-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L	0.005	0.013	0.009	0.002	0.002	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.024	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.026	0.011	0.066	0.006	0.009	
Manganese	7439-96-5	0.001	mg/L	0.022	0.041	1.34	0.001	0.547	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	3.75	<0.05	3.02	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.1	0.2	0.6	0.3	0.3	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.04	<0.01	0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.12	16.6	0.03	0.12	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.12	16.6	0.03	0.12	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	<0.1	3.3	<0.1	<0.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.3	16.6	3.3	0.1	<0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.13	2.38	0.09	0.27	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.04	<0.01	0.08	0.01	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	3.75	----	----	----	
Total Anions	----	0.01	meq/L	1.04	----	3.47	1.69	2.21	
Total Cations	----	0.01	meq/L	1.04	3.71	3.59	1.85	2.30	
Ionic Balance	----	0.01	%	----	0.62	----	----	----	
Ionic Balance	----	0.01	%	----	----	1.78	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	4	2	2	1	<1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1d	BH2	BH3s	BH3d	BH4d
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-001	ES1625572-002	ES1625572-003	ES1625572-004	ES1625572-005	
				Result	Result	Result	Result	Result	
EP068B: Organophosphorus Pesticides (OP) - Continued									
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Parathion	56-38-2	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1d	BH2	BH3s	BH3d	BH4d
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-001	ES1625572-002	ES1625572-003	ES1625572-004	ES1625572-005	
				Result	Result	Result	Result	Result	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1d	BH2	BH3s	BH3d	BH4d
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-001	ES1625572-002	ES1625572-003	ES1625572-004	ES1625572-005	
				Result	Result	Result	Result	Result	
EP080: BTEXN - Continued									
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%	115	128	112	115	112	
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%	87.5	103	90.4	90.9	95.5	
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%	81.4	98.0	78.3	88.0	84.7	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%	28.5	27.8	25.2	26.5	25.6	
2-Chlorophenol-D4	93951-73-6	1	%	68.3	70.4	64.4	64.0	63.8	
2,4,6-Tribromophenol	118-79-6	1	%	48.6	57.4	58.8	54.0	47.4	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%	69.7	80.3	68.3	67.2	66.2	
Anthracene-d10	1719-06-8	1	%	82.5	93.1	84.0	83.8	60.5	
4-Terphenyl-d14	1718-51-0	1	%	61.0	71.0	63.0	72.4	60.3	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	115	117	110	112	
Toluene-D8	2037-26-5	2	%	105	104	107	101	104	
4-Bromofluorobenzene	460-00-4	2	%	97.9	101	102	95.7	96.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.70	7.46	7.10	6.21	6.60	
EA006: Sodium Adsorption Ratio (SAR)									
Sodium Adsorption Ratio	----	0.01	-	3.77	5.12	0.47	----	0.66	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	1280	1140	221	<1	181	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	832	741	144	<1	118	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	----	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	337	228	84	<1	62	
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	453	564	82	<1	62	
Total Alkalinity as CaCO3	----	1	mg/L	453	564	82	<1	62	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	152	2	4	<1	6	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	33	35	16	<1	11	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	13	9	4	<1	5	
Magnesium	7439-95-4	1	mg/L	74	50	18	<1	12	
Sodium	7440-23-5	1	mg/L	159	178	10	<1	12	
Potassium	7440-09-7	1	mg/L	<1	<1	2	<1	1	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	<0.01	<0.01	<0.01	0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.005	0.010	<0.001	<0.001	
Barium	7440-39-3	0.001	mg/L	0.033	0.444	0.011	<0.001	0.056	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.004	0.001	<0.001	<0.001	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.004	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	0.012	
Manganese	7439-96-5	0.001	mg/L	0.010	0.595	0.722	<0.001	0.002	
Iron	7439-89-6	0.05	mg/L	<0.05	7.99	2.97	<0.05	<0.05	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	1.5	0.6	0.1	<0.1	0.3	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	3.91	0.03	<0.01	<0.01	0.10	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	3.91	0.03	<0.01	<0.01	0.10	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.3	0.1	<0.1	<0.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.5	0.3	0.1	<0.1	0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.06	0.41	<0.01	0.11	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.07	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	----	----	
Total Anions	----	0.01	meq/L	13.1	12.3	2.17	<0.01	1.67	
Total Cations	----	0.01	meq/L	13.6	12.3	2.17	<0.01	1.78	
Ionic Balance	----	0.01	%	----	----	----	----	----	
Ionic Balance	----	0.01	%	1.90	0.04	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	5	1	<1	1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010	
				Result	Result	Result	Result	Result	
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L	----	----	----	----	----	
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	<1	<1	<1	
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
4,4'-DDT	50-29-3	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010	
				Result	Result	Result	Result	Result	
EP068B: Organophosphorus Pesticides (OP) - Continued									
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Parathion	56-38-2	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time					[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]
Compound	CAS Number	LOR	Unit		ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH5	BH6s	BH6d	W9001	W9003
Client sampling date / time				[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	[07-Nov-2016]	
Compound	CAS Number	LOR	Unit	ES1625572-006	ES1625572-007	ES1625572-008	ES1625572-009	ES1625572-010	
				Result	Result	Result	Result	Result	
EP080: BTEXN - Continued									
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%	107	91.3	113	108	94.7	
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%	88.8	96.9	92.2	92.0	90.4	
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%	81.5	93.6	81.4	79.6	93.3	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%	27.7	26.9	29.8	25.2	23.8	
2-Chlorophenol-D4	93951-73-6	1	%	63.8	65.3	66.8	58.5	54.2	
2,4,6-Tribromophenol	118-79-6	1	%	46.8	60.7	52.1	52.1	58.4	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%	68.3	71.4	65.6	58.2	56.9	
Anthracene-d10	1719-06-8	1	%	81.7	82.6	81.4	77.0	75.2	
4-Terphenyl-d14	1718-51-0	1	%	60.8	63.6	61.3	62.9	83.6	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	123	109	113	115	117	
Toluene-D8	2037-26-5	2	%	108	101	102	105	106	
4-Bromofluorobenzene	460-00-4	2	%	102	93.0	99.6	100	98.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		SW1	----	----	----	----
Client sampling date / time		[07-Nov-2016]		----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1625572-011	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.77	----	----	----	----
EA006: Sodium Adsorption Ratio (SAR)								
Sodium Adsorption Ratio	----	0.01	-	----	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	733	----	----	----	----
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	----	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	15	----	----	----	----
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	----	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	----	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	----	----	----	----
Client sampling date / time				[07-Nov-2016]	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1625572-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	----	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	----	----	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	----	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	----	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	----	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	----	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	----	----	----	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	----	----	
Total Anions	----	0.01	meq/L	----	----	----	----	----	
Total Cations	----	0.01	meq/L	----	----	----	----	----	
Ionic Balance	----	0.01	%	----	----	----	----	----	
Ionic Balance	----	0.01	%	----	----	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	---	---	---	---
Client sampling date / time				[07-Nov-2016]	---	---	---	---	
Compound	CAS Number	LOR	Unit	ES1625572-011	-----	-----	-----	-----	
				Result	---	---	---	---	
EP068B: Organophosphorus Pesticides (OP) - Continued									
Diazinon	333-41-5	0.5	µg/L	---	---	---	---	---	
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	---	---	---	---	---	
Parathion-methyl	298-00-0	2	µg/L	---	---	---	---	---	
Malathion	121-75-5	0.5	µg/L	---	---	---	---	---	
Fenthion	55-38-9	0.5	µg/L	---	---	---	---	---	
Chlorpyrifos	2921-88-2	0.5	µg/L	---	---	---	---	---	
Parathion	56-38-2	2	µg/L	---	---	---	---	---	
Pirimphos-ethyl	23505-41-1	0.5	µg/L	---	---	---	---	---	
Chlorfenvinphos	470-90-6	0.5	µg/L	---	---	---	---	---	
Bromophos-ethyl	4824-78-6	0.5	µg/L	---	---	---	---	---	
Fenamiphos	22224-92-6	0.5	µg/L	---	---	---	---	---	
Prothiofos	34643-46-4	0.5	µg/L	---	---	---	---	---	
Ethion	563-12-2	0.5	µg/L	---	---	---	---	---	
Carbophenothion	786-19-6	0.5	µg/L	---	---	---	---	---	
Azinphos Methyl	86-50-0	0.5	µg/L	---	---	---	---	---	
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L	---	---	---	---	---	
2-Chlorophenol	95-57-8	1	µg/L	---	---	---	---	---	
2-Methylphenol	95-48-7	1	µg/L	---	---	---	---	---	
3- & 4-Methylphenol	1319-77-3	2	µg/L	---	---	---	---	---	
2-Nitrophenol	88-75-5	1	µg/L	---	---	---	---	---	
2,4-Dimethylphenol	105-67-9	1	µg/L	---	---	---	---	---	
2,4-Dichlorophenol	120-83-2	1	µg/L	---	---	---	---	---	
2,6-Dichlorophenol	87-65-0	1	µg/L	---	---	---	---	---	
4-Chloro-3-methylphenol	59-50-7	1	µg/L	---	---	---	---	---	
2,4,6-Trichlorophenol	88-06-2	1	µg/L	---	---	---	---	---	
2,4,5-Trichlorophenol	95-95-4	1	µg/L	---	---	---	---	---	
Pentachlorophenol	87-86-5	2	µg/L	---	---	---	---	---	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L	---	---	---	---	---	
Acenaphthylene	208-96-8	1	µg/L	---	---	---	---	---	
Acenaphthene	83-32-9	1	µg/L	---	---	---	---	---	
Fluorene	86-73-7	1	µg/L	---	---	---	---	---	
Phenanthrene	85-01-8	1	µg/L	---	---	---	---	---	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	----	----	----	----
Client sampling date / time				[07-Nov-2016]	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1625572-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Anthracene	120-12-7	1	µg/L	----	----	----	----	----	
Fluoranthene	206-44-0	1	µg/L	----	----	----	----	----	
Pyrene	129-00-0	1	µg/L	----	----	----	----	----	
Benz(a)anthracene	56-55-3	1	µg/L	----	----	----	----	----	
Chrysene	218-01-9	1	µg/L	----	----	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	----	----	----	----	----	
Benzo(k)fluoranthene	207-08-9	1	µg/L	----	----	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	----	----	----	----	----	
Dibenz(a.h)anthracene	53-70-3	1	µg/L	----	----	----	----	----	
Benzo(g.h.i)perylene	191-24-2	1	µg/L	----	----	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	----	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	----	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	----	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	----	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	----	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	----	----	----	----	----	
Toluene	108-88-3	2	µg/L	----	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	----	----	----	----
Client sampling date / time				[07-Nov-2016]	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1625572-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080: BTEXN - Continued									
^ Total Xylenes	1330-20-7	2	µg/L	----	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	----	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	----	----	----	----	----	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%	----	----	----	----	----	
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%	----	----	----	----	----	
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%	----	----	----	----	----	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%	----	----	----	----	----	
2-Chlorophenol-D4	93951-73-6	1	%	----	----	----	----	----	
2,4,6-Tribromophenol	118-79-6	1	%	----	----	----	----	----	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%	----	----	----	----	----	
Anthracene-d10	1719-06-8	1	%	----	----	----	----	----	
4-Terphenyl-d14	1718-51-0	1	%	----	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	----	
Toluene-D8	2037-26-5	2	%	----	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	129
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

CERTIFICATE OF ANALYSIS

Work Order : **ES1622836**
Client : **OBERON COUNCIL**
Contact : BRENDON STUART
Address : 137-139 OBERON STREET
 OBERON NSW, AUSTRALIA 2787
Telephone : +61 02 6393 5000
Project : 213337
Order number : ----
C-O-C number : ----
Sampler : DEAN LAVERS
Site : ----
Quote number : ----
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact :
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 12-Oct-2016 10:25
Date Analysis Commenced : 12-Oct-2016
Issue Date : 17-Oct-2016 11:13



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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			SW1	----	----	----	----
		Client sampling date / time			10-Oct-2016 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1622836-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.94	----	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	643	----	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	10	----	----	----	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L	<5	----	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : ES1714650 Client : OBERON COUNCIL Contact : BRENDON STUART Address : 137-139 OBERON STREET OBERON NSW,AUSTRALIA 2787 Telephone : +61 02 6393 5000 Project : 213337 Order number : ---- C-O-C number : ---- Sampler : Dean Lavers Site : ---- Quote number : SYBQ/330/15 No. of samples received : 3 No. of samples analysed : 3	Page : 1 of 4 Laboratory : Environmental Division Sydney Contact : Customer Services ES Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 Telephone : +61-2-8784 8555 Date Samples Received : 15-Jun-2017 12:30 Date Analysis Commenced : 15-Jun-2017 Issue Date : 21-Jun-2017 19:51
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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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW



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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

- ED093F: Sodium Adsorption ratio could not be determined as both the Mg and Ca results were less than reportable limits.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)		Client sample ID		BH3s	W9001	W9003	----	----	
Client sampling date / time		13-Jun-2017 09:00		13-Jun-2017 09:00		13-Jun-2017 09:00		----	----
Compound	CAS Number	LOR	Unit	ES1714650-001	ES1714650-002	ES1714650-003	-----	-----	
				Result	Result	Result	----	----	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.10	6.14	7.12	----	----	
EA006: Sodium Adsorption Ratio (SAR)									
Sodium Adsorption Ratio	----	0.01	-	4.96	----	3.54	----	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	525	<1	529	----	----	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	341	<1	344	----	----	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	71	<1	82	----	----	
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	<1	<1	<1	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	187	1	183	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	187	1	183	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	<1	9	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	41	<1	41	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	2	<1	5	----	----	
Magnesium	7439-95-4	1	mg/L	16	<1	17	----	----	
Sodium	7440-23-5	1	mg/L	96	<1	74	----	----	
Potassium	7440-09-7	1	mg/L	<1	<1	2	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.7	<0.1	0.7	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.09	<0.01	0.09	----	----	
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	0.04	<0.01	0.05	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.04	<0.01	0.05	----	----	



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH3s	W9001	W9003	----	----
Client sampling date / time				13-Jun-2017 09:00	13-Jun-2017 09:00	13-Jun-2017 09:00	----	----	
Compound	CAS Number	LOR	Unit	ES1714650-001	ES1714650-002	ES1714650-003	-----	-----	
				Result	Result	Result	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.7	<0.1	4.1	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.7	<0.1	4.2	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	2.55	<0.01	2.86	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.01	----	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	5.08	0.02	5.00	----	----	
Total Cations	----	0.01	meq/L	5.59	<0.01	4.92	----	----	
Ionic Balance	----	0.01	%	4.80	----	0.82	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	<1	2	----	----	