Mayfield West Recycling Facility

Surface Water Characterisation and Mitigation Plan

Prepared for Benedict Recycling Pty Ltd | c {ŜLJŭŜYˉōŜℕ 2018

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Prepared for Benedict Recycling Pty Ltd | 6 September 2018

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Mayfield West Recycling Facility

Final

Report J14142RP1 | Prepared for Benedict Recycling Pty Ltd | 6 September 2018

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Signature		Signature	
Date	6 September 2018	Date	6 September 2018

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1 Introduction

1.1 Background

Benedict Recycling Pty Ltd (Benedict Recycling) is the operator of the Mayfield West Recycling Facility (MWRF) located at 1A McIntosh Drive, Mayfield West. Project approval SSD 7698 (SSD approval) allows resource recovery processing activities to 315,000 tonnes per year of general solid waste (non-putrescible) including construction and demolition waste, and commercial and industrial waste.

Condition B33 of the SSD approval requires that a Surface Water Characterisation and Mitigation Plan (SWCMP) be prepared to characterise the surface water on site and to provide a mitigation plan. The SWCMP forms part of the site's Operational Environmental Management Plan (OEMP).

The SWCMP has been prepared by Chris Kuczera of EMM Consulting Pty Limited (EMM). Chris has been endorsed by the Secretary of the Department of Planning (DPE) as being a suitably qualified and experienced person under Condition B33(a). The Secretary's endorsement of Chris Kuczera is contained in Appendix A.

The SWCMP has been prepared in consultation with the Environment Protection Authority (EPA). Comments received from the EPA are contained in Appendix B, summarised in Section 2.3 and addressed in the relevant sections of this SWCMP.

The most recent version of the SWCMP, as approved by the Secretary, must be implemented for the duration of the development in accordance with Condition B34(b).

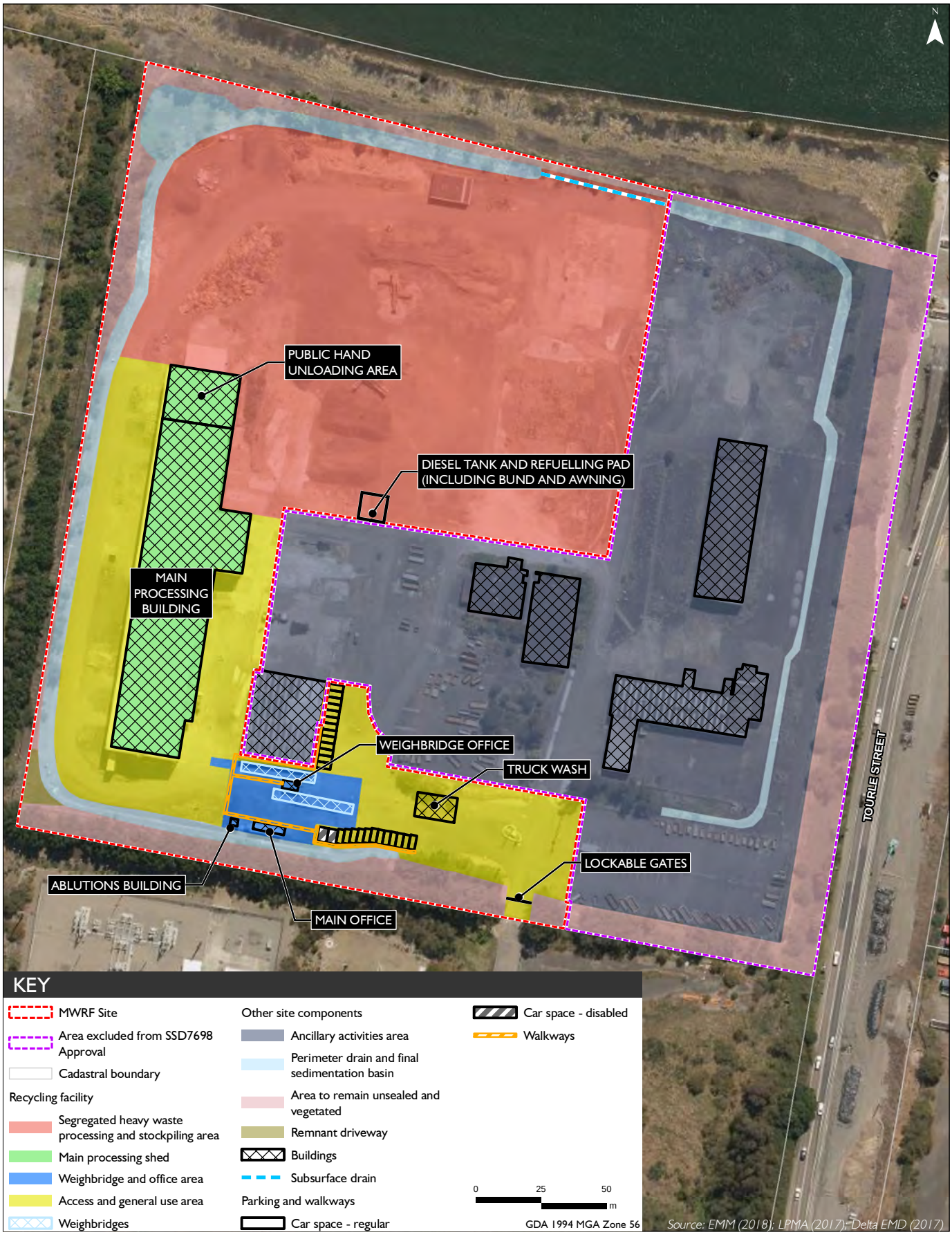
1.2 Location

The MWRF is located at 1A McIntosh Drive, Mayfield, NSW within the Newcastle City Council local government area. The site occupies part of Lot 1 DP874109 and is about 4.9 ha. The Lot is bounded by the Hunter River (South Arm) to the north, Tourle Street to the east, Ausgrid Mayfield West Substation to the south and light industrial buildings to the west. Figure 1.1 shows the layout of the MWRF.

1.3 Purpose of the Surface Water Characterisation and Mitigation Plan

The purpose of the SWCMP is to characterise the surface water at the site and to provide a mitigation plan to manage potential impacts associated with discharges of site water to the Hunter River. The plan documents the following:

- SSD approval conditions and Environment Protection Licence (EPL) conditions relevant to the management of site surface water;
- the surface water management system, including anticipated overflows;
- site surface water characterisation;
- management measures;
- discharge criteria and monitoring; and
- surface water incident procedure and contingency options.



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Site layout

Recycling Facility, Mayfield West

Figure 1.1

2 Statutory context

2.1 Environmental Planning and Assessment Act 1979

The MWRF is approved to operate under project approval SSD 7698 pursuant to Section 4.38 of the *Environmental Planning and Assessment Act 1979.* The SWCMP has been prepared to address Condition B33 which requires the preparation of a SWCMP to characterise the surface water on site and to provide a mitigation plan. The SWCMP forms a sub plan to the Operational Environment Management Plan (OEMP). Table 2.1 provides a summary of where the requirements of Condition B33 and other consent conditions relevant to the management of surface water are addressed in this SWCMP.

Table 2.1 Development consent requirements

Condition	Requirement	Location
B17	The Development must comply with Section 120 of the POEO Act, which prohibits the pollution of waters, except as expressly provided in an EPL.	Section 2.2
B18	Any discharge or water quality criteria specified under the EPL must be complied with.	Section 2.2
B19	Surface water must only be discharged from the location specified in the EPL.	Section 2.2
B20	Overland flow from the Development must be contained within the sealed areas of the site.	Section 5.2.1
B21	Any spills must be contained and disposed of at a licensed facility.	Section 5.2.2
B22	Any servicing or repair work on motor vehicles or mobile plant is to be carried out within a sealed area that has environmental controls appropriate for servicing or repair work. This must include bunding where there this work could result in liquids being spilled.	Section 5.2.2
B24	All excess water from the truck wash and wheel wash is to be discharged into suitable holding tanks and removed from the facility for treatment at an appropriately licensed facility or via trade waste.	Section 5.2.3
B25(a)&(b)	Prior to the commencement of operations, the Applicant must design, install and operate a surface water management system for the Development. The system must: (a) be designed and constructed by a suitably qualified and experienced person(s) endorsed by the Secretary; NSW Government 6 Mayfield West Resource Recovery Facility Department of Planning and Environment (SSD 7698) (b) be generally in accordance with the conceptual design in the RTS, the letter titled Mayfield West Recycling Facility (SSD 7698) – Water Assessment, dated 8 September 2017 prepared by EMM and applicable Australian Standards;	Section 3.1 Appendix A Appendix C
B25(c)&(d)	(c) ensure that the system capacity has been designed in accordance with Australian Rainfall and Runoff (Engineers Australia, 2016) and Managing Urban Stormwater: Council Handbook (EPA, 1997); (d) include detention basins with a minimum capacity to contain the 90th percentile rainfall over any consecutive 5 day period in accordance with Managing Urban Stormwater - Soils and Construction Vol. 2B: Waste landfills (Department of Environment and Climate Change NSW, 2008). The wet weather capture capacity requirements of the sediment basins and water treatment system may be modified by the EPL subject to the required surface water characterisation (Condition B33);	Sections 3.2 Appendix C
B25(e)	Ensure vegetation within the sediment basin and perimeter drain has been removed and the surface water infrastructure has been sealed to prevent surface water infiltration to groundwater;	Section 3.2

Table 2.1 Development consent requirements

Condition	Requirement	Location
B25(f)	Bund any potentially contaminating waste, any surface water leaving this area must be directed to the three-stage pit or equivalent for treatment, the water must then be directed to holding tanks for testing and depending on its quality either discharged to the perimeter drain or sewer as trade waste .	Section 3.2 and 6.2
B26	The Applicant must provide a Compliance Certificate to the secretary prior to the commencement of operations, that confirms the surface water management system has been designed and installed as per the requirements of Condition B25 and the alterations will not impede or divert natural surface water runoff so as to cause a nuisance to adjoining properties.	Section 3.1 and Appendix F
B28	The surface water management system must be operated and maintained for the duration of the Development.	Section 5.2.1
B29	The Applicant must maintain the surface water management system to minimise the infiltration of surface water to groundwater. This includes inspecting the infrastructure monthly for cracking and vegetation break through, removing the vegetation and sealing the infrastructure. Any maintenance on the surface water management system must be undertaken by a suitably qualified and experienced person(s), a record of these works must be kept for the life of the Development.	Section 5.2.1
B30	The Applicant must maintain the surface water detention basins on site with a minimum capacity to contain the 90th percentile rainfall over any consecutive 5-day period in accordance with Managing Urban Stormwater - Soils and Construction Vol. 2B: Waste landfills. The Managing Urban Stormwater series of document relate to clean sediment and therefore the wet weather capture and storage capacity requirements of the sediment basins and treatment systems may be modified by the EPL based on the required surface water characterisation (Condition B33).	Section 3.2 and 3.3 Appendix C
B31	The Applicant must ensure that a visible marker is installed in the sediment detention basin in a position that shows the freeboard in the basin that equates to the volume required to contain all rainfall and runoff in the catchment from a 90th percentile rainfall event over any consecutive 5-day period.	Appendix C
B32	All waste unloaded at the public hand unloading area must be unloaded and stockpiled underneath the public unloading awning or within the main processing building.	Section 5.2.3
B33(a)	Prior to the commencement of operations, the Applicant must prepare a Surface Water Characterisation and Mitigation Plan (SWCMP) to the satisfaction of the Secretary to characterise the surface water and implement a mitigation plan, the SWCMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C7. The SWCMP must: (a) be carried out by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Secretary;	This document Section 1.1
B33(b)	Be prepared in consultation with the EPA;	Section 2.3
B33(c)	Detail the triggers of when the pump which transfers surface water from the three-stage pit to the holding tanks would be activated;	Section 3.2 & Appendix C
B33(d)	Detail the type and size of the bunding around the potentially contaminating waste area;	Section 3.2
B33(e)	Detail the frequency of overflows from the three-stage pit and sediment basin;	Section 3.2 & Appendix C
B33(f)	Collect representative samples, including a minimum of four surface water samples from the sediment basin and the three-stage pit. The surface water samples must be analysed for the analytical suite identified in Table 3.16 of the RTS;	Section 4
B33(g)	Characterise the surface water for the entire development and detail the potential impact of discharges on receiving surface waters with reference to ANZECC (2000) assessment criteria;	Section 4.4

Table 2.1 Development consent requirements

Condition	Requirement	Location
B33(h)	Be based on the results of the surface water characterisation, investigate all practical alternatives to discharge and whether sediment basin sizing, at-source pollution controls, tertiary water treatment, water treatment plants and other treatment and reuse options are appropriate;	Not applicable
B33(i)	Provide the Secretary with a timeframe for and implement the measures identified in sub-clause (h);	Not applicable
B33(j)	Consider the human health risks associated with the surface water reuse process at the site;	Section 4.5.4
B33(k)	Include details of the maintenance procedures of the sediment basins and surface water infrastructure;	Section 5.2.1
B33(l)	Describe the procedures for maintaining vegetation along the perimeter drain and sediment basin;	Section 5.2.1
B33(m)	Establish an ongoing surface water monitoring program to validate the proposed mitigation measures. The surface water monitoring program must provide monitoring details of surface water flows, quality, storage and discharge limits;	Section 6.3
B33(n)	Identify measures for managing pollutant exceedances; and	Sections 6.3 and 8
B33(o)	Identify contingency options to account for any mitigation measures that do not adequately address the site water pollution risks.	Section 8
B34(b)	The Applicant must implement the most recent version of the SWCMP approved by the Secretary for the duration of the development.	Section 1.1
B35	Within six months of the commencement of operations and following the management measures being implemented as per SWCMP (Condition B33), the Applicant must provide a Surface Water Validation Report (SWVR) to the satisfaction of the Secretary. The SWVR must: (a) be carried out by a suitably qualified and experienced expert whose appointment has been endorsed by the Secretary; (b) be prepared in consultation with the EPA; (c) collect a minimum of four surface water samples from the sediment basin and four from the three-stage pit system; (d) characterise the surface water data (samples) and detail the potential impact of discharges on receiving surface waters with reference to ANZECC (2000) assessment criteria; (e) compare the results with the surface water characterisation in the SWCMP (Condition B33); (f) ensure surface water is being managed in accordance the EPL; (g) provide an assessment of the effectiveness of implemented mitigation measures; (h) if necessary, provide additional mitigation measures to control and/or treat all pollutants to ensure the ANZECC (2000) assessment criteria can be met including further storage or the installation of a water treatment plant; and (i) update the SWCMP to reflect any changes to the surface water management system.	Section 6.3.2
B36	Any alterations to the surface water management system identified in the SWVR must be implemented prior to any further controlled discharges occurring to the satisfaction of the Secretary.	Section 6.3.2
B37	The Applicant must comply with any amended surface water quality criteria and discharge limits identified in the EPL.	Section 2.2

Table 2.1 Development consent requirements

Condition	Requirement	Location
B38	Within 18 months of the commencement of operations, the Applicant must commission an independent Surface Water Audit of the Development to the satisfaction of the Secretary. The audit must: (a) be carried out by a suitably qualified and experienced expert whose appointment has been endorsed by the Secretary; (b) be conducted in consultation with the EPA; (c) audit the Development whilst it is in operation; (d) validate the development against the SWCMP required by Condition B33; (e) include a summary of any EPL water quality exceedances; (f) review the design and management practices of the Development against industry best practice for surface water; (g) include an action plan that identifies and prioritises additional surface water mitigation measures and/or treatment options that may be necessary to reduce surface water impacts; and (h) provide a further program of monitoring to address water quality issues that may emerge over time.	Section 9.2
B43(a&b)	(a) a stormwater isolation valve is installed, the stormwater isolation valve must be closed at all times unless stormwater is being discharged and its closure must be monitored weekly; (b) during an incident, the stormwater isolation valve must remain in the closed position until manually opened upon confirmation that stormwater isolation is no longer required or once any contaminated water is disposed via trade waste or at a site that can lawfully receive the waste;	Section 5.2.2
C7(a)	The Applicant must ensure that the environmental management plans required under Condition C4 of this consent are prepared by a suitably qualified person or persons in accordance with best practice and include: (a) detailed baseline data;	Section 1.1 Section 4
C7(b)	b) a description of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures/criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the Development or any management measures;	 Section 2 Section 6
C7(c)	c) a description of the management measures that would be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria;	Section 5
C7(d)	(d) a program to monitor and report on the: (i) impacts and environmental performance of the Development; and (ii) effectiveness of any management measures (see (c) above)	 Section 6
C7(e)	(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 8
C7(f)	(f) a program to investigate and implement ways to improve the environmental performance of the Development over time;	Section 9
C7(g)	(g) a protocol for managing and reporting any: (i) incidents; (ii) complaints; (iii) non-compliances with statutory requirements; and (iv) exceedances of the impact assessment criteria and/or performance criteria; and	 Section 7.1 Section 7.2 Section 7.1 Section 8
C7(h)	(h) a protocol for periodic review of the plan.	Section 9
C8	Within three months of: (a) approval of a modification; (b) approval of an annual review under Condition C9; (c) submissions of an incident report under Condition C11; or (d) completion of an audit under Condition C13. the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.	Section 9
C9	Each year, the Applicant must review the environmental performance of the Development to the satisfaction of the Secretary.	Section 9.1

Table 2.1 Development consent requirements

Condition	Requirement	Location
C10	The Applicant must notify the Secretary and any other relevant agencies of any incident or potential incident with actual or potential significant off-site impacts on people or the biophysical environment associated with the Development immediately after the Applicant becomes aware of the incident.	Section 7.1
C13	Within one year of the commencement of operations, and every three years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the Development.	Section 9.3

Notes: Adapted from development consent for application No SDD7698 dated 13 March 2018.

2.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) relates to the management of pollution in NSW and is administered by the EPA. Under Section 48 of the POEO Act, premise-based scheduled activities (as defined in Schedule 1 of the POEO Act) require an Environment Protection Licence (EPL). The site currently operates under EPL 20771. In accordance with the EPL and Condition B19 of the SSD approval, water may only be discharged from the site from the licensed discharged point being the final basin outlet pipe (outfall chamber) within the sedimentation basin in the north-west corner of the site.

Condition B18 of the SSD approval requires that any discharge or water quality criteria specified under the EPL must be complied with. The EPL has the following concentration limits:

- oil and grease: 10 mg/L;
- pH: 6.5-8.5; and
- total suspended solids: 50 mg/L.

Condition B37 requires the site to comply with any amended surface water quality criteria and discharge limits identified in the EPL.

Section 120 of the POEO Act prohibits the pollution of waters, except as expressly provided in an EPL.

2.3 Consultation with EPA

The draft SWCMP was forwarded to the EPA for comment. The EPA provided comment in a letter response (EPA August 2018). This response is contained in Appendix G of this SWCMP.

The EPA raised concerns associated with the potential for a range of water quality risks from the different waste types handled at the premises. However, the EPA considered these concerns could be addressed as part of the Surface Water Validation Report (SWVR) required under Condition B35 of the SSD approval. The EPA considered this approach would allow data to be collected from an operational surface water management system with representative rainfall events and site activities representative of expanded operations.

The recommendations outlined in Attachment A of the EPA's letter (EPA August 2018) have been incorporated into the relevant sections of this SWCMP, in particular, Section 5.1 (Additional investigations). It is noted that consultation will be conducted with EPA prior to the commencement of SWVR sampling and assessment to confirm adequacy of proposed sampling and assessment methodology. Following the completion of the SWVR, the SWCMP will be updated to reflect any changes in the surface water management system which may be necessitated due to the findings of the SWVR. Mitigation measures and contingency measures contained in this SWCMP will also be revised as required following finalisation of the SWVR.

3 Surface water management system

Condition B25 of the SSD approval requires the surface water management system to be designed and installed prior to the commencement of operations. Condition B28 of the SSD approval requires that the surface water management system be operated and maintained for the duration of the development.

3.1 Design

The surface water management system has been designed and certified by Mark Tooker, who has been approved by the Secretary of DPE as a suitably qualified and experienced person as required by Condition B25(a). Mark Tooker's design report is provided as Appendix C.

The surface water management system has been designed generally in accordance with:

- the Reply to Submissions (RTS) (EMM 2017a) as required by Condition B25(b);
- letters provided to the EPA dated 8 September 2017 (EMM 2017b) and 27 September 2017 (EMM 2017c); and
- the following design related consent conditions:
    - B25(d): include detention basins with a minimum capacity to contain the 90th percentile rainfall over any consecutive 5 day period in accordance with Managing Urban Stormwater - Soils and Construction Vol. 2B: Waste landfills (Department of Environment and Climate Change NSW, 2008).
    - B25(e): ensure vegetation within the sediment basin and perimeter drain has been removed and the surface water infrastructure has been sealed to prevent surface water infiltration to groundwater.
    - B25(f): bund any potentially contaminating waste, any surface water leaving this area must be directed to the three-stage pit or equivalent for treatment, the water must then be directed to holding tanks for testing and depending on its quality either discharged to the perimeter drain or sewer as trade waste .

A compliance certificate to certify the surface water management system has been installed as per the requirements of Condition B25 is contained in Appendix F.

3.2 Surface water management system

The surface water management system of the MWRF is described under the following subsections.

3.2.1 Area 1 surface water management system

General solid waste that is considered to have a higher risk of contaminating stormwater will be stockpiled and processed in a designated area that is referred to as Area 1. Such wastes include:

- soils that meet the CT1 thresholds for General Solid Waste in Table 1 of the Waste Classification Guidelines as in force from time to time with the exception of the maximum threshold values for contaminants specified in the "Other Limits" column of Condition L3.1 of the current EPL;

- soils that meet the SCC1 and TCLP thresholds for General Solid Waste in Table 2 of the Waste Classification Guidelines;
- concrete batch plant waste;
- basic oxygen slag;
- electric arc furnace slag;
- electric arc ladle slag;
- granulated blast furnace slag; and
- rail ballast.

Area 1 has a 0.52 ha surface area and is sealed and bunded. Runoff from Area 1 will be initially treated in a sediment pit (referred to as a two stage pit) prior to being pumped into a series of plastic holding tanks that will have a collective capacity of 250 m^3. The pump in the two stage pit will be activated when the two stage pit is three quarters full. Water in the holding tanks will be either:

- used for dust suppression;
- discharged to the sewer as trade waste; or
- released into the perimeter drain (subject to favourable water quality).

3.2.2 Area 2 water management system

The remainder of the site is referred to as Area 2. Area 2 has a 7.4 ha contributing catchment area that comprises the remainder of the SSD approved site (including haul roads, site buildings and waste stockpiles) and the remainder of Lot 1 DP 874109 (comprised of currently unused lay down areas, derelict site buildings and leased areas. Wastes stored within the SSD approved portion of Area 2 include:

- certified virgin excavated natural material (VENM);
- certified excavated natural material (ENM) (where the waste does not contain contaminant levels exceeding the limits for General Solid Waste stated in the EPA's Waste Classification Guidelines Part 1: Classifying Waste); and
- processed wastes that have been tested for compliance against the relevant resource recovery orders.

- Runoff from Area 2 drains to a perimeter drain that has been sealed using asphalt. The perimeter drain is sealed and contains a number of rock check dams to enhance the capture of coarse sediments. The drain flows into a sedimentation basin that is located in the north western portion of the site. The basin has been sealed and has a volume of 2,852 m^3 which exceeds the minimum capacity required by Condition B25(d). Water accumulated in the basin will be managed as follows:
  - water will be used for dust suppression as required;

- in accordance with Condition B31 a visible marker has been installed in the final sedimentation basin, showing the freeboard in the basin required to contain runoff from a 90th percentile rainfall event over any consecutive 5 day event;

- when basin levels are high and water quality is suitable, water will be discharged to the Hunter River Estuary as controlled discharge; and

- uncontrolled overflows to the Hunter River will occur when the basin is full.

Figure 3.1 shows the functionality of the surface water management system and Figure 3.2 shows the location of Areas 1 and 2 and the water management infrastructure. A water balance for the proposed system has been carried out as part of the Surface Water Management System Design report contained in Appendix C. The water balance found both the two stage pit and sediment basin would overflow 1.4 times per year (Tooker 2016).

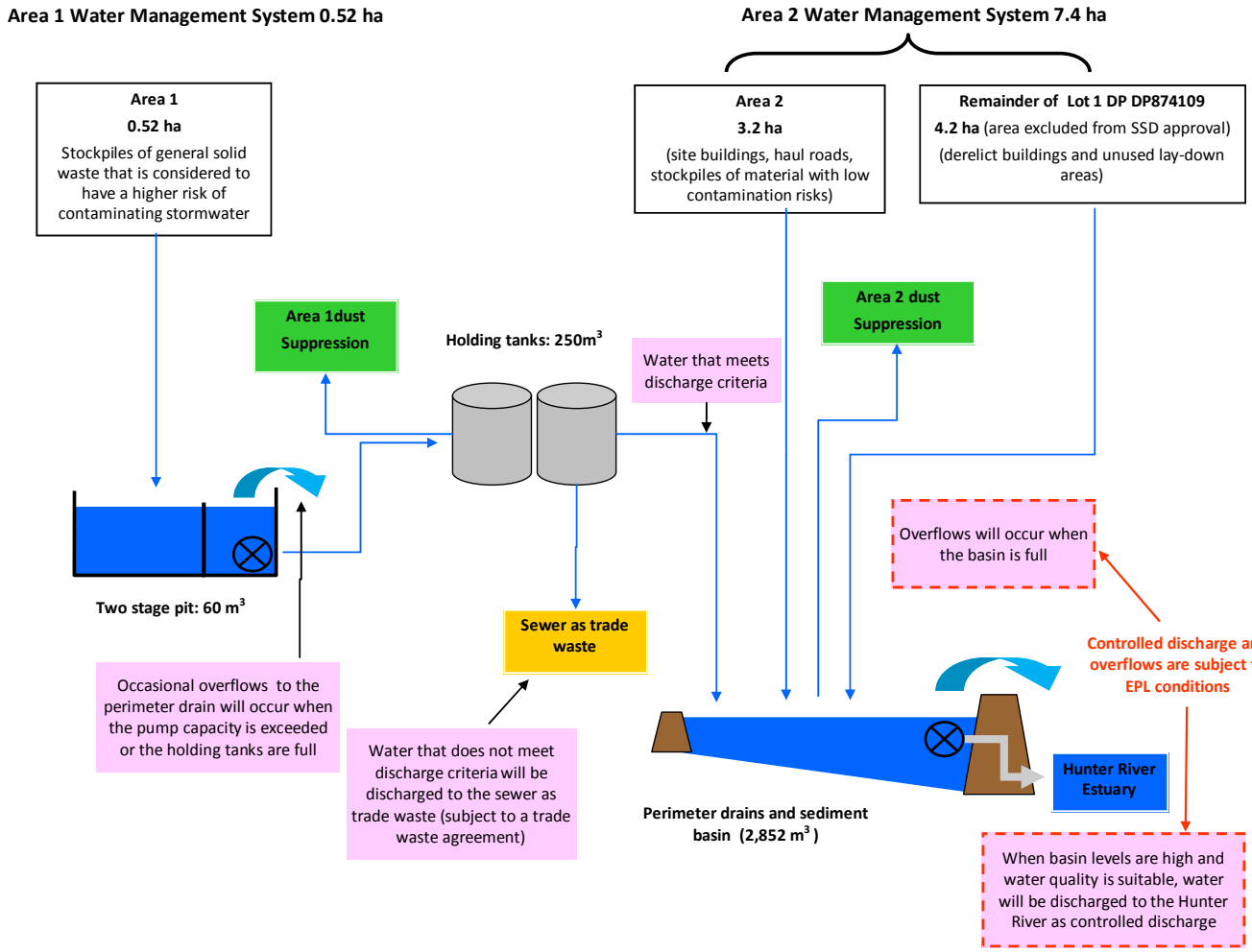
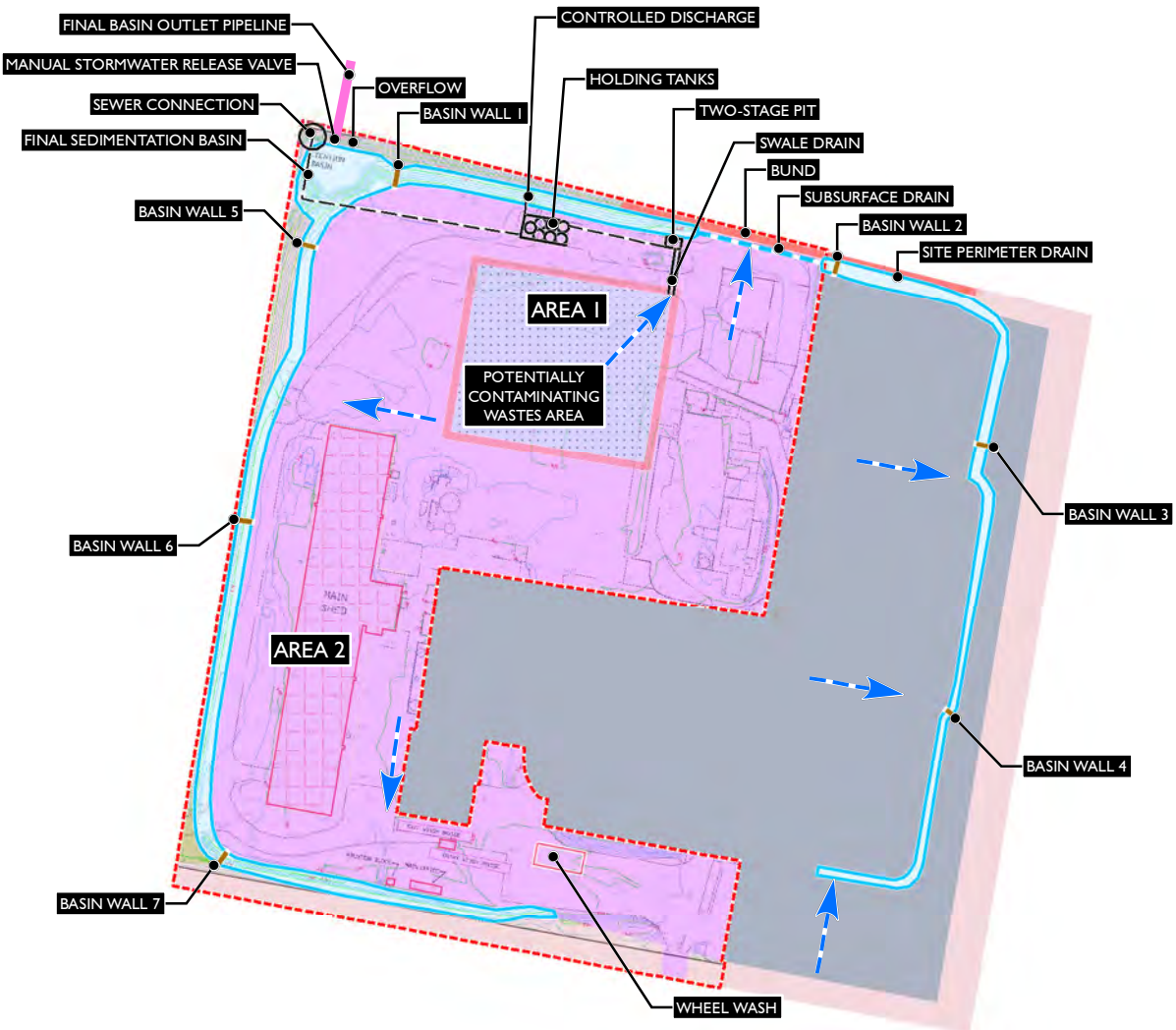


Figure 3.1 Surface water system functionality



Source: EMM (2018)

0 50 100 m

GDA 1994 MGA Zone 56

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KEY

- Development area
- Recycling facility
- Drain and bund with single valved discharge point
- Bund
- Basin wall
- Overland flow path

Surface water management system

Mayfield Recycling Facility
Mayfield West
Figure 3.2

EMM

4 Surface water characterisation

4.1 Overview

A surface water characterisation assessment has been undertaken to address the following consent conditions:

- Condition B33(f) – collect representative samples, including a minimum of four surface water samples from the sediment basin and the two-stage pit. The surface water samples must be analysed for the analytical suite identified in Table 3.16 of the RTS.
- Condition B33(g) – characterise the surface water for the entire development and assess the potential impact of discharges on receiving surface waters with reference to ANZECC (2000) assessment criteria.

The following sections describe the sampling methods, rainfall and site context and results.

4.2 Monitoring program

The following samples have been collected to inform the characterisation assessment:

- four samples were collected from the sediment basin over the March to June 2018 period; and
- two samples from the two-stage pit were collected in June 2018, shortly after it was constructed.

This section describes the site and weather context during each sampling event and sampling methods.

4.2.1 Sampling context

i Site context

Samples were collected between March and June 2018. The following civil works were undertaken during or immediately prior to this period:

- the perimeter drain was sealed with asphalt in March 2018, prior to sampling;
- the sediment basin was sealed with concrete in mid-May 2018; and
- the Area 1 bunding, two-stage pit and holding tanks were constructed in June 2018. However, the two-stage pit pump-out system to the holding tanks and discharge from the holding tanks to trade waste was not commissioned as this requires a trade waste agreement to be in place. As a result, the Area 1 water management system was not functional during sampling.

It is also noted that between March and June 2018, general solid waste was stockpiled and processed in northern portion of the site, which includes Area 1 and the surrounding site area. Figure 4 shows the site conditions in early April and mid June 2018. Table 4.1 provides a summary of the site context for each sampling event.

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Source: EMM (2018); Nearmap (2018)

0 50 100 m

GDA 1994 MGA Zone 56

N

KEY

Development area

Site conditions during sampling

Mayfield Recycling Facility
Mayfield West
Figure 4.1

EMM

ii Weather context

The greater Newcastle area received above average rainfall in March and June, average rainfall in April and below average rainfall in May. Significant rainfall occurred on 22 March which resulted in minor flooding in Newcastle. The rainfall in June was primarily associated with intense showers that resulted in significant spatial variation in daily rainfall totals between regional gauges.

The site weather station is yet to be commissioned. In the absence of site specific rainfall data, recorded rainfall at the following regional gauges was reviewed to establish estimates of rainfall at the site:

- BoM (61390 Newcastle University) – located 2.5 km to the west of the site. Note this gauge has an intermittent record that only provides data for some events.
- BoM (61055 Nobbys Signal Station AWS) – located 7.5km to the south-east of the site.
- BoM (61078 Williamtown RAAF) - located 14km to the north-east of the site.

Table 4.1 provides a summary of the rainfall conditions prior to each sampling event.

iii Summary

Table 4.1 provides a summary of the rainfall and site context and sampling locations for each sampling event.

Table 4.1 Sampling context and objectives

Sampling Event	Rainfall context	Site context	Sampling locations
Event 1 21 March 2018	**Wet weather**: **Significant rainfall** 80 to 140mm of rainfall was recorded at regional gauges[1] within 48 hours[2] of 9 am on the 22 March 2018. The majority of this rainfall occurred prior to sampling. Benedict Recycling advised that no site overflows or controlled discharges occurred due to this rainfall.	• The perimeter drain was sealed shortly before sampling. • The sedimentation basin was unsealed • Water management works in Area 1 were not commenced.	Sediment basin
Event 2 5 April 2018	**Wet weather**: **Moderate rainfall** 0 to 90mm of rainfall was recorded at regional gauges[1] 48 hours prior to sampling. 28mm was recorded at the University of Newcastle gauge, which is the closest gauge to the site. Benedict Recycling advised that no site overflows or controlled discharges occurred due to this rainfall.	• The perimeter drain was sealed. • The sedimentation basin was unsealed. • Water management works in Area 1 were not commenced.	Sediment basin
Event 3 4 June 2018	**Wet weather**: **Moderate rainfall** 41 to 56mm of rainfall was recorded at regional gauges[1] 48 hours prior to sampling. 47 mm was recorded at the University of Newcastle gauge, which is the closest gauge to the site. Benedict Recycling advised that no site overflows or controlled discharges occurred due to this rainfall.	• The perimeter drain was sealed. • The sedimentation basin was sealed • Water management works in Area 1 were under construction.	Sediment basin and two-stage pit

Table 4.1 Sampling context and objectives

Sampling Event	Rainfall context	Site context	Sampling locations
Event 4 12 June 2018	**Wet weather**: **Minor rainfall** 6 to 51mm of rainfall was recorded at regional gauges[1] 48 hours prior to sampling. 6 mm was recorded at the University of Newcastle gauge, which is the closest gauge to the site. Benedict Recycling advised that no site overflows or controlled discharges occurred due to this event.	• The perimeter drain was sealed. • The sedimentation basin was sealed • Water management works in Area 1 were under construction. • Other non-water management works were under construction. Approximately 20 concrete agitators loads of concrete where being poured each day.	Two-stage pit
Event 5 15 June 2018	**After wet weather sample** No rainfall was recorded at regional gauges[1] 48 hours prior to sampling	As per Event 4	Sediment basin
Event 6 19 June 2018 Note: this was routine monitoring of EPL regulated pollutants.	**Wet weather**: **Significant rainfall** 75 to 87mm of rainfall was recorded at regional gauges[1] 48 hours prior to 9am on 20 June 2018[3]. 79 mm was recorded at the University of Newcastle gauge, which is the closest gauge to the site. Benedict Recycling advised that no site overflows or controlled discharges occurred due to this event.	As per Event 4	Sediment basin

Notes: *1.Regionl rainfall data refers to data from BoM 61055 (Newcastle Nobbys Signal Station AWS), BoM 61078 (Williamtown RAAF), BoM 61390 (Newcastle University).*

2. Event 1 Sampling was carried out at 4.30pm on 21 March 2018. Substantial rainfall fell on the morning of the 21 March. Therefore the total rainfall depths from 20 and 21 March have been used.

3. Event 6 Sampling was carried out at 4.30pm on 19 June 2018. Substantial rainfall fell on the morning of the 19 June. Therefore the total rainfall depths from 19 and 20 June have been used.

4.3 Sampling methods

Surface water samples for sampling Events 1 to 5 were analysed for the analytical suite identified in Table 3.16 of the RTS, as required by Condition B33(f). Table 4.2 details this analytical suite and the applied sampling and analysis methods.

Sampling Event 6 was routine EPL monitoring and the analytical suite was limited to pH, TSS and oil and grease.

Table 4.2 Monitoring analytes and methods

Category	Analytes	Sampling and analysis methods
Physio-chemical parameters	pH Total suspended solids Oil & grease	pH was measured in-situ using a portal water quality meter. Analysis was undertaken by a NATA certified laboratory. It is noted that NATA accreditation does not cover the oil & grease method of analysis.
Major ions	Calcium (Ca), magnesium (Mg), sodium (Na) and potassium (K) Chloride (Cl), sulfate (SO_4) and alkalinity Sulfide (S) Hardness	Analysis was undertaken by a NATA certified laboratory.
Nutrients	Total phosphorus Total nitrogen Nitrate/nitrite and oxidised nitrogen (NO_x) Ammonia	Analysis was undertaken by a NATA certified laboratory.
Metals and metalloids	Aluminium (Al), silver (Ag), boron (B), beryllium (Be), bismuth (Bi), cadmium (Cd), cobalt (Co), total chromium (Cr), copper (Cu), iron (Fe), gallium (Ga), mercury (Hg), lanthanum (La), manganese (Mn), molybdenum (Mo), nickel (Ni), lead (Pb), antimony (Sb), selenium (Se), tin (Sn), strontium (Sr), thallium (Tl), uranium (U), vanadium (V) and zinc (Zn) Chromium (VI)	Samples were filtered in the field using a 0.45 µm filter. Analysis was undertaken by a NATA certified laboratory.
Organics	Benzene, toluene, ethylbenzene and xylene (BTEX) Polyaromatic hydrocarbons (PAHs) Phenols Petroleum hydrocarbons (total recoverable hydrocarbons) Polychlorinated biphenyls (PCBs) Pesticides	Samples were filtered in the field using a 0.45 µm filter. Analysis was undertaken by a NATA certified laboratory.
Miscellaneous	Fluoride Cyanide Anionic Surfactants	Analysis was undertaken by a NATA certified laboratory.

4.4 Water quality results

This section presents and analyses the water quality results and is structured as follows:

- Section 4.4.1 describes the receiving water;
- Section 4.4.2 describes the approach used to establish guideline values for each analyte;
- Section 4.4.3 presents results from sampling Events 1 to 5; and
- Section 4.4.4 presents results from sampling Event 6.

Results are discussed in Section 4.5.

4.4.1 Receiving water

Both controlled discharges and uncontrolled overflows will drain into the southern arm of the Hunter River Estuary. The Hunter River Estuary at the discharge location receives strong tidal flows and associated tidal flushing. The receiving water is therefore considered to be a marine environment. Due to the strong tidal flows, the potential for site discharges to alter the water quality in the Hunter River Estuary are considered to be negligible.

4.4.2 Assessment approach

Water quality results were initially reviewed to identify analytes that were below the laboratory limit of reporting (LOR) in all samples. These analytes were not considered to be potential analytes of concern. Results for analytes that were above LOR in at least one sample were compared to guideline values that were established from the following sources:

- EPL limits (relevant to TSS, pH and oil and grease);
- high reliability trigger values for fresh and marine water that were sourced from relevant sections of ANZECC (2000);
- low reliability trigger levels were sourced from information provided in Volume 2 of the ANZECC (2000) guidelines; and
- international guidelines and eco-toxicity literature.

A guideline value for each analyte was selected using the approach described in the following section. Analytes that exceeded the relevant guideline value in at least one sample were identified as potential analytes of concern and are assessed further.

i Selecting guideline values

A single guideline value was adopted for each analyte. Given the receiving water is the Hunter River Estuary, guideline values for marine water that are reported in Volume 1 of ANZECC (2000) were adopted where available. The values reported in Volume 1 are high reliability trigger values. The following approach was applied to establish a guideline value for analytes that do not have high reliability trigger values for marine water:

- 1st preference - High reliability trigger values for fresh water were adopted where available.
- 2nd preference - Low reliability trigger values for marine water that are reported in Volume 2 of ANZECC (2000) were assessed for adequacy and adopted if deemed adequate (the adequacy assessment is discussed below).
- 3nd preference - Low reliability trigger values for fresh water that are reported in Volume 2 of ANZECC (2000) were assessed for adequacy and adopted if deemed adequate (the adequacy assessment is discussed below).
- 4th preference – chronic trigger values from international guidelines and eco-toxicity literature were adopted if an adequate value could not be established using the information provided in Volume 2 of ANZECC (2000).

As mentioned above, low reliability trigger values were assessed for adequacy. This was done as some of the low reliability trigger values have been established using minimal reference data, which has resulted in high assessment factors being applied to the calculated value. Low reliability trigger values that were either below the LOR or the highest recorded concentration (from the characterisation sampling) were verified using at least one chronic trigger value sourced from international guidelines and / or eco-toxicity literature. If the values were substantially different, the chronic trigger values sourced from international guidelines and / or eco-toxicity literature were adopted instead of the low reliability trigger values that are reported in Volume 2 of ANZECC (2000).

4.4.3 Results for Events 1 to 5

Samples from Events 1 to 5 were analysed for the analytical suite that is provided in Table 4.2. Laboratory certificates for all results are provided in Appendix D.

Results for the following analytes were below the laboratory limit of reporting (LOR) in all sampling events and are therefore not considered to be potential analytes of concern:

- organics: BTEX, Phenols, TRHs and pesticides; and
- dissolved metals and metalloids: Beryllium (Br), Bismuth (Bi), Hexavalent Chromium (Cr VI), Selenium (Se), Sliver (Ag), Thallium (Ti), Tin (Sn) and Mercury (Hg).

It is noted that PAHs were below the LOR in all samples except for Event 4 (collect from the two-stage pit) which identified levels of some PAHs that are similar to the low reliability trigger values that are reported in Section 8.3 of Volume 2 of ANZECC (2000). PAHs will continue to be monitored during site validation and discharge monitoring (refer Section 6.2.3).

Results for all remaining analytes are summarised in Table 4.3.

4.4.4 Event 6 results

Results for pH, TSS and, oil & grease recorded during Event 6 (routine EPL monitoring) were:

- pH: 8.9;
- TSS: 100 mg/L; and
- oil & grease: <5 mg/L.

Table 4.3 Water quality monitoring results

Parameter	Unit	Freshwater guideline value[1,2]	Estuarine/marine guideline value[1,2]	Sediment basin	Sediment basin	Sediment basin	Two stage pit	Two stage pit	Sediment basin
Sample Event				**Event 1**	**Event 2**	**Event 3**	**Event 3**	**Event 4**	**Event 5**
Physio-chemical parameters									
pH		6.5 – 8.0	**7.0–8.5**	6.9	7.9	**8.6**	7.5	**8.8**	7.0
Conductivity	µS/cm	125-2,200	**Not relevant**	Not analysed	Not analysed	305	112	540	289
Total suspended solids (TSS)	mg/L	**50**[4]	-	**1,015**	**284**	**147**	<5	**204**	**325**
Oil and grease	mg/L	**10**[5]	-	**15**	<5	<5	<5	**40**	**78**
Major ions									
Calcium (Ca)	mg/L	-	-	18	39	38	10	69	35
Magnesium (Mg)	mg/L	-	-	<1	2	2	1	4	2
Sodium (Na)	mg/L	-	-	8	11	9	6	37	13
Potassium (K)	mg/L	-	-	2	3	4	<1	4	4
Chloride (Cl)	mg/L	-	-	9	13	16	14	40	12
Sulfide (S)	mg/L	-	-	<0.5	<0.1	Not analysed	Not analysed	Not analysed	Not analysed
Sulfate (SO_4)	mg/L	-	-	47	88	86	13	178	63
Total alkalinity (as $CaCO_3$)	mg/L	-	-	68	70	104	78	68	37
Total Hardness (as $CaCO_3$)	mg/L	-	-	45	106	103	29	189	96
Nutrients									
Ammonia	mg N/L	0.90 (toxicant) 0.020 (stressor)	**0.91 (toxicant)** **0.015 (stressor)**	0.12	<0.01	0.01	<0.01	**0.05**	**0.04**
Nitrate	mg N/L	Under review[7]	Under review[7]	0.34	0.72	0.32	1.44	1.83	0.61
Nitrite	mg N/L	-	-	0.02	0.05	0.02	<0.01	0.21	0.05
Oxidised nitrogen (NOx)	mg N/L	0.040 (stressor)	**0.015 (stressor)**	**0.36**	**0.77**	**0.34**	**1.44**	**2.04**	**1.70**
Total kjeldahl nitrogen (TKN)	mg N/L	-	-	1.2	0.7	0.9	0.2	1.2	1.0

Table 4.3 Water quality monitoring results

Parameter	Unit	Freshwater guideline value[1,2]	Estuarine/marine guideline value[1,2]	Sediment basin	Sediment basin	Sediment basin	Two stage pit	Two stage pit	Sediment basin
Sample Event				**Event 1**	**Event 2**	**Event 3**	**Event 3**	**Event 4**	**Event 5**
Total nitrogen (TN)	mg/L	0.35	**0.30**	**1.6**	**0.77**	**1.2**	**1.6**	**3.2**	**1.7**
Total phosphorus (TP)	mg/L	0.025	**0.030**	**0.61**	**0.12**	**0.15**	0.02	**0.38**	**1.14**
Inorganics (dissolved)									
Fluoride	mg/L	**2.4**[11]	-	0.2	0.2	0.2	0.2	0.5	0.3
Anionic surfactants as MBAS	mg/L	**0.280**	0.0001[3]	0.2	0.2	0.2	<0.1	**1.2**	<0.1
Metals/metalloids (dissolved)									
Aluminium (Al)	mg/L	**0.055**	0.0005[3]	**0.18**	**0.06**	0.04	0.04	0.02	0.04
Antimony (Sb)	mg/L	0.009[3]	**0.270**[3]	<0.001	<0.001	<0.001	<0.001	0.002	0.001
Arsenic	mg/L	**0.024 (As III)** **0.013 (As V)**	0.0023(As III)[3] 0.0045(As V)[3]	Not analysed	Not analysed	0.001	<0.001	0.006	Not analysed
Boron (B)	mg/L	**0.370**	ID	<0.05	<0.05	0.05	0.05	0.06	<0.05
Cadmium (Cd)	mg/L	0.0002	**0.0007**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002
Cobalt (Co)	mg/L	0.0028[3]	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.003**
Total chromium (assumed to be Cr III)[8]	mg/L	ID (Cr III)	**0.027 (Cr III)**	<0.001	0.002[6]	0.002	<0.001	0.003[6]	0.016
Copper (Cu)	mg/L	0.0014	**0.0013**	0.002[6]	0.003[6]	0.003[6]	<0.001	0.003	**0.030**
Gallium (Ga)	mg/L	0.018[3]	**0.018**[3]	Not analysed	Not analysed	<0.001	<0.001	<0.001	0.004
Lanthanum (La)	mg/L	**0.004**[9]	ID	Not analysed	Not analysed	<0.001	<0.001	<0.001	**0.006**
Manganese (Mn)	mg/L	**1.900**	0.080[3]	0.003	0.016	0.010	0.008	0.002	0.973
Molybdenum (Mo)	mg/L	0.034[3]	**0.023**[3]	0.002	0.004	0.003	<0.001	0.012	0.005
Nickel (Ni)	mg/L	0.011	**0.007**	<0.001	<0.001	<0.001	<0.001	<0.001	0.008
Lead (Pb)	mg/L	0.0034	**0.0044**	<0.001	<0.001	0.002	<0.001	<0.001	0.059
Strontium (Sr)	mg/L	**0.150**[3]	ID	0.068	0.143	**0.207**	0.029	**0.216**	**0.161**
Uranium (U)	mg/L	**0.005**[10]	ID	Not analysed	Not analysed	<0.001	<0.001	0.002	0.001

Table 4.3 Water quality monitoring results

Parameter	Unit	Freshwater guideline value[1,2]	Estuarine/marine guideline value[1,2]	Sediment basin	Sediment basin	Sediment basin	Two stage pit	Two stage pit	Sediment basin
Sample Event				**Event 1**	**Event 2**	**Event 3**	**Event 3**	**Event 4**	**Event 5**
Vanadium (V)	mg/L	0.006[3]	**0.1**	<0.01	<0.01	<0.01	<0.01	0.01	0.03
Zinc (Zn)	mg/L	0.008	**0.015**	<0.005	<0.005	<0.005	<0.005	<0.005	**0.154**
Iron (Fe)	mg/L	**0.3**[3]	ID	<0.05	<0.05	<0.05	0.17	<0.05	<0.05

Notes: *1. The Guideline Values for field parameters and nutrients refer to the trigger values for physical and chemical stressors in south-east Australia (lowland rivers [eastward flowing] and estuaries) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC (2000).*
2. Unless otherwise stated, the Guideline Values for dissolved metals refer to the high reliability trigger values for slightly-moderately disturbed ecosystems that are reported in Table 3.4.1 of ANZECC (2000). It is noted that no hardness adjustments have been made.
3. The Guideline Value refers to a low reliability trigger values that are provided in Volume 2 of ANZECC (2000).
4. The Guideline Value for suspended sediment of 50 mg/L is recommended in Managing Urban Stormwater: Soils and Construction (Landcom 2004) and is the MWRF's EPL concentration limit for TSS.
5. EPL concentration limit for oil and grease.
6. Value is below guideline values once adjustments for hardness are made using the hardness adjustment algorithms provided in Table 3.4.3 of ANZECC (2000).
7. Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality 2000 Errata Slip Page 3.4-5, Table 3.4.1, Nitrate: "Delete all trigger values and replace with "Under review".
8. Total chromium results were assumed to represent Cr (III) concentrations. This was done because Cr (VI) concentrations were below detection limits.
9. The guideline value has been sourced from Herrmann et all (2015)
10. The guideline value has been sourced from Van Dan (2012)
11. The guideline value has been provided by the EPA (August 2018)
ID - Insufficient data to derive a reliable trigger value

Bold *denotes a Guideline Value or Range is exceeded.*

Red *denotes the adopted guideline value. Given the receiving water is the Hunter River Estuary, preference has been given to the guideline values for Estuarine and Marine environments, where a suitable value is available.*

Purple *denotes a low reliability marine trigger value that has not been used as a high reliability fresh water trigger value is available.*

4.5 Water characterisation

4.5.1 Discussion

With reference to the water quality results presented in Section 4.4, the water quality of site runoff can be characterised as:

- Neutral to slightly alkaline, with pH measurements ranging from 6.9 to 8.8.
- Low to moderate levels of salinity with the electrical conductivity ranging from 112 to 540 µS/cm.
- Moderate to high levels of carbonate and associated hardness and alkalinity.
- High levels of suspended solids, with TSS concentrations ranging between <5 and 1,015 mg/l. Five out of six samples exceeded the EPL limit of 50 mg/l. Site observations indicate that the suspended material does not settle under gravity indicating potential for high levels of dispersive material.
- Oil and grease concentrations ranged from below detection to 78 mg/l. Three of the six samples exceeded the EPL limit of 10 mg/l. As TPHs and TRHs were generally below detection, the oil and grease is not expected to be associated with hydrocarbons. The laboratory method used to measure oil and grease uses an organic solvent to extract hydrocarbons from the sample. The organic solvent also extracts other non-hydrocarbon related organic substances. The source of elevated oil and grease is likely to be associated with the elevated levels of suspended sediment. However, this requires further assessment.
- BTEX, Phenols, TRHs, TPHs and pesticides were generally below LOR in all samples indicating that these organics are unlikely to occur in site runoff in measurable concentrations.
- Concentrations of nitrogen and phosphorus were generally similar to untreated stormwater runoff from urban areas.
- Concentrations of anionic surfactants (a detergent) exceeded the guideline value in 1 out of 6 samples.
- Concentrations of dissolved metals and inorganics were generally below the guideline values established in Section 4.4, with the exception of:
    - Aluminium exceeded the ANZECC (2000) trigger value in two out of six samples.
    - Strontium exceeded the low reliability trigger value in three out of six samples.
    - Sampling Event 5 (collected after wet weather) contained elevated concentrations of aluminium, cobalt, copper, lanthanum, strontium and zinc. As these metals were not identified in sampling Events 1 to 4 (all undertaken during wet weather) the elevated concentrations do not appear to be associated with rainfall runoff.

      The elevated metals may be associated with contamination of the surface water system by construction activities that were occurring onsite at the time of sampling. Potential sources include washing out of concrete agitators and other equipment used for concreting.

The following sections provide further information on toxicants (metals and inorganics) and human health risks.

4.5.2 Metals and inorganics

As discussed in Section 4.5.1, the water characterisation assessment has identified that concentrations of anionic surfactants, aluminium, cobalt, copper, lanthanum, strontium and zinc exceeded the relevant guideline value on at least one occasion. These metals are therefore considered to be potential analytes of concern and require further assessment.

The guideline values listed in Table 4.3 reference trigger values that are have been established to protect the receiving environment from the effects of chronic (ie long term) exposure. As described in Section 3, discharge from the site to the Hunter River Estuary will occur as either:

- controlled discharge - this will only occur when basin levels are high and water quality is suitable; or
- uncontrolled overflows – this will occur when the basin is full.

Both discharge mechanisms are expected to occur for a short period of time (ie less than 4 days). Accordingly, potential receiving water quality risks associated with site discharge are considered to be acute (ie due to short term exposure) rather than chronic (ie due to long term exposure).

Acute trigger values for anionic surfactants, aluminium, cobalt, copper, strontium and zinc have been established based on a review of information provided in ANZECC (2000), international guidelines and eco-toxicity literature. Table 4.4 compares the acute trigger values for each metal to the chronic values and maximum concentration recorded during the characterisation assessment. Appendix E provides detailed information on the assumptions applied to calculating acute trigger values.

Table 4.4 Chronic and acute trigger values

Analyte	Units	Maximum concentration	Trigger value (chronic exposure)	Trigger value (acute exposure)	Acute trigger value exceeded
anionic surfactants	mg/L	1.2	0.14	1.82	No
aluminium	mg/L	0.18	0.055	0.45	No
cobalt	mg/L	0.003	0.001	0.110	No
copper	mg/L	0.03	0.0013	0.007	Yes
lanthanum	mg/L	0.006	0.004	0.020	No
strontium	mg/L	0.216	0.15	1.50	No
zinc	mg/L	0.154	0.015	0.045	Yes

With reference to Table 4.4, the maximum concentrations of copper and zinc exceeded acute trigger values, while maximum concentrations of anionic surfactants, cobalt, copper, lanthanum and strontium were below the acute values.

It is noted that the maximum concentration of copper and zinc was recorded during sampling Event 5 and may be associated with contamination by onsite construction activities.

4.5.3 Residual receiving water risks

Water characterisation results have identified that elevated concentration of suspended solids, oil and grease, copper and zinc as the residual receiving water risks associated with site discharge.

4.5.4 Human health risks

Human contact with stormwater will be limited to incidental exposure during maintenance and due to the application of stormwater as dust suppression. The water characterisation results presented in Section 4.4 are generally within the guideline values for secondary contact that are provided in Section 5 of ANZECC (2000). These values are conservative for this application as they assume ingestion of 100 ml of water occurs.

5 Mitigation and management measures

5.1 Additional investigations

Water characterisation results have identified that elevated concentration of suspended solids, oil and grease, copper and zinc as being the residual receiving water risks associated with site discharge. Further investigations will be undertaken to:

- assess the performance of the water management system once the Area 1 water management system is operational, including consideration of further options to minimise the frequency and volume of managed overflows;
- verify the initial characterisation results that are reported in Section 4 (in line with EPA recommendation, this will include the calculation of a hardness algorithm to demonstrate the hardness of receiving waters);
- carry out appropriate modelling and assessment of the mixing process of controlled and overflow discharges to the Hunter River (where required);
- monitor overflow frequency and controlled discharge through ongoing monitoring. This will inform the water balance model over time; and
- review the practicalities and benefits of using flocculants or coagulants to either;
    - improve the water quality in the sediment basin; or
    - improve the water quality of controlled discharge from the sediment basin.

Benedict Recycling have already engaged a process water engineer to investigate the most suitable chemical treatment options. The selected water treatment system will be commissioned prior to the commencement of water validation sampling. The EPA will be consulted prior to and during the installation and commissioning of the selected water treatment system.

Additional investigations will continue to reference chronic based trigger values in the assessment of mitigation and contingency options.

The outcomes of the additional investigations will be documented in the Surface Water Validation Report that will be prepared within six months of the commencement of expanded operations, in accordance with Condition B35. Validation monitoring is described further in Section 6.3.2.

5.2 Ongoing management measures

5.2.1 Maintenance of surface water system

The following measures will be implemented to ensure the functionality of the surface water system:

- in accordance with Condition B28, the surface water management system will be operated and maintained for the duration of the development;

- in accordance with Condition B29, the surface water management system will be maintained to minimise the infiltration of surface water to groundwater including monthly inspections and maintenance as required to address cracking and vegetation breakthrough through the seal of the perimeter drain or final sedimentation basin;

- any maintenance on the surface water management system is to be undertaken by a suitably qualified and experienced person(s), a record of these works will be kept for the life of the Development;

- sediment accumulated in the perimeter drains and sediment basin will be removed on an as needed basis;

- in accordance with Condition B20, overland flow from the development will be contained within the sealed areas of the site; and

- in accordance with Condition B24, all excess water from the wheel wash will be discharged into suitable holding tanks and removed from the MWRF for treatment at an appropriately licensed facility or to trade waste.

5.2.2 Spills

The following management measures will address potential impacts on water quality arising from any spills or firewater:

- in accordance with Condition B43, the stormwater isolation valve within the outfall chamber will be monitored weekly to ensure it remains in a closed position to contain chemical spills or fire water. It is to remain closed until manually opened to facilitate controlled discharge. Controlled discharge is discharge further in Section 6.2.2;

- any spills will be contained (as safe and practical), and clean-up materials disposed of at a licensed facility;

- in accordance with Condition B22, any servicing or repair work on motor vehicles or mobile plant will be carried out within the main processing shed or other sealed area on the site that has environmental controls appropriate for servicing or repair work. This will include bunding where there this work could result in liquids being spilled;

- in accordance with Condition B42 overfilling of the diesel tank will be prevented through gauging and monitoring of the tank's contents;

- hoses used for transfer of diesel will be inspected weekly;

- in an emergency, flow of liquid from the diesel tank to a consuming device will be immediately shut off; and

- a diesel spill kit will be stored in the refuelling area and deployed in the event of a spill.

5.2.3 Waste management

The following measures will be implemented to minimise sediment and contaminant mobilisation arising from the management of waste on the site:

- Waste is to be segregated, with potentially contaminated waste, as described in Section 3.2, stored within the bunded Area 1;
- all waste unloaded at the public unloading area is to be unloaded and stockpiled within the main processing building (in accordance with Condition B32);
- irrigation sprays will be only used when the surface of a stockpile is dry and irrigation is to cease when the surface of the stockpile is wet;
- site water will be used for dust suppression but will not be used for product processing; and
- all excess water from the wheel wash is to be discharged into suitable holding tanks and discharged via trade waste or removed from the MWRF for treatment at an appropriately licensed facility. It is noted that wheel wash systems are a net user of water so excess water is only expected to be produced during maintenance.

6 Discharge protocols and monitoring

6.1 Provisional discharge criteria

Table 6.1 provides provisional criteria for discharge to the Hunter River Estuary. The discharge criteria will be finalised once the validation monitoring (described in Section 6.3.2) is completed. Up until this time, validation and discharge monitoring will be assessed against both chronic and acute trigger values.

Table 6.1 Provisional discharge criteria

Analyte	Discharge criteria mg/L	Basis
pH	6.5-8.5	EPL 20771
TSS	50	EPL 20771
Oil and grease	10	EPL 20771
anionic surfactants	1.82	Acute trigger value as established in Table 4.4
aluminium	0.45	Acute trigger value as established in Table 4.4
cobalt	0.11	Acute trigger value as established in Table 4.4
copper	0.007	Acute trigger value as established in Table 4.4
lanthanum	0.012	Acute trigger value as established in Table 4.4
strontium	1.50	Acute trigger value as established in Table 4.4
zinc	0.045	Acute trigger value as established in Table 4.4
other	Acute trigger value	Acute trigger value to be established for any analyte that exceeds a chronic trigger value in future sampling.

6.2 Management of discharge

Site discharge will occur as controlled discharge to trade waste, controlled discharge from the sediment basin and uncontrolled overflows from the sedimentation basin. The following sections describe the management approach and monitoring requirements for each discharge mechanism. These sections use the following terminology:

- discharge criteria - refers to the provisional discharge criteria established in Table 6.1; and
- discharge samples - refers to sampling from the holding tanks and/or the sediment basin during discharge conditions. Section 6.3.1 describes the proposed analytes and sampling and analysis methods.

An application for a Trade Waste agreement has been lodged with Hunter Water.

6.2.1 Discharge from the holding tanks

Runoff from Area 1 will be collected in the two-stage pit before being pumped into the holding tanks. Water stored in the holding tanks will be either released into the perimeter drain or discharged into the sewer as trade waste. Both mechanisms will be manually operated and will occur at controlled rates.

Release from the holding tanks to the perimeter drain will only occur if the water in the holding tanks is assessed to have a low risk of degrading the water quality of the sediment basin.

This will ensure that the discharge from the sediment basin (to the Hunter River Estuary) will not have an increased risk of not achieving the discharge criteria.

The water characterisation results provided in Table 4.3 indicate that at the time of sampling, the quality of water in the two-stage pit was not degraded relative to water in the sediment basin. Hence, these results indicate that the release of water from the holding tanks into the perimeter drain will not increase the risk of discharge from the sediment basin exceeding the discharge criteria.

This risk will be progressively assessed through the following monitoring:

- discharge samples will be collected from one of the tanks and the sediment basin following the initial five tank filling events (ie five independent rainfall events that enable the holding tanks to be partially or fully filled); and

- discharge samples will be collected quarterly (during wet weather conditions) once the initial five samples are collected.

The initial five samples will provide sufficient information to enable the water quality risks associated with the release of water from the holding tanks into the perimeter drain to be reliably assessed. If this information indicates that the risks are low, release from the holding tank into the perimeter drain will be undertaken without monitoring each release event.

If release into the perimeter drain is considered to be high risk, all water in the holding tanks will be discharged to the sewer as trade waste. This discharge will be undertaken in accordance with a trade waste agreement.

For both mechanisms, discharge samples will continue to be collected on a quarterly basis to enable the risks to be continually assessed.

6.2.2 Controlled discharge

Controlled discharge will be required to reduce the frequency and occurrence of uncontrolled overflows from the sediment basin. Controlled discharges will occur via pumped dewatering of the sediment basin into piped drainage that drains into the Hunter River Estuary. All controlled discharge will be manually operated.

The following protocols will be applied to managing controlled discharges:

- Following a rainfall event, site management will review rainfall forecasts and basin levels to establish the need for controlled discharge.

- If controlled discharge is deemed advantageous, discharge samples will be collected. Laboratory results will be available within two business days.

- If laboratory results indicate that the discharge criteria will not be exceeded, controlled discharge will occur. Additional discharge samples will be collected during discharge to verify the water quality during discharge.

Over time, if water quality data indicates that the quality of controlled discharge has a low risk of exceeding the discharge criteria, pre-discharge monitoring requirements will be discontinued. This will provide more flexibility on the timing of controlled discharge. Monitoring during discharge will be maintained.

6.2.3 Uncontrolled overflows

Uncontrolled overflows will unavoidably occur when the sediment basin is full. The frequency and magnitude of uncontrolled overflows can be reduced by controlled discharges. If uncontrolled overflows occur, a discharge sample will be collected from the basin within 24 hours of discharge.

6.3 Monitoring

The following ongoing monitoring is proposed:

- monitoring of site discharge and releases from the holding tank into the perimeter drain;
- validation monitoring; and
- weather and water quantity monitoring.

6.3.1 Provisional discharge quality monitoring

The objective of discharge monitoring is to enable assessment of compliance with the discharge criteria. Section 6.2 describes the approach to managing discharges and proposes event based and quarterly monitoring from the holding tanks and sediment basin during discharge conditions. Table 6.2 provides the proposed monitoring triggers and sampling locations for each monitoring category.

Table 6.2 Provisional discharge monitoring requirements

Category	Trigger	Sampling locations
Holding tanks (initial sampling)[1]	Samples will be collected following the initial five tank filling events	• Holding tanks • Sediment basin
Controlled discharge (assessment)[2]	Prior to a controlled discharge occurring	• Sediment basin
Controlled discharge (verification)	During a controlled discharge	• Sediment basin
Uncontrolled overflows	Within 24 hours of an uncontrolled overflow occurring	• Sediment basin
Quarterly monitoring (during wet weather)[3]	Samples will be collected during wet weather conditions on a quarterly basis	• Holding tanks • Sediment basin

Notes: *1. This monitoring requirement will be discontinued after the initial five samples have been collected.*

2. This monitoring requirement will be discontinued if water quality data indicates that the quality of controlled discharge has a low risk of exceeding the discharge criteria.

3. Any samples collected during a quarter can be used to meet the quarterly monitoring requirement provided samples are collected from both the holding tanks and sediment basin at the same time.

Table 6.3 provides the proposed analytes and sampling and analysis methods. The proposed monitoring includes all analytes that exceeded the guideline values (based on chronic trigger levels) on at least one occasion and additional analytes requested by the EPA (August 2018).

Table 6.3 Provisional monitoring analytes and methods

Category	Analytes	Sampling and analysis methods
Physio-chemical parameters	pH Total suspended solids Oil & grease	pH will be measured in-situ using a portal water quality meter. Analysis will be undertaken by a NATA certified laboratory.
Major ions	Hardness and alkalinity	Analysis will be undertaken by a NATA certified laboratory.
Metals and metalloids	Aluminium (Al), cobalt (Co), copper (Cu), lanthanum (La), strontium (Sr) and zinc (Zn)	Samples will be filtered in the field using a 0.45 µm filter. Analysis will be undertaken by a NATA certified laboratory.
Miscellaneous	Anionic Surfactants,	Analysis will be undertaken by a NATA certified laboratory
Nutrients	Total phosphorus, total nitrogen, oxides of nitrogen, ammonia and filterable reactive phosphate	Analysis will be undertaken by a NATA certified laboratory

6.3.2 Validation monitoring

In accordance with Condition B35, within six months of the commencement of expanded operations, a Surface Water Validation Report (SWVR) will be prepared. The SWVR will be prepared in consultation with the EPA and will:

- collect a minimum of four surface water samples from the sediment basin and four from the two stage pit;
- analyse samples for all analytes identified in Table 4.2 of this SWCMP and characterise the samples with reference to ANZECC (2000), Hunter River baseline water quality, the results of the surface water characterisation monitoring program, and EPL conditions; and
- in addition to the analytes identified in Table 4.2, at the request of the EPA (August 2018) the following analytes will also be analysed during the validation sampling:
  - methylphenols;
  - PAHs;
  - cyanide; and
  - water treatment chemicals (dependent on selected water treatment option).
- provide an assessment of the effectiveness of implemented mitigation measures and if necessary provide additional measures.

The above sampling will be undertaken following the full establishment of the water management system, including commissioning of the proposed water treatment system (refer Section 5.1) and will target, where possible, rain events that generate runoff and discharge.

In response to the EPA recommendation (EPA Letter August 2018), where relevant, the surface water validation report will include appropriate modelling and assessment of the mixing process of controlled and overflow discharges to the Hunter River to demonstrate that ANZECC trigger values are achieved at the edge of a near field mixing zone and that there are no impacts within the mixing zone such as objectionable deposits or bioaccumulation.

Any alterations to the surface water management system identified in the SWVR will be implemented prior to further site discharges. The SWCMP will be updated to reflect any changes to the surface water management system.

6.3.3 Weather and water quantity monitoring

Table 6.4 describes weather and water quantity monitoring that will be undertaken.

Table 6.4 Weather and water quantity monitoring requirements

Aspect	Objective	Monitoring location	Frequency	Monitoring description
Meteorological monitoring	To accurately record site rainfall. This information can be used to calibrate the site water balance model and demonstrate compliance with rainfall related consent conditions	On site meteorological station	Continuous	Benedict will operate an onsite meteorological station capable of measuring rainfall
Dust suppression monitoring	Benedict will record volumes of water used daily for dust suppression to improve the reliability of the site's water balance model.	Flow meter to sprinkler system and water cart use	Continuous	Volumes of water used daily for dust suppression will be recorded either by cumulative flow meter and/or a daily water cart count
Discharges from the sediment basin	To record the occurrence of controlled discharges and uncontrolled overflows from the sediment basin	Sediment basin	During discharge	Qualitatively record the discharge time, duration and type
Discharges to trade waste	To monitor discharges to trade waste in accordance with a trade waste agreement	Trade waste discharge location	As required by the trade waste agreement	As required by the trade waste agreement

7 Incident procedure

7.1 Water quality incident procedure

A water quality incident is defined as any incident or potential incident that poses an actual or potential significant off-site impact on water quality or a non-compliance in relation to the SSD approval conditions relevant to water management on the site.

In all cases, where a potential or actual water quality incident occurs, the incident is to be reported immediately to the site leading hand/ supervisor.

Water quality incidents are to be reported via telephone to the EPA and DPE immediately after the incident occurs. Formal written advice is to be provided to the EPA and DPE within 7 days of the incident occurring. The incident report should include:

- time and date the incident occurred;
- name of person recording the incident;
- nature, details and location of the incident;
- duration of the incident;
- actions taken to contain or ameliorate the effects of the incident; and
- actions taken to minimise the reoccurrence of the incident.

Records of incidents are to be kept for at least four years in accordance with the EPL.

7.2 Complaint procedure

Any enquiries or complaints made by members of the public to site personnel are to be directed to the site manager.

All information relating to such complaints will be kept in a register. The register will include, but not be restricted to, the following information:

- date and time of complaint;
- complainant details (ie full name, address and contact details where these have been voluntarily provided);
- nature and source of complaint;
- action taken; and
- follow-up with complainant.

Complaints will be reported to DPE and EPA annually through annual reviews and annual returns respectively. The complaint register will be made available to any relevant regulatory authority or independent auditor upon request.

The complaint register will be publically available on the Benedict website in accordance with Condition C15.

Should the complaint be relevant to any of the surface water management SSD approval conditions, it shall be handled as per the relevant conditions.

8 Contingency measures

Contingency measures will be implemented under the following circumstances:

- in the event the Hunter Trade Waste application approval is delayed or not approved; and
- if the validation monitoring or discharge monitoring results show analytes above non trivial levels.

Contingency measures would include all practical measures to improve water quality. Consideration would be given to:

- additional monitoring to identify the source of the degraded water quality;
- review operational practices to reduce water quality risks, such as further segregation and/or bunding of waste types;
- treatment of water in the sediment basin using coagulants or flocculants;
- treatment of controlled discharges to improve water quality;
- source controls to minimise the risk of pollutants entering the stormwater system in identified high risk areas;
- additional water treatment options, including consideration of further water treatment systems if required; and
- increase runoff capture/storage volumes.

9 Continual improvement

Environmental performance of the MWRF's surface water management system will be evaluated through the validation monitoring program (refer Section 6.2) and the findings of the independent surface water audit (refer Section 9.2). Continual improvement will be ensured through the routine monitoring program, the annual review process (refer Section 9.1) and independent environment audits (refer Section 9.3). Any actions identified through these processes will be implemented as required.

The SWCMP will be reviewed and if necessary, revised, in accordance with Condition C8 of the SSD approval, within three months of the following:

- approval of a modification;
- approval of an annual review (refer Section 9.1);
- submission of an incident report (refer Section 7.1); or
- completion of an audit under Condition C13 (refer Section 9.3).

9.1 Annual review

The environmental performance of the surface water management system and supporting mitigation measures will be reviewed by Benedict and reported annually to DPE through the annual review in accordance with Condition C9.

The annual review will include a conditions compliance report which will include a review the MWRF's compliance with conditions identified in Section 2.1. The annual review will also include a comprehensive review of surface water monitoring results, which will include a comparison of results against the relevant criteria identified in Section 6 of this plan and monitoring results of previous years.

The annual review process will also identify measures, as required, that will be implemented over the following year to further improve the environmental performance of the surface water management system.

9.2 Independent surface water audit

In accordance with Condition B38, within 18 months of the commencement of expanded operations, an independent surface water audit of the MWRF will be undertaken. The audit is to:

- be carried out by a suitably qualified and experienced expert whose appointment has been endorsed by the Secretary;
- be conducted in consultation with the EPA;
- audit the MWRF whilst it is in operation;
- validate the development against this SWCMP;
- include a summary of any EPL water quality exceedances;

- review the design and management practices of the MWRF against industry best practice for surface water;
- include an action plan that identifies and prioritises additional surface water mitigation measures and/or treatment options that may be necessary to reduce surface water impacts; and
- provide a further program of monitoring to address water quality issues that may emerge over time.

Benedict will submit the audit to DPE, together with its response to any recommendations of the audit. The SWCMP will be reviewed, as required, in consultation with DPE following the surface water audit.

9.3 Independent environmental audit

Within one year of the commencement of expanded operations, and every three years thereafter, or as directed by DPE, Benedict will arrange an independent environmental audit of the MWRF in accordance with Condition C13 of the SSD approval.

These audits will provide ongoing independent reviews the performance of the MWRF's surface water management system and the adequacy of the SWCMP. Any recommendations to improve the environmental performance of the surface water management system will be considered and adopted, as appropriate, in consultation with DPE.

10 References

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Appendix A

Department of Planning and Environment Endorsement

NSW GOVERNMENT | Planning & Environment

Contact Name: Jeremy Slattery
Number: +612 8276 1296
Email: Jeremy.Slattery@planning.nsw.gov.au

Mr Ernest Dupere
Benedict Recycling Pty Ltd
PO Box 431
Frenchs Forest NSW 1640

Attention: Philip Towler
ptowler@emmconsulting.com.au

Dear Mr Dupere

Mayfield West Recycling Facility
Endorsement of Experts
(SSD 7698)

I refer to your correspondence dated 22 March 2018, seeking approval for Mr Mark Tooker of Tooker & Associates to design a Surface Water Management System (SWMS) and Mr Chris Kuczera of EMM to prepare a Surface Water Characterisation and Mitigation Plan (SWCMP), as required by SSD 7698 Conditions B25 and B33.

The Department has reviewed the qualifications of Mr Mark Tooker and considers he has the appropriate skills and experience to design the Surface Water Management System.

The Department has reviewed the qualifications of Mr Chris Kuczera and considers he has the appropriate skills and experience to prepare a Surface Water Characterisation and Mitigation Plan.

Should you have any queries in relation to this matter, please contact Jeremy Slattery, Environmental Officer on the above contact details.

Yours sincerely

C. Ritchie

Chris Ritchie
Director
Industry Assessments
as delegate of the Secretary

4/4/18.

Appendix B

Environment Protection Authority consultation

DOC18/574595

Ms Kate Masters
Department of Planning and Environment
Industry Assessments
PO Box 39
SYDNEY NSW 2001
kate.masters@planning.nsw.gov.au

Standard and Electronic Mail
13 August 2018

Dear Ms Masters

Mayfield West Recycling Facility – SSD 7698 – Surface Water Characterisation Assessment

I refer to your email to the Environment Protection Authority (**EPA**) dated 26 July 2017, requesting comments on the Surface Water Characterisation Assessment and Mitigation Plan (**the Plan**), prepared by EMM Consulting for the Mayfield West Recycling Facility, located at 1A McIntosh Drive, Mayfield NSW (**the Premises**).

The EPA has reviewed the Plan and believes it contains several deficiencies which are set out in full in Attachment A.

The EPA considers however that the deficiencies can be addressed as part of the Surface Water Validation Report provided that appropriate contingency mitigation options are in place.

While the EPA acknowledges that the water management system has not yet been fully established, and that there has been limited data collected to date, there is an indication of a range of water quality risks in leachate and stormwater from the different waste types handled at the Premises. The EPA considers that the additional investigations proposed in the Plan are not an adequate response to the data and potential risk to water quality. In particular, the limited data, the limited range of analytes proposed for ongoing assessment, and the quality and frequency of managed overflows are areas of risk to be further addressed.

The recommendations in Attachment A include suggestions for additional investigations and consideration of mitigation measures and contingencies to improve the proposed validation monitoring and reporting process. If Benedict Recycling can address the issues in Attachment A and include the recommended additional investigations and contingencies in the proposed Surface Water Validation Reporting process, then the EPA considers that the validation program could proceed with the expanded operations. This would allow data to be collected from an operational water management system, with representative rainfall events and site activities representative of expanded operations.

If you have any further questions in relation to this matter please contact Karen Gallagher on 02 49086822.

Yours sincerely

STEVEN JAMES
Unit Head, Waste Compliance - Hunter
Environment Protection Authority

Enclosed: Attachment A

Attachment A

Technical Advice Water (TAW) advice on the Surface Water Characterisation and Mitigation Plan (the Plan) for Mayfield West Recycling expansion

The Plan does not set out the types of material to be handled in Area 1 compared to Area 2. The information on the materials that will constitute "potentially contaminating wastes" to be handled in Area 1 appear to be defined in an EMM letter of 8 September 2017 (Doc ref: J14152_EPA_08Sep17_PT, Section 2.1). This information, and information on material to be handled in Area 2, should be carried over into operational plans for the site.

It should be noted that the Area 1 water management system was not functional during sampling for the Plan and a trade waste agreement was not in place as proposed in the approved design.

It is recommended that:

- *the types of materials that will be handled in Areas 1 and 2 are specified in operational plans including a clear definition of what constitutes "potentially contaminating wastes" that will be handled in Area 1*
- *the water management system be fully established and material to be handled moved to the target area to properly inform the validation monitoring; and*
- *a trade waste agreement is put in place in a timely manner, plus contingencies put in place if this cannot be achieved.*

Treatment system design

It is noted that the holding tanks design is inconsistent with the development consent and the Plan now refers to a two-stage pit rather than a three-stage pit. It is difficult to determine if an additional pit could further improve water quality as it is noted that the capacity and two-stage pit is also greater than the previously proposed three-stage pit, which could increase retention times.

If there is potential for reduced treatment performance of a two-stage pit compared to a three-stage pit, the result may be a need for greater frequency and volume of discharges to sewer.

It is recommended that adequate contingencies be considered for implementation if the validation report results continue to show analytes above relevant trigger values, including additional pits or other treatment measures, at source controls and/or increased runoff capture volumes to minimise the frequency of managed overflows. All practical measures to improve water quality should be implemented.

Receiving water

Section 4.4.1 states that "*Both controlled discharges and uncontrolled overflows will drain into the southern arm of the Hunter River Estuary. The Hunter River Estuary at the discharge location receives strong tidal flows and associated tidal flushing. The receiving water is therefore considered to be a marine environment. Due to the strong tidal flows, the potential for site discharges to alter the water quality in the Hunter River Estuary are considered to be negligible*."

This is not an appropriate conclusion regarding potential impacts on the environment.

It is recommended that if dilution in the environment is considered then appropriate modelling of the mixing process would be required to demonstrate that ANZECC trigger values are achieved at the edge of a near field mixing zone and that there were no impacts within the mixing zone such as objectionable deposits or bioaccumulation.

Water characterisation (Section 4.5)
PAHs

Section 4.4.3 states that: "*It is noted that PAHs were below the LOR in all samples except for Event 4 (collect from the two-stage pit) which identified levels of some PAHs that are similar to the low reliability trigger values that are reported in Section 8.3 of Volume 2 of ANZECC (2000). As no PAHs were detected in samples from the sediment basin, PAHs are not considered to be potential analytes of concern*."

Rather than discounting PAHs as potential analytes of concern, the results may be indicative of a general site risk, including:

- a range of potential pollutants periodically introduced from materials handled onsite
- some PAHs are bioaccumulative therefore even if PAHs are not detected in the sediment basin that does not necessarily mean that risks cannot develop over time in the basins or in the receiving environment.
- the sewer discharge is still not in place and therefore currently any detections of PAHs in the two-stage tank system can not be appropriately managed.

It is noted that for one sample (sample ID ES1817001-001) that benzo(a)pyrene TEQ was calculated to be 2.9 µg/L. This analyte has a low reliability trigger value of 0.2 µg/L.

The limited data set so far for PAHs does not provide a basis for removing it from the ongoing discharge analyte list at this point.

It is recommended that PAHs remain part of the ongoing discharge monitoring and verification monitoring programs until it can be adequately demonstrated that this pollutant does not represent a risk to receiving waters.

Oil and grease

The Plan states that "*Oil and grease concentrations ranged from below detection to 78 mg/l. Three of the six samples exceeded the EPL limit of 10 mg/l. As TPHs and TRHs were generally below detection, the oil and grease is not expected to be associated with hydrocarbons. The laboratory method used to measure oil and grease uses an organic solvent to extract hydrocarbons from the sample. The organic solvent also extracts other non-hydrocarbon related organic substances. The source of elevated oil and grease is likely to be associated with the elevated levels of suspended sediment. However, this requires further assessment*."

While these oils and greases may contribute to suspended solids or be associated with them, suspended solids are not the source of the oil and grease.

Nutrients

Section 4.5.1 states that concentrations of nitrogen and phosphorus were generally similar to untreated stormwater runoff from urban areas. Comparison with pollutant levels in urban stormwater is not an appropriate approach to considering the potential impacts of a discharge from licensed premises. Section 45 of the POEO Act requires discharges to be considered on a case and site-specific basis with reference to the receiving waters, including a requirement to consider the maintenance or restoration of the relevant environmental values.

The mitigation assessment therefore does not appropriately account for the potential risks of nutrients.

It is recommended that the ongoing discharge monitoring, verification monitoring and validation report address nutrient risks. Results for ammonia and oxides of nitrogen should also be considered.

Metals and inorganics

A range of metals exceeded the ANZECC trigger values, e.g. aluminium, cobalt, copper, lanthanum, strontium and zinc and are proposed for ongoing discharge monitoring and validation monitoring.

Copper and zinc
Copper and Zinc were detected in the sediment basins in one sample at levels that may be acutely toxic at the point of discharge. It is stated that this sampling event was after wet weather not during wet weather, however, if it is detected in a discharge basin then there is potential for elevated levels to be in controlled discharges or managed overflows.

It is recommended that copper and zinc be considered for licence limits and immediate actions taken to reduce potential levels in discharges (including bringing forward the implementation of the proposed further investigations in the Plan for zinc and copper such as use of flocculants). Where necessary, following validation monitoring further treatment or mitigation options may be necessary.

Fluoride
The Plan states that "*fluoride levels exceed the low reliability trigger value in all samples. This low reliability trigger value is often exceeded indicating that the low reliability trigger value of 0.115 mg/l requires further investigation*." Based on new ecotoxicity information on fluoride available to the EPA, a trigger value of 2.4 mg/L can be used in the ongoing assessment.

Acute trigger values
Section 4.5.2 – "Assessment of metals and inorganics", states that discharges "… *are expected to occur for a short period of time (ie less than 4 days). Accordingly, potential receiving water quality risks associated with site discharge are considered to be acute (ie due to short term exposure) rather than chronic (ie due to long term exposure)."*

This conclusion is not appropriate for the following reasons:

- Consistent with the National Water Quality Management Strategy policies and principles, EPA policy is that the NSW Water Quality Objectives (and therefore the relevant ANZECC trigger values) should be met at the edge of a near field mixing zone and if no mixing zone is available or defined then the ANZECC trigger values should be achieved at the point of discharge.
- There are matters under s45 of the POEO Act that require consideration, including the practical measures available to avoid, minimise and mitigate pollution.
- Repeated exposure to ongoing controlled discharges and managed overflows would constitute a chronic exposure in receiving waters, including any small waterway carrying the wastewater to the river and habitats around the discharge point.
- There is potential pollutant loading issues in the environment such as accumulation of pollutants in sediments and via nutrient cycling.

The first step is to consider all practical measures to minimise pollution and consider whether overflow frequency requirements are commensurate with risk. Overflow frequency requirements are currently based on *Managing Urban Stormwater – Soils and Construction Volume 2E Mines and quarries* (Blue Book Volume 2E), however this is based on clean sediment, not sediment basins that contain contaminants/leachates.

Acute values could only be considered as a basis for developing maximum licence limits if all practical measures are demonstrated to be put in place to avoid and minimise pollution and the limits aim to prevent acute levels at the point of discharge.

It is also not accepted that elevated metals may be associated with contamination of the surface water system by construction activities that were occurring onsite at the time of sampling as metals have been detected in potential water discharges from similar operations that are not undergoing construction.

It is recommended that ANZECC trigger values are used in the ongoing validation assessments. If dilution in the environment is to be considered then appropriate mixing process modelling would be

required to demonstrate that the ANZECC trigger values are achieved at the edge of a near field mixing zone and that there were no impacts within the mixing zone such as objectionable deposits or bioaccumulation.

Additional investigations (Section 5.1 of the Plan)

The additional investigations proposed are not based on an appropriate assessment of risk, i.e. the investigations are:

- based on only considering acute trigger values for a range of analytes based on limited data
- not adequately considering nutrient risks
- not further considering the potential for PAHs to be an ongoing risk factor
- not considering the potential for a range of other pollutants to be present now that a sub-set of pollutants sampled has been shown to be present in wastewater
- not considering the potential for higher concentration of pollutants from Area 1 once it is established with only "*potentially contaminating wastes*."

The outcomes of the additional investigations are proposed to be documented in the Surface Water Validation Report that is proposed to be prepared within six months of the commencement of expanded operations.

It is recommended that the above risk factors are also taken into account in the additional investigations and also include:

- *factoring in the application of chronic-based trigger values in the assessment of mitigation and contingency options*
- *consideration of further options to minimise the frequency and volume of managed overflows (such as a secondary basin to capture and further treat overflows)*
- *calculation of hardness algorithm should be provided to demonstrate that hardness of receiving waters are used in the assessment.*

The currently proposed investigations are limited to:

- assessing the performance of the water management system once the Area 1 water management system is operational
- verifying the initial characterisation results
- reviewing the practicalities and benefits of using flocculants or coagulants to either;
    - improve the water quality in the sediment basin; or
    - improve the water quality of controlled discharge from the sediment basin.

The above proposed approaches should still be progressed based on the following:

- The additional investigations for zinc and copper treatment could also address levels of other metals.
- Area 1 is not yet established and discharges to sewer is proposed be available for wastewater that is not suitable for controlled discharge.
- contingency options have been identified during the development assessment process and in the Plan including additional treatment options and available land area for further treatment system if required.
- the assessment of a full range of options can occur concurrently with or following the validation monitoring program.

It should be noted that further options than currently proposed are likely to be required based on the data provided in the Plan. It is therefore recommended that a full range of additional options and contingencies are adequately progressed in the validation report.

<u>Water treatment chemicals</u>

EPA should require an assessment of any proposed water treatment chemicals such as the proposed flocculant and contaminants to ensure low risk options are used and residual chemicals are not discharged to the environment. The Response to Submissions provided a commitment to use only commercially available non-toxic flocculants at the site.

It is recommended that this assessment be provided to the EPA prior to the Validation Report as the Plan indicates that Benedict Recycling have already engaged Nalco to investigate the most suitable chemical treatment options and there are potential risks related to copper and zinc.

Two stage pit, basin and tank sizing

The Plan states that when basin levels are high and water quality is suitable, water will be discharged to the Hunter River Estuary as a controlled discharge. The basins must be kept at a capacity that allows its design volume to be captured after the proposed five-day management period.

It is recommended that a site management plan clearly documents the methods to achieve this outcome, i.e. pump or onsite storage or controlled discharges.

Managed overflows
The additional investigation proposed should also further consider mitigation of managed overflows based on current and the additional validation monitoring proposed. It is possible that based on the initial results, the frequency of managed overflows based on Blue Book Volume 2E may not be adequately protective as Volume 2E relates to clean sediments. It is noted, however, that the design of the system is better than Volume 2E (Areas 1 and 2 average 1.4 overflows per year verses average 2-4 overflows per year set out in Volume 2E guidance). As stated above, however, Volume 2E relates to clean sediment, not sediment basins receiving waste contaminants/leachates.

Based on existing data that indicate contaminated leachate is a likely risk factor for the site, it is recommended that:

- *overflow frequency is tracked through ongoing monitoring and the water balance model improved over time through the proposed weather and water quantity monitoring*
- *further options to minimise overflows are considered as part of the Surface Water Validation report*
- *further at-source controls or additional treatment of managed overflows are considered as part of the validation report such as a secondary basin.*

The extent of the required mitigation measure will depend on results of the ongoing and validation monitoring programs.

Validation sampling program methodology

In addition to the analytes proposed for ongoing discharge quality monitoring from Table 6.3 in the Plan, it is recommended that nutrients, PAHs and water treatment chemicals be added to the ongoing discharge monitoring at least in the short term until more representative results are obtained.

Monitoring

Validation monitoring (Section 6.3.2)
In accordance with Condition B35, this section indicates that a minimum of four surface water samples will be collected from the sediment basin and four from the two-stage pit 6 months after expanded operations based on analyses of analytes identified in Table 4.2 of the Plan, (i.e. the full suite of analytes).

It should be clarified that the proposed validation monitoring is in addition to the samples already collected, it follows the completion of current works on the water management system and where possible targets rainfall events that generate runoff and discharge.

Other pollutants
The detection of a range of pollutants in collected stormwater indicates a potential risk of a wide range of potential pollutants in leachate that were not included in the initial sampling suite. In addition to reviewing the risk related to frequency and volume of managed overflows, an appropriate response to the data would be to review the analyte list to consider other potential pollutants.

It is recommended that the following analytes remain or are added to the proposed sampling suite for validation monitoring:

- Nutrients (total phosphorus and nitrogen, oxides of nitrogen, ammonia, filtrable reactive phosphate)
- PAHs
- **Methylphenols (new)**
- **Cyanide (new)**
- **Water treatment chemicals (new)**

Contingency measures (Section 8)

It is recommended that:

- *The contingency measures be updated to account for resolution of issues raised above as the contingencies listed in the Plan are based on exceeding proposed discharge criteria that have not been appropriately developed.*
- *The contingencies should also cover the contingency options committed to in the development assessment process including the information that: "There is ample area within the site to install a water treatment system." (EMM letter of 27 September, Doc reference J14152_EPA_08Sep17_PT)*
- *As discussed above, contingencies should also cover options to reduce the frequency and volume of managed overflows where water quality data indicates potential risks to receiving waters.*

Appendix C

Surface water management system design report

TOOKER+ ASSOCIATES

MAYFIELD WEST RECYCLING FACILITY

1A McINTOSH DRIVE, MAYFIELD WEST

BENEDICT RECYCLING PTY LTD

SURFACE WATER MANAGEMENT SYSTEM

MAY 2018

m 0409 912 631 e mark.tooker@tookerandassociates.com.au a 30 Walworth Avenue, Newport abn 39 619 046 070

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FIGURES

APPENDICES

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1. INTRODUCTION

On the 13 March 2018, the Minister for Planning approved the State Significant Development application (No. 7698) for increased processing capacity at the existing Mayfield West Recycling Facility. The site is at 1A McIntosh Drive and is Lot 1 DP 874109.

The development consent conditions for the development required details of the Surface Water Management System prior to the commencement of operations within conditions B25 and B33 (c) and (e). These conditions are presented in Appendix A.

This report has been prepared to provide the surface water management details required by these conditions.

This report has been prepared by Mark Tooker who has been approved by the Secretary of the Department of Planning and Environment (DPE) as a suitably qualified and experienced person as required by consent condition B25 (a) (refer Appendix B).

The surface water management system has been designed generally in accordance with the Reply to Submissions (RTS) document as required by consent condition B25 (b).

The design of the surface water management system has generally been in accordance with the following documents as required by consent conditions B25 (c) and (d):

- Australian Rainfall and Runoff, Engineers Australia 2016 (Reference 1);
- Managing Urban Stormwater – Soils and Construction Volumes 1, 2b (waste landfills) and 2e (mines and quarries) (Reference 2).

Consent condition B25 (f) requires any area with potentially contaminated waste to be bunded so that surface water is managed in its own separate system with an initial storage pit leading to larger holding tanks which are separate to the perimeter sediment basins used to manage surface waters from the remainder of the site. This is the system proposed in the RTS document. This area has been nominated as Area 1 for the purposes of this report and Area 2 will be the remainder of the site managed in the perimeter sediment basins.

Consent conditions B33 (c) and (e) are dealt with in Section 3.2 of this report dealing with the performance of the surface water management system.

2. APPROVED DEVELOPMENT

2.1 Area 1 – Potentially Contaminating Waste Area

Area 1 will have a surface area of approximately 5200m^2 and is located in the north western area of the site as shown on Figure 1. It will have a perimeter bund mound 100mm high consisting of asphalt to prevent surface waters flowing directly to the Area 2 perimeter sediment basins.

Surface runoff from Area 1 will be directed to the initial treatment and pumping tank. This tank will have plan dimensions of 4mx6m and be 2.3m deep (refer Figure 2). The deep of the tank allows for 300mm of sediment storage at the base of the tank and 48m^3 (48,000L) of runoff storage. The tank will be divided into 2 stages with the first stage with plan dimensions of 4mx4m as the gross

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sediment removal area. The wall dividing Stages 1 and 2 would have a vertical slot 300mm wide against one wall with a removable Bidum cloth filtering device as flows pass through to the Stage 2 chamber. The Stage 2 chamber would have plan dimensions of 2mx4m and would have the pump located in the corner diagonally opposite the vertical filter slot. Both chambers would be treated with flocculant to maximise the sediment removal. Accumulated sediment would be removed on a weekly basis or as required if it accumulates above a depth of 300mm. A depth marker would be installed in the initial tank showing the sediment depth and the 500mm freeboard at the top of the tank.

The pump in the Stage 2 chamber would have a capacity of 27 L/s and would be activated when the tank was three quarters full or when the freeboard reduces to 500mm. Runoff in Stage 2 of the tank would be pumped to the holding tanks which would have a capacity of 238m^3 or 238,000L. The settling volume required for Area 1 based on the 90 percentile 5 day rainfall (refer Section 3) is 200m^3 (200,000L). The total capacity available in the initial and holding tanks is 286m^3 which readily exceeds the design requirement.

Sediment accumulated in the initial and holding tanks would be removed weekly thereby reducing the requirement for sediment storage in the tanks.

Water in the holding tanks would be reused for dust suppression over the site. The water demand for dust suppression would be typically 2L per m^2 per dry day over Area1. For the average number of dry days in a year (266 days for Newcastle, BOM), the overall demand for dust suppression would be approximately 2,766m^3.

Water in the holding tanks would be tested regularly and if appropriate would be released to the perimeter sediment basins for discharge to the river. If the quality was not adequate then water would be discharged to the sewer to maintain the required storage.

2.2 Area 2 – Perimeter Sediment Basins

Area 2 will have a surface area of approximately 74,390m^2 and runoff from this area will flow to the perimeter sediment basins (refer Figure 1). The seven basins will be formed by constructing seven permeable rock bunds across the existing perimeter channel. These bund walls will slow down the flow promoting sediment to settle in the channel before reaching the final basin. The perimeter basin and final basin are formed with asphalt. Vegetation in the channel and final basin will be removed and the surface sealed before the placement of the rock bunds. This will prevent infiltration of surface runoff into the groundwater. This conforms with development consent condition B25 (e).

The final settling basin, located in the north western corner of the site, has a gated outlet chamber and a rock protected overflow weir. At a level of RL 8.3m AHD, surveyors have established that the storage volume available in the final and perimeter sediment basins is approximately 3793m^3 (3,793,000L). The settling volume required for Area 2 based on the 90 percentile 5 day rainfall (refer Section 3) is 2852m^3 (2,852,000L). The total capacity available in the proposed basins readily exceeds the design requirement. A depth marker would be installed in the final basin to indicate the

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sediment depth and the level of RL 8.12m AHD which would represent the design storage level allowing a freeboard of 180mm. The crest of the perimeter basin bund walls would be set at RL 8.2m AHD to allow for freeboard for flows over the bunds in severe rainfall events. The bund walls would be permeable constructed with poorly graded rock (50mm-150mm diameter), at a slope of 1V:0.5H with a crest width of 500mm.

Sediment accumulated in the final and perimeter basins would be removed weekly thereby reducing the requirement for sediment storage in the basins.

Water in the perimeter basins would be reused for dust suppression over the site. Dust suppression will be required for approximately 44% of Area 2 representing an area of 32,392m^2. The water demand for dust suppression would be typically 2L per m^2 per dry day over approximately 7,406m^2 of Area 2 and 1L per m^2 per dry day for approximately 24,986m^2 of Area 2. For the average number of dry days in a year (266 days for Newcastle, BOM), the overall demand for dust suppression in Area 2 would be approximately 10,606m^3. A 20L/s pump would be available to deliver water for dust suppression purposes or to assist in discharging water from the basins to the river when the water quality is suitable.

Water in the sediment basins would be tested regularly and if appropriate would be released or pumped to the river.

3. SURFACE WATER MANAGEMENT SYSTEMS

3.1 Settling Volumes

The settling volumes in the surface water management systems for Areas 1 and 2 have been calculated based on the methodology in Reference 2 for a 90 percentile 5 day rainfall event as specified in development consent condition B25 (d). This rainfall is 51.8mm as specified in Table 6.3a in Volume 1 of Reference 2.

The settling volume is calculated as:

Vs=10 x volumetric runoff coefficient x 90 percentile 5 day rainfall x area.

The recommended volumetric runoff coefficient in Table F2 in Volume 1 of Reference 2 for the worst case most dispersive soil (Type D) is 0.74 for design rainfall depths between 51mm and 60mm (design rainfall depth is 51.8mm).

The area for each management system on site is expressed in hectares in the above formula and is 0.52 ha for Area 1 and 7.439 ha for Area 2.

The required settling volumes according to Reference 2 are:

- Area 1 200 m^3
- Area 2 2852m^3

The settling volumes available in the surface water management systems for both areas readily exceeds these volumes and are:

- Area 1 286m^3;

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- Area 2 3793m^3.

The sediment storage in the two systems does not need to be significant as the basins and tanks will be cleared of accumulated sediment on a weekly basis.

3.2 Frequency of Overflows

Section 3.2 of this report deals with the requirements of the development consent conditions at B33 (c) and (e).

The selection of the design rainfall and the method of determination of the settling volume then governs the average annual overflow frequency from the system. In Table 6.2 of Reference 2, a system based on a 90 percentile rainfall is expected to have an annual overflow frequency of between 2 to 4 events per year.

The overflows are different from the controlled discharges which will occur after rainfall when the stored water meets to water quality guideline and water can be discharged to the river.

A water balance model was run with 14 years of 6 minute actual rainfall records for Newcastle between the years 1995 to 2008 to verify the overflow performance of the surface water management systems proposed for Areas 1 and 2. This rainfall record is recommended by Newcastle City Council for stormwater Water Sensitive Urban Design purposes in their area. This rainfall record has an average annual rainfall of 1125mm which is similar and therefore representative of the average annual rainfall of 1122mm from the 147 year rainfall record for Newcastle. The daily rainfall depths for this record and the evapo-transpiration rate are presented on Figure 3.

The water balance component of the well known MUSIC model was used to simulate the behaviour of the surface water management systems. The schematic layouts of these systems for Areas 1 and 2 are presented on Figure 4.

3.2.1 Area 1 – Surface Water Management System Performance

Runoff from Area 1 flows into the initial tank prior to being pumped to the holding tanks. Water from the holding tanks is reused as available for dust suppression. Overflows can occur from the initial tank and the holding tanks and this overflow will be directed to the sewer as trade waste. Discharges of water with suitable water quality to the river will occur from both the initial tank and the holding tanks.

The average annual total runoff from Area 1 was 4.46 ML/yr with 1.38ML/yr lost in evapo-transpiration (refer Figure 5). The pump has a capacity of 27L/s allowing all but 0.04ML/yr on average to overflow from the initial tank to the sewer. On average, 4.39 ML/yr will be transferred to the holding tanks (refer Figure 6). From the holding tanks, on average, 1.93ML/yr is treated and discharged to the river while 2.48ML/yr on average is reused for dust suppression. The demand for dust suppression on average was 2.78ML/yr (refer to Figure 7).

The daily runoff flow rate into Area 1 over the 14 year rainfall record is presented in Figure 8. In Figure 9 are the daily flow rates and number of overflow events from the Area 1 surface water

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management system. There are 19 overflow events over 14 years which on average is 1.4 overflow events per year. This performance is much better than the government guideline value of 2 to 4 overflows per year. The proposed surface water management system therefore has a performance which exceeds the government best practice guideline.

3.2.2 Area 2 – Surface Water Management System Performance

Runoff from Area 2 flows into the perimeter basins and final basin, is treated and discharged to the river via the final basin. Overflows can occur from the final basin if the water level exceeds RL 8.3m AHD. Discharges of water with suitable water quality to the river will occur from the final basin following treatment.

The average annual total runoff from Area 2 was 63.81ML/yr with 19.73ML/yr lost in evapo-transpiration (refer Figure 10). The pump with a capacity of 20L/s is used to supply water for dust suppression from the perimeter basins but is only able to supply on average 10.6ML/yr which is approximately only around 9% of the demand (refer Figure 11). On average, 2.54ML/yr overflows from the final basin to the river. The remainder of runoff, 44.55ML/yr is treated and discharged to the river.

The daily runoff flow rate into Area 2 over the 14 year rainfall record is presented in Figure 12. In Figure 13 are the daily flow rates and number of overflow events from the Area 2 surface water management system. There are 19 overflow events over 14 years which on average is 1.4 overflow events per year. This performance is much better than the government guideline value of 2 to 4 overflows per year. The proposed surface water management system therefore has a performance which exceeds the government best practice guideline.

4. Conclusions

The surface water management systems for Areas 1 and 2 have been designed in accordance with the development consent conditions and exceed the performance proposed by these conditions and the nominated best practice government guidelines.

This report demonstrates conformance with development consent conditions B25, B33 (c) and (e).

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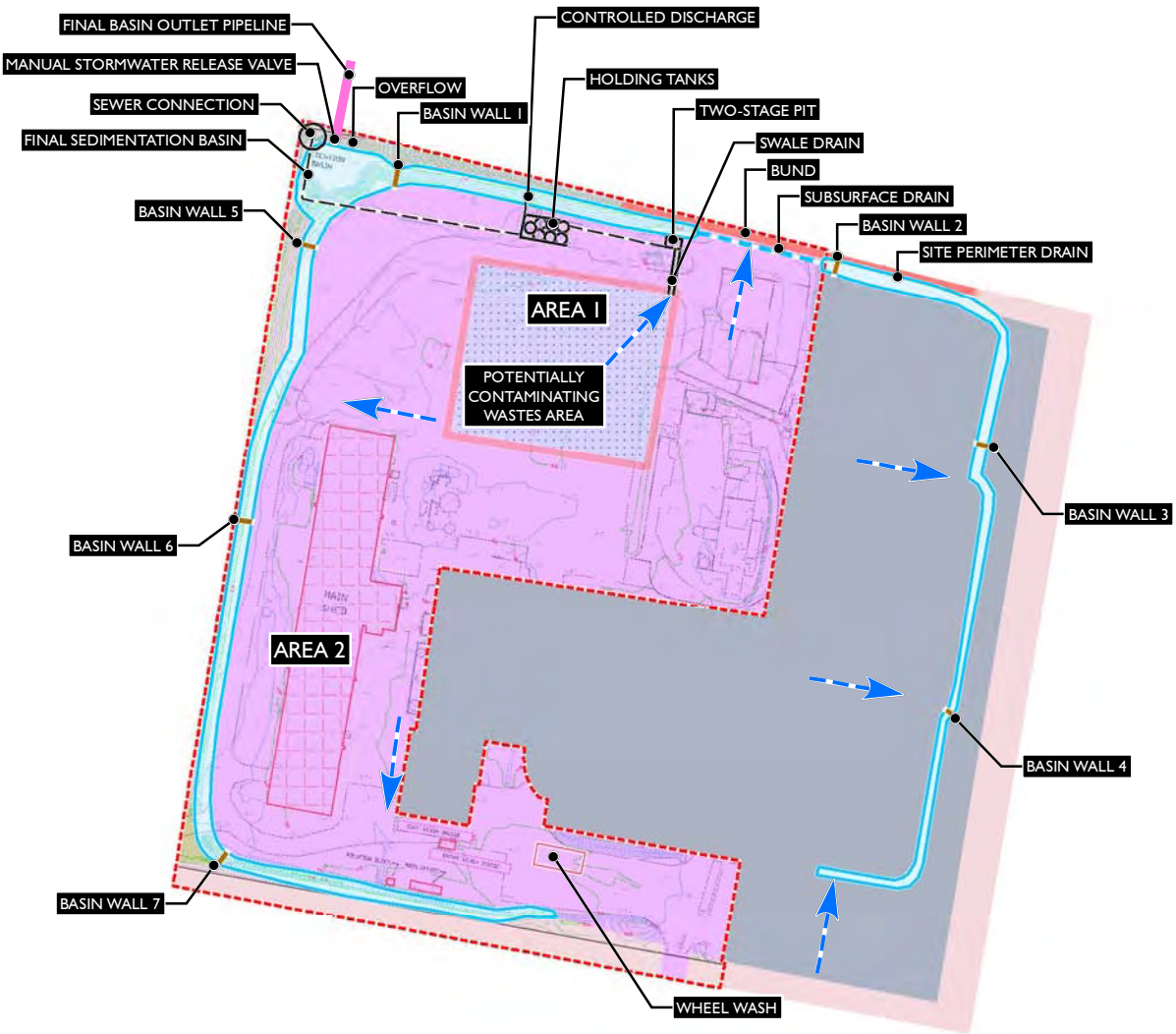
FIGURES



T:\Jobs\2014\J14152 - Benedict Newcastle Recycling\GIS\02_Maps\MP001_SWMP_20180716_01.mxd 16/07/2018

Source: EMM (2018)

0 50 100 m

GDA 1994 MGA Zone 56

N

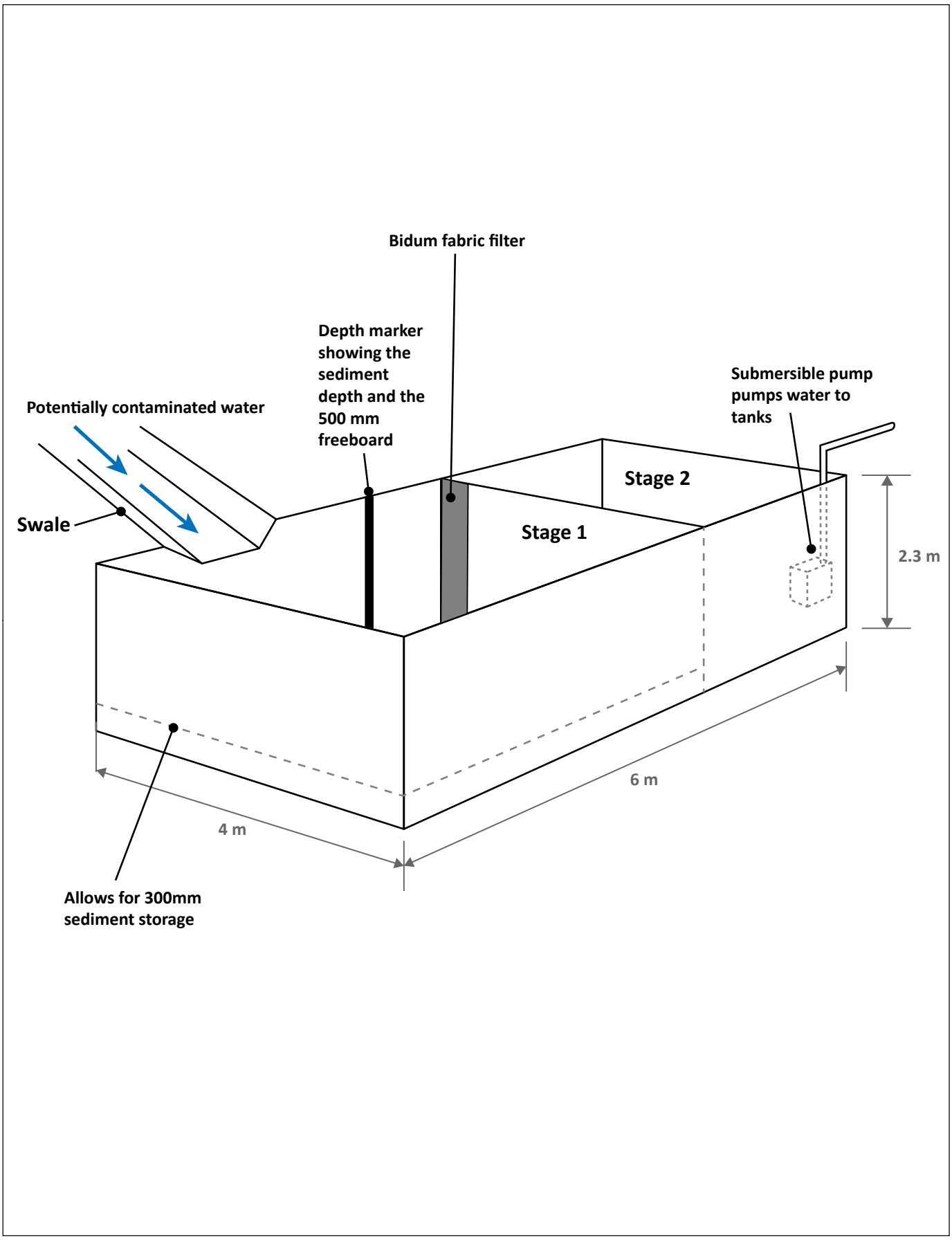
KEY

- Development area
- Recycling facility
- Drain and bund with single valved discharge point
- Bund
- Basin wall
- Overland flow path

Surface water management system

Mayfield Recycling Facility
Mayfield West
Figure 3.1

EMM



Two-stage pit schematic

Mayfield West Recycling Facility

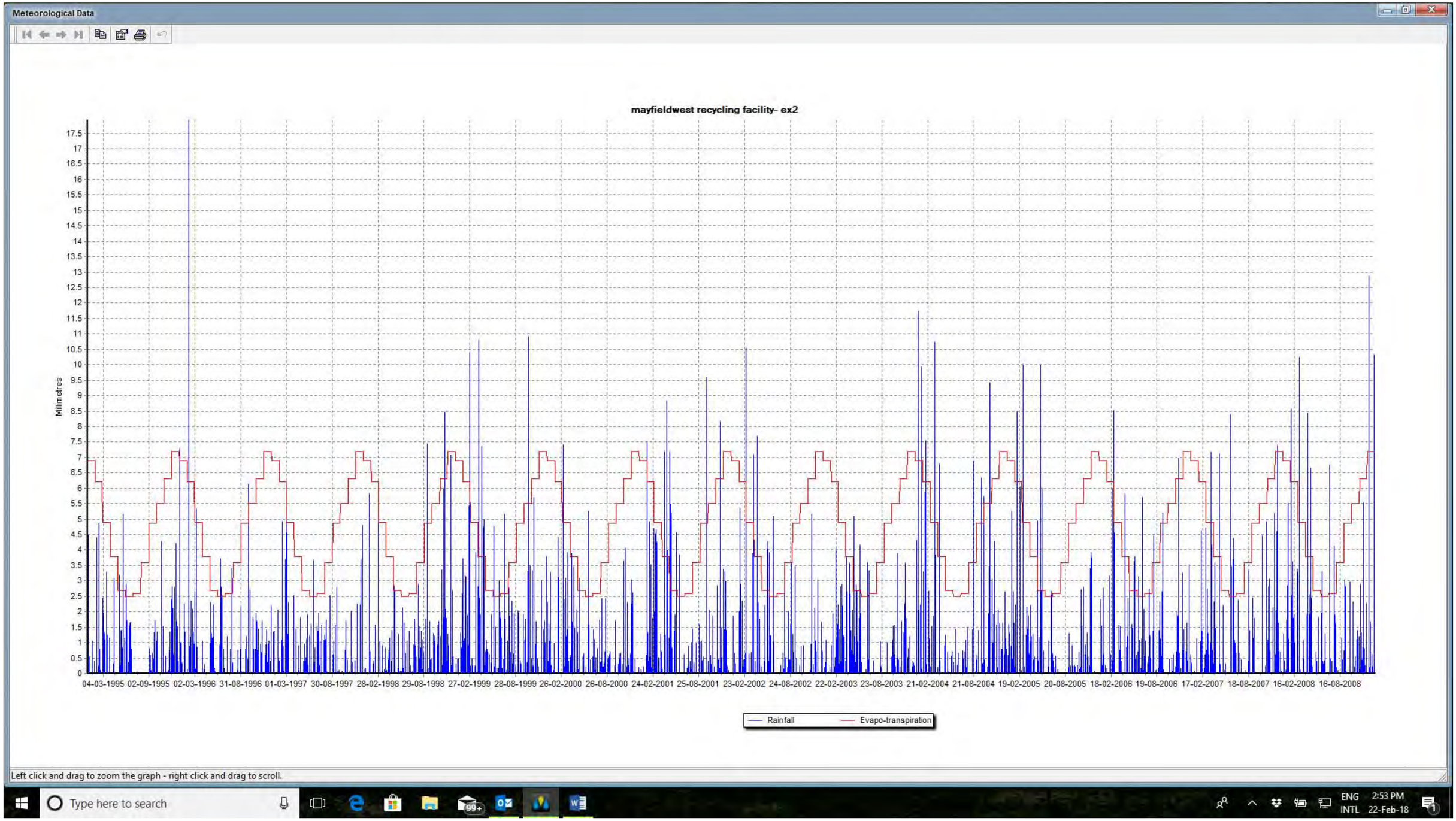
EMM

Figure 2

FIGURE 3

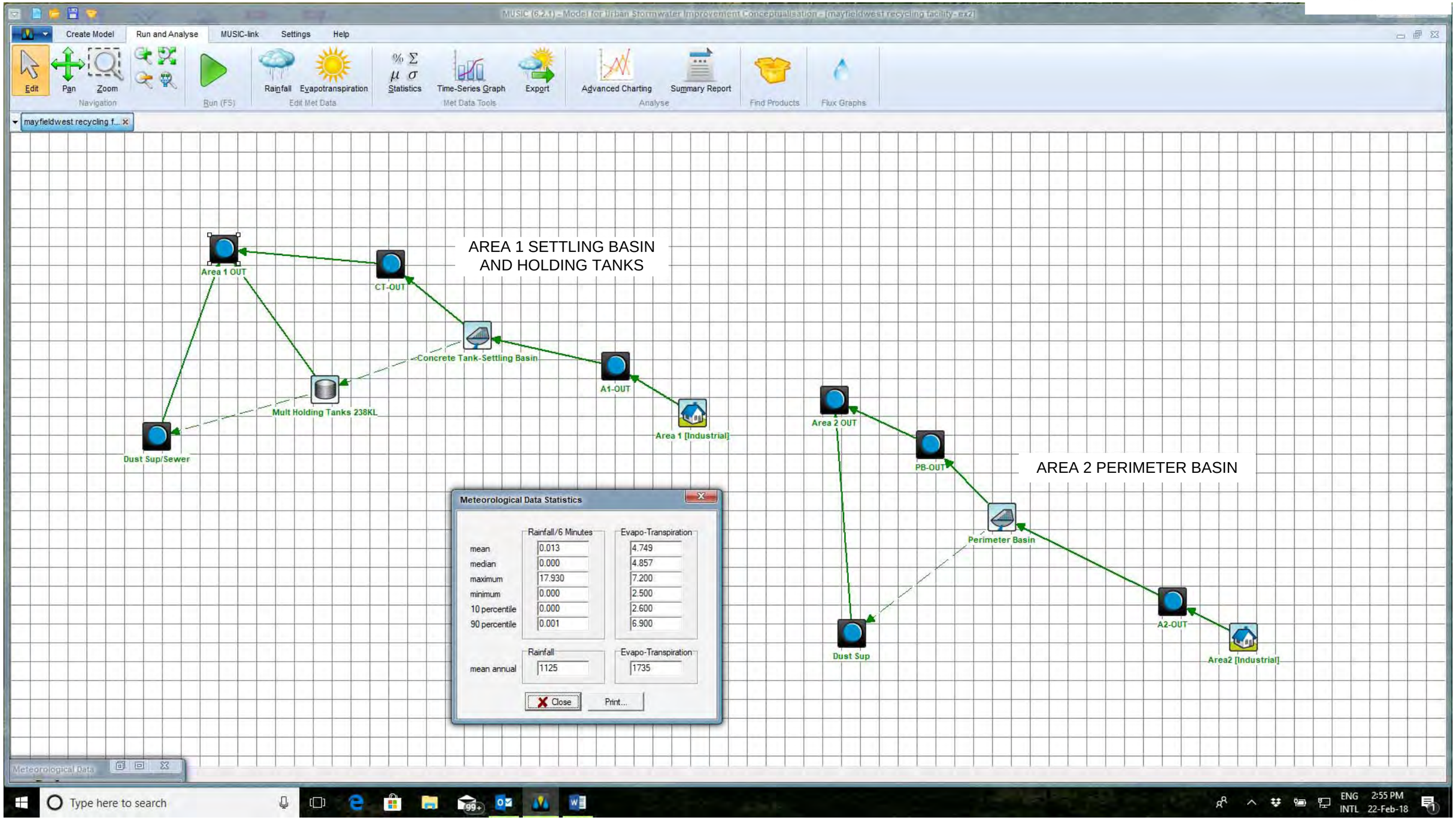
MUSIC MODELLING RESULTS – mayfieldwest recycling facility ex2.sqz

1. **RAINFALL**



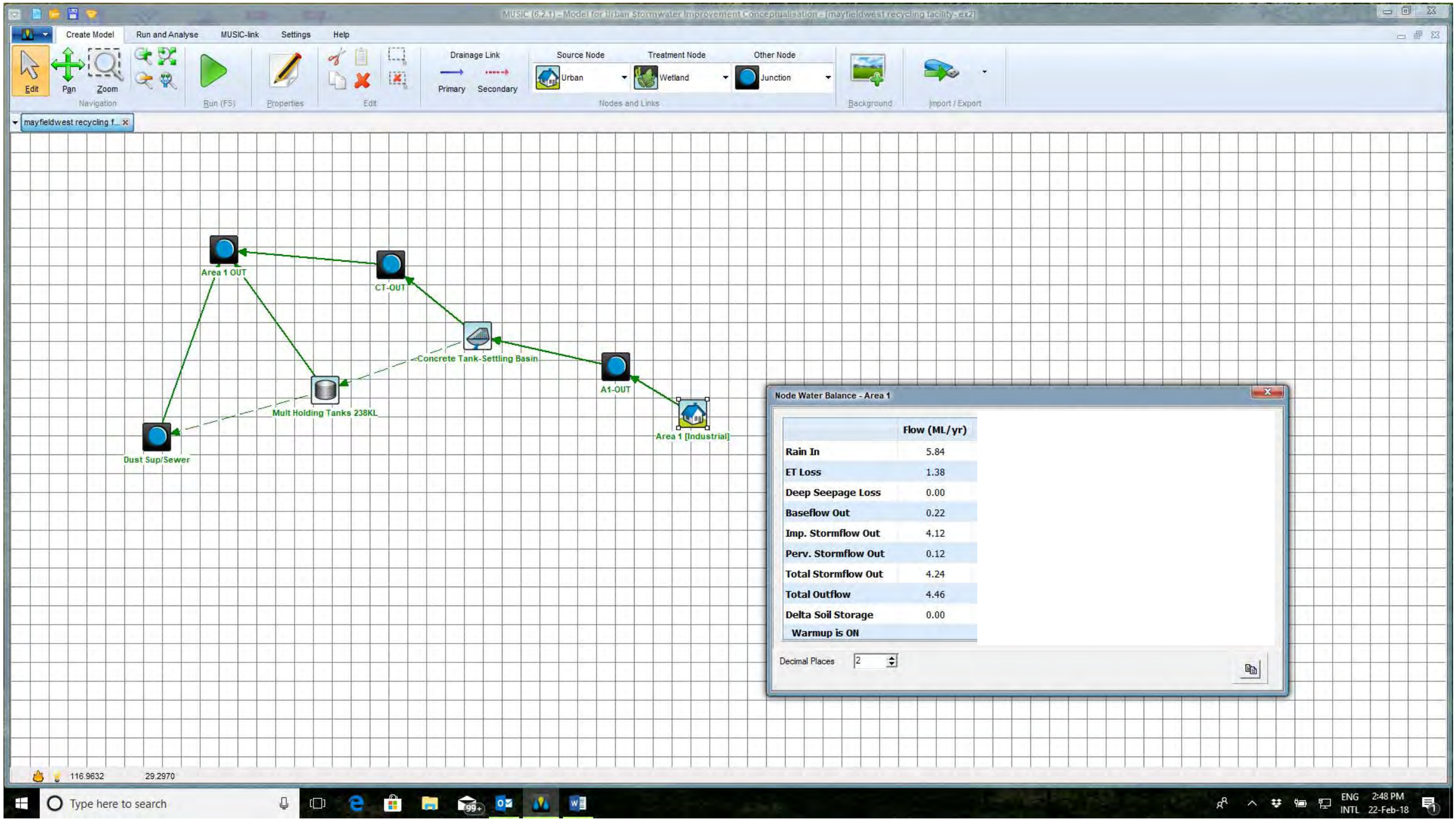
DAILY RAINFALL RECORD
FOR WATER BALANCE
ANALYSIS
1995-2008

FIGURE 4



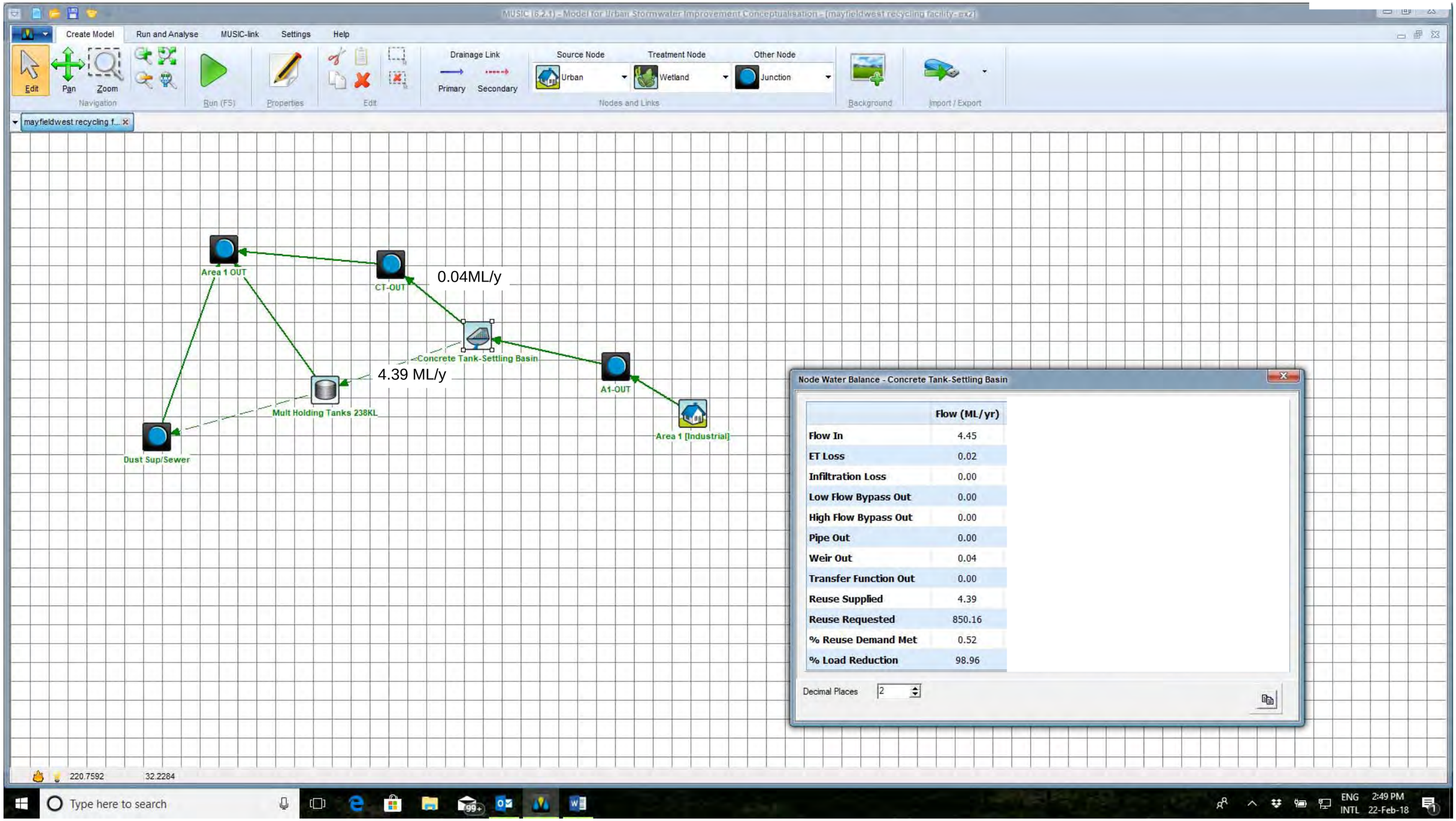
WATER BALANCE MODEL LAYOUTS

2. AREA 1 RESULTS (SMALL AREA)



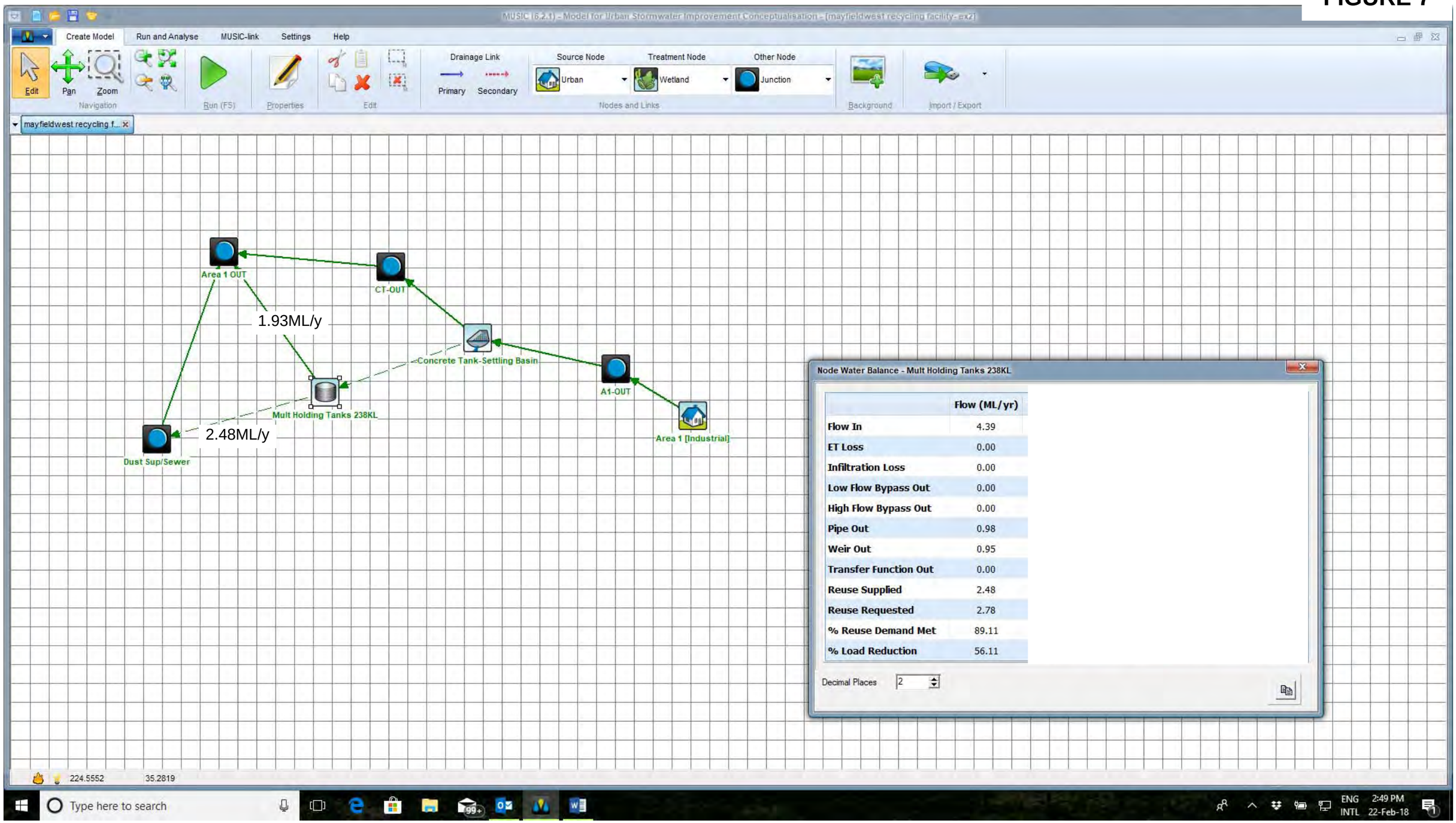
WATER BALANCE AREA 1
RUNOFF PRODUCED
4.46 ML/year

FIGURE 6



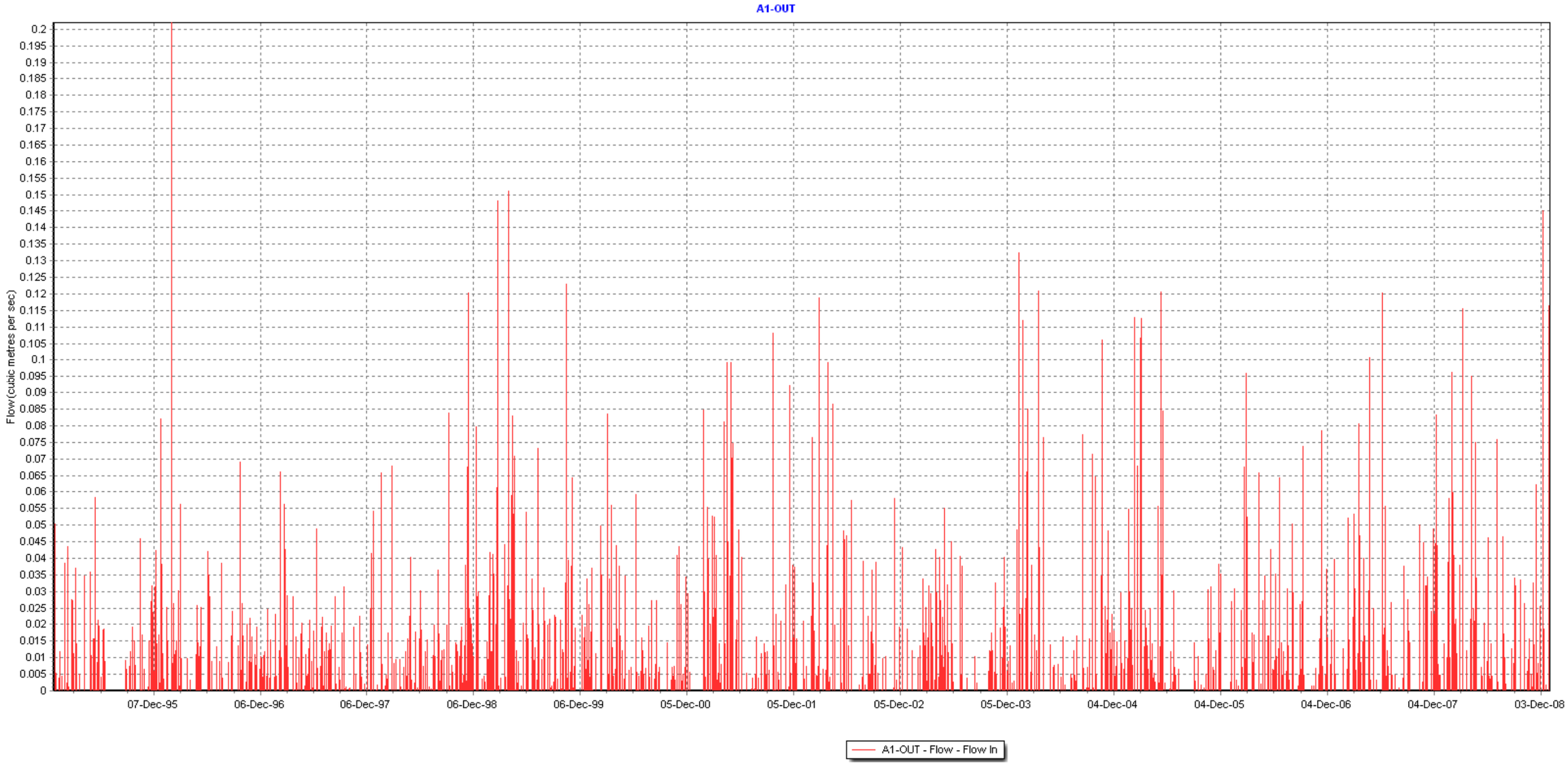
WATER BALANCE AREA 1
CONCRETE SETTLING BASIN

FIGURE 7



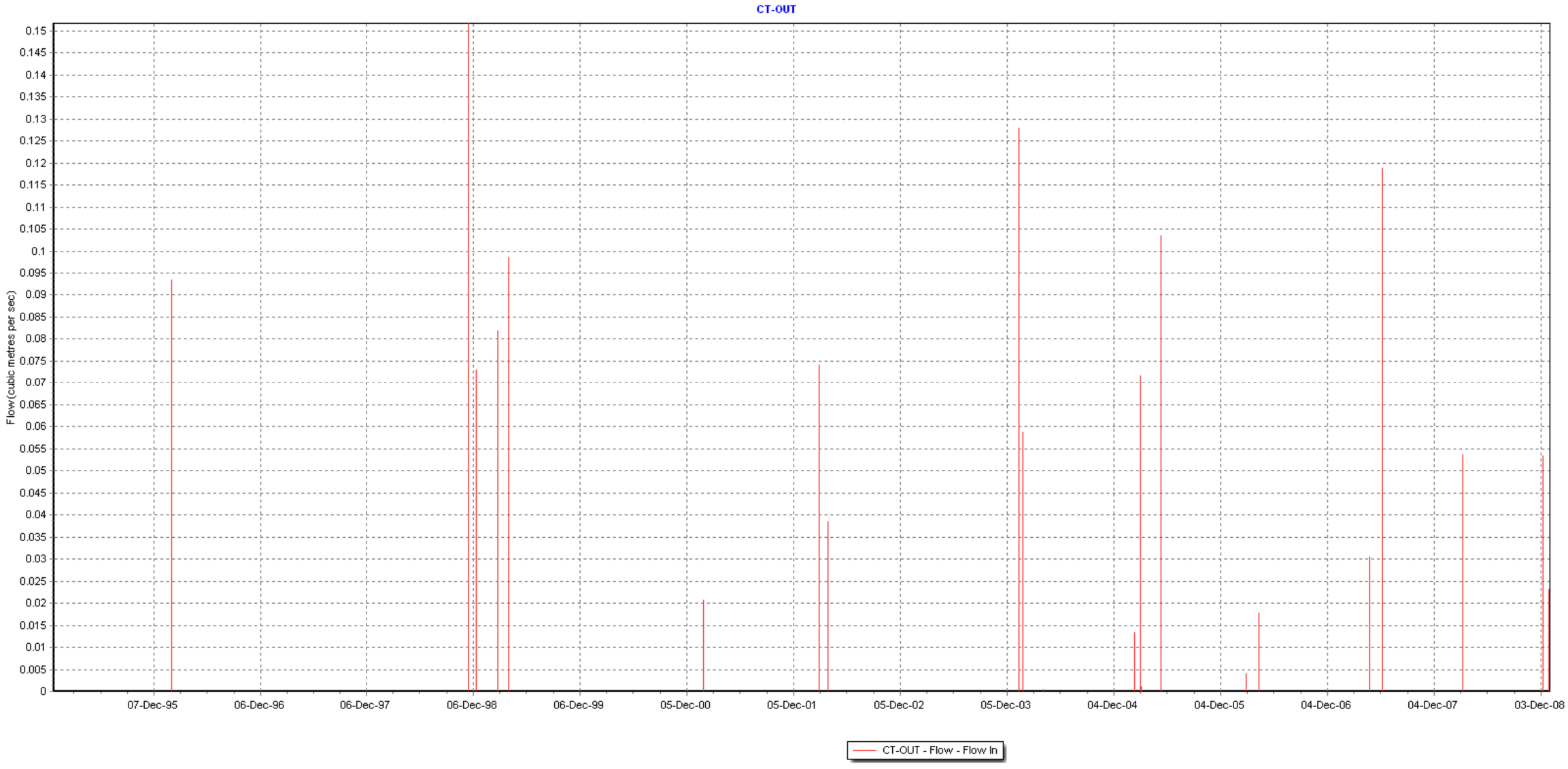
WATER BALANCE AREA 1
HOLDING TANKS

FIGURE 8



WATER BALANCE AREA 1
DAILY RUNOFF RATE INTO AREA 1
1995-2008

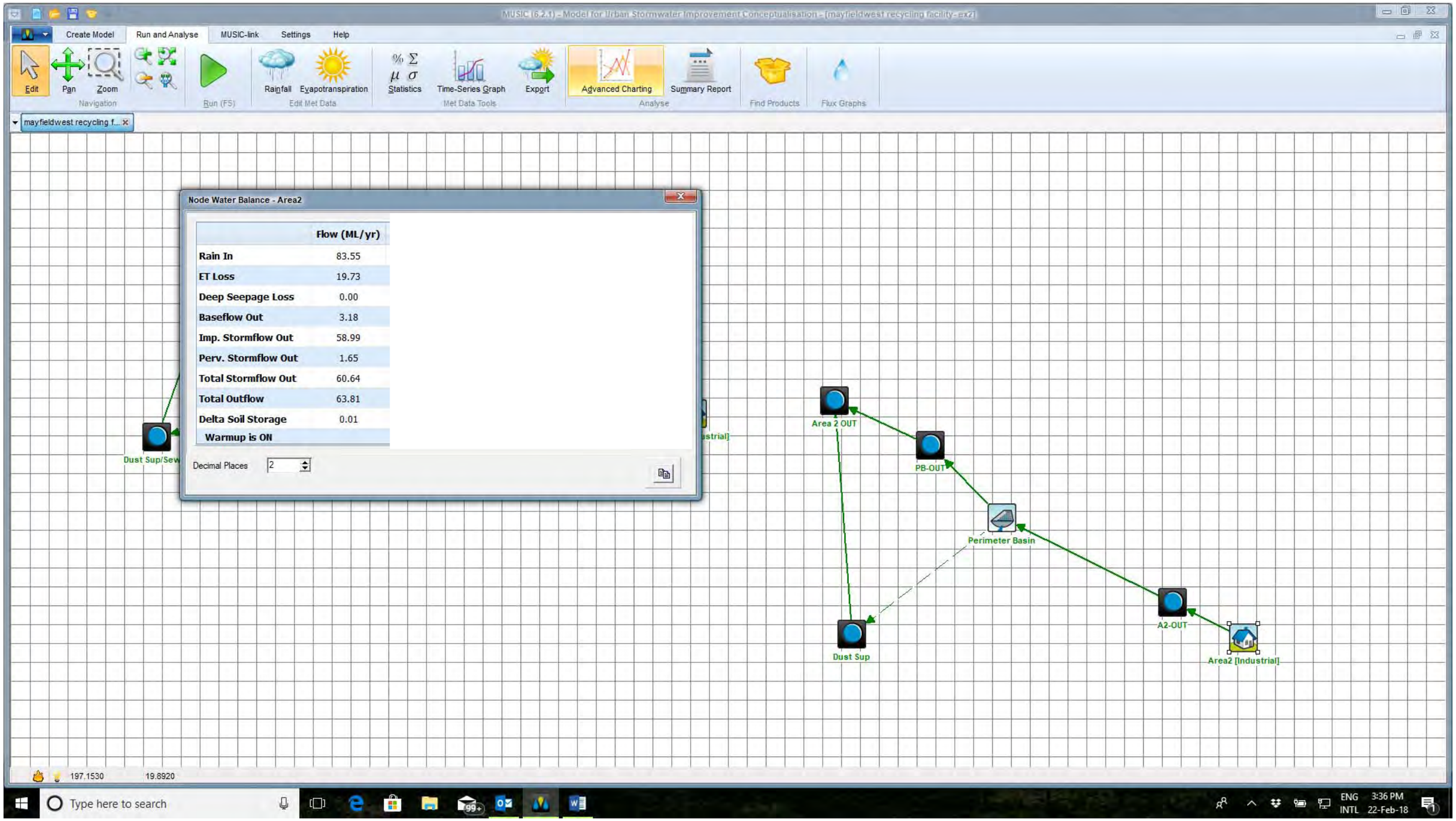
FIGURE 9



WATER BALANCE AREA 1
DAILY OVERFLOW RATE FROM
CONCRETE SETTLING BASIN
1995-2008

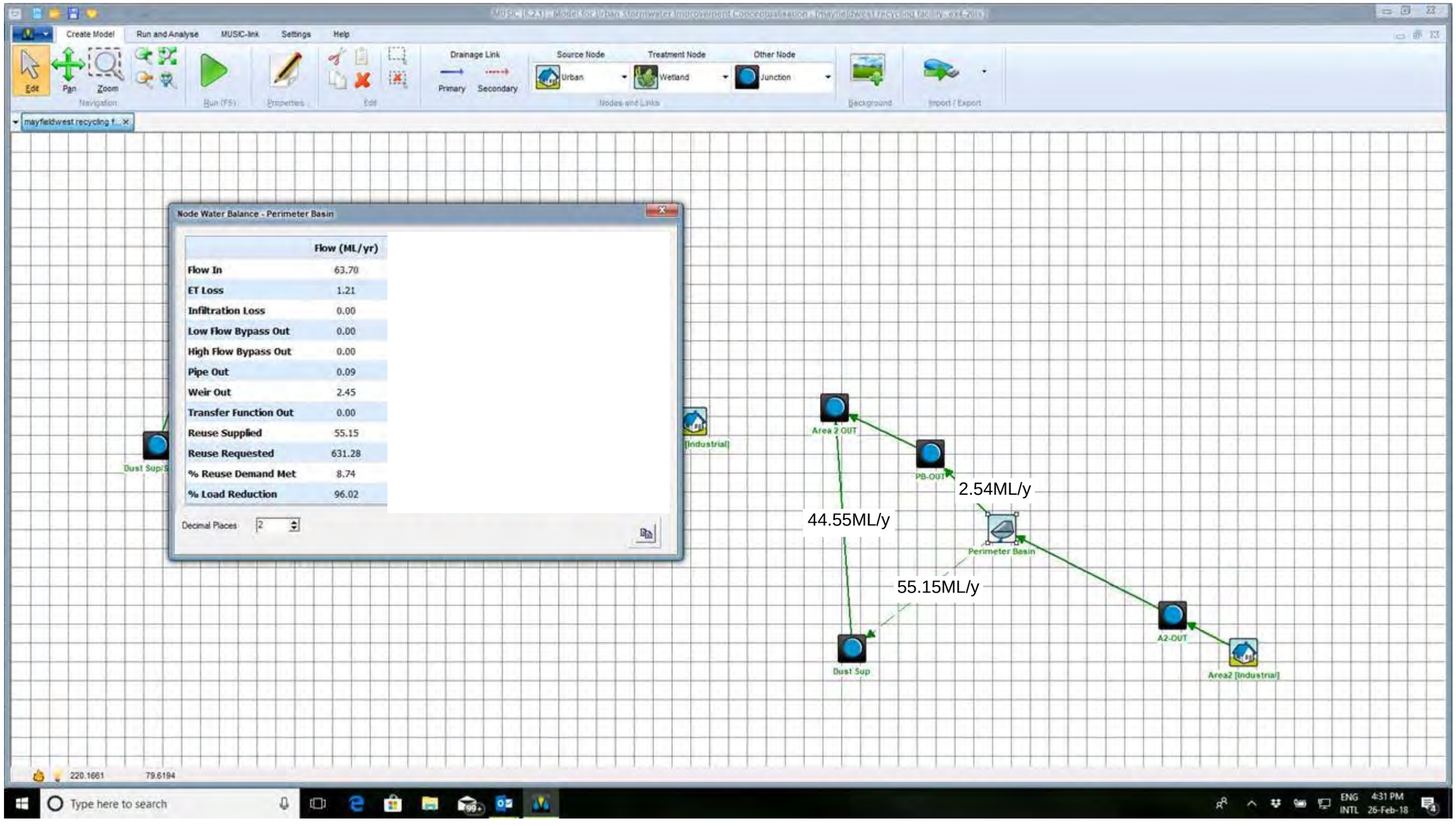
3. AREA 2 RESULTS (LARGE AREA)

FIGURE 10



WATER BALANCE AREA 2
RUNOFF PRODUCED
63.81 ML/y

20L/s



WATER BALANCE AREA 2
PERIMETER BASIN AND
CHANNELS

NSW GOVERNMENT | Planning & Environment

Contact Name: Jeremy Slattery
Number: +612 8276 1296
Email: Jeremy.Slattery@planning.nsw.gov.au

Mr Ernest Dupere
Benedict Recycling Pty Ltd
PO Box 431
Frenchs Forest NSW 1640

Attention: Philip Towler
ptowler@emmconsulting.com.au

Dear Mr Dupere

Mayfield West Recycling Facility
Endorsement of Experts
(SSD 7698)

I refer to your correspondence dated 22 March 2018, seeking approval for Mr Mark Tooker of Tooker & Associates to design a Surface Water Management System (SWMS) and Mr Chris Kuczera of EMM to prepare a Surface Water Characterisation and Mitigation Plan (SWCMP), as required by SSD 7698 Conditions B25 and B33.

The Department has reviewed the qualifications of Mr Mark Tooker and considers he has the appropriate skills and experience to design the Surface Water Management System.

The Department has reviewed the qualifications of Mr Chris Kuczera and considers he has the appropriate skills and experience to prepare a Surface Water Characterisation and Mitigation Plan.

Should you have any queries in relation to this matter, please contact Jeremy Slattery, Environmental Officer on the above contact details.

Yours sincerely

C. Ritchie

Chris Ritchie
Director
Industry Assessments
as delegate of the Secretary

4/4/18.

Appendix D

Water characterisation sampling results

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
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ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
MAYFIELD WEST NSW 2304

Attention Dayne Steggles

Project:	RCA ref 13465-702		
Date:	26/03/2018		
Client reference:	n/a		
Received date:	21/03/2018	**Number of samples:**	1
Client order number:	Not supplied	**Testing commenced:**	21/03/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Alkalinity	ENV-LAB112	mg/L	RCA Laboratories - Environmental	NATA	±6.97
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Sediment Pond
Water		
Sample Number	-	031813465001
Date Sampled	-	21/03/2018
Sampled By		LS
pH Value	pH unit	6.89
Total Suspended Solids	mg/L	1015
Oil & Grease**	mg/L	15
Hydroxide Alkalinity as CaCO3	mg/L	<1
Carbonate Alkalinity as CaCO3	mg/L	<1
Bicarbonate Alkalinity as CaCO3	mg/L	68
Total Alkalinity as CaCO3	mg/L	68

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

Note Sample received outside Technical Holing Time for pH

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
21/03/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	6.97
21/03/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	70
22/03/2018	Total Alkalinity	ENV-LAB112	mg/L	100	80.-120	100
26/03/2018	Oil & Grease**	ENV-LAB115	mg/L	100	17.5 – 32.5	82

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
031813465001	21/03/2018	pH	ENV-LAB006	pH	-	6.89	6.89
031813465001	21/03/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	1015	1020
031813465001	22/03/2018	Total Alkalinity	ENV-LAB112	mg/L	1	68	66
031813465001	26/03/2018	Oil & Grease**	ENV-LAB115	mg/L	5	15	15

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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1808718**	Page	: 1 of 9
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: LAURA SCHOFIELD	Contact	: Customer Services ES
Address	: PO BOX 175 92 HILL ST CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 2 4902 9200	Telephone	: +61-2-8784 8555
Project	: 13465	Date Samples Received	: 23-Mar-2018 10:55
Order number	:	Date Analysis Commenced	: 24-Mar-2018
C-O-C number	: ----	Issue Date	: 04-Apr-2018 12:22
Sampler	: CLIENT		
Site	: ----		
Quote number	: SYBQ/400/17		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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.

- EK085, Spike failed for SULFIDE due to matrix interferences (confirmed by re-analysis).
- EK085, LOR raised due to sample matrix.
- EP041A- NIS - invalidated Duplicate/Spike due to insufficient volume supplied.
- EP050: The MBAS reported is calculated as LAS, mol wt 342.
- 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	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**45**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**47**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**9**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**18**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		<1	----	----	----	----
Sodium	7440-23-5	1	mg/L		**8**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**2**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.18**	----	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.002**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.003**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.002**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.068**	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG035F: Dissolved Mercury by FIMS									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG049F: Dissolved Trivalent Chromium									
Trivalent Chromium	16065-83-1	0.01	mg/L		<0.01	----	----	----	----
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.12**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.02**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.34**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.36**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.2**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.6**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.61**	----	----	----	----
EK085M: Sulfide as S2-									
Sulfide as S2-	18496-25-8	0.1	mg/L		<0.5	----	----	----	----
EP041A: Nonionic Surfactants									
Nonionic Surfactants as CTAS	----	5	mg/L		<5	----	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		**0.2**	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	----	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		108	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	031813465001	----	----	----	----
				Client sampling date / time	21-Mar-2018 16:28	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1808718-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**84.7**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**76.1**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**18.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**38.5**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**38.9**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**83.9**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**91.5**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**97.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**99.8**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**100**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**95.1**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
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

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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
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Attention Dayne Steggles

Project:	RCA ref 13465-703		
Date:	16/04/2018		
Client reference:	n/a		
Received date:	5/04/2018	**Number of samples:**	1
Client order number:	Not supplied	**Testing commenced:**	5/04/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Alkalinity	ENV-LAB112	mg/L	RCA Laboratories - Environmental	NATA	±6.97
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Sediment Pond
Water		
Sample Number	-	041813465001
Date Sampled	-	5/04/2018
Sampled By		LS
pH Value	pH unit	7.89
Total Suspended Solids	mg/L	284
Oil & Grease**	mg/L	<5
Hydroxide Alkalinity as CaCO3	mg/L	<1
Carbonate Alkalinity as CaCO3	mg/L	<1
Bicarbonate Alkalinity as CaCO3	mg/L	70
Total Alkalinity as CaCO3	mg/L	70

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

Note Sample received outside Technical Holing Time for pH

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
5/04/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	6.98
5/04/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	71
5/04/2018	Total Alkalinity	ENV-LAB112	mg/L	100	80.-120	102
13/04/2018	Oil & Grease**	ENV-LAB115	mg/L	100	17.5 – 32.5	104

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
041813465001	5/04/2018	pH	ENV-LAB006	pH	-	7.89	7.92
041813465001	5/04/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	284	284
041813465001	5/04/2018	Total Alkalinity	ENV-LAB112	mg/L	1	70	73
041813465001	13/04/2018	Oil & Grease**	ENV-LAB115	mg/L	5	<5	<5

Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1809760**	Page	: 1 of 9
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: LAURA SCHOFIELD	Contact	: Customer Services ES
Address	: PO BOX 175 92 HILL ST CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 2 4902 9200	Telephone	: +61-2-8784 8555
Project	: 13465	Date Samples Received	: 05-Apr-2018 14:07
Order number	: ----	Date Analysis Commenced	: 06-Apr-2018
C-O-C number	: ----	Issue Date	: 11-Apr-2018 16:00
Sampler	: CLIENT		
Site	: ----		
Quote number	: SYBQ/400/17		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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.

- MBAS is calculated as LAS, molecular weight 342
- 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	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**106**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**88**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**13**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**39**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**2**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**11**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**3**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.06**	----	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.002**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.016**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.004**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.143**	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG035F: Dissolved Mercury by FIMS									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG049F: Dissolved Trivalent Chromium									
Trivalent Chromium	16065-83-1	0.01	mg/L		<0.01	----	----	----	----
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.05**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.72**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.77**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.7**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.5**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.12**	----	----	----	----
EK085M: Sulfide as S2-									
Sulfide as S2-	18496-25-8	0.1	mg/L		<0.1	----	----	----	----
EP041A: Nonionic Surfactants									
Nonionic Surfactants as CTAS	----	5	mg/L		<5	----	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		**0.2**	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**94.0**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	041813465001	----	----	----	----
				Client sampling date / time	05-Apr-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1809760-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**68.8**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**66.6**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**17.5**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**47.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**55.7**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**73.3**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**84.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**76.4**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**84.5**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**95.6**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**88.1**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
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

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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
MAYFIELD WEST NSW 2304

Attention Dayne Steggles

Project:	RCA ref 13465-704		
Date:	8/06/2018		
Client reference:	n/a		
Received date:	4/06/2018	**Number of samples:**	2
Client order number:	Not supplied	**Testing commenced:**	4/06/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Alkalinity	ENV-LAB112	mg/L	RCA Laboratories - Environmental	NATA	±6.97
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Sediment Pond	Pit
Water			
Sample Number	-	061813465001	061813465002
Date Sampled	-	4/06/2018	4/06/2018
Sampled By		LS	LS
pH Value	pH unit	8.64	7.54
Conductivity	µS/cm	305	112
Total Suspended Solids	mg/L	147	<5
Oil & Grease**	mg/L	<5	<5
Hydroxide Alkalinity as CaCO3	mg/L	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	104	78
Total Alkalinity as CaCO3	mg/L	104	78

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

Note Sample received outside Technical Holing Time for pH

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
4/06/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	7.04
4/06/2018	Conductivity	ENV-LAB010	µS/cm	1413	1385 - 1441	1409
5/06/2018	Conductivity	ENV-LAB010	µS/cm	1413	1385 - 1441	1417
4/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	72
6/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	71
5/06/2018	Total Alkalinity	ENV-LAB112	mg/L	100	80.-120	104
4/06/2018	Oil & Grease**	ENV-LAB115	mg/L	100	17.5 – 32.5	104

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
061813465001	4/6/2018	pH	ENV-LAB006	pH	-	8..64	8.63
061813465001	4/6/2018	Conductivity	ENV-LAB010	µS/cm	1	4.71	4.71
061813465001	5/06/2018	Conductivity	ENV-LAB010	µS/cm	1	305	310
061813465002	4/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	<5	<5
061813465001	6/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	147	148
061813465001	5/06/2018	Total Alkalinity	ENV-LAB112	mg/L	1	104	109
0618973004 BATCH	6/06/2018	Oil & Grease**	ENV-LAB115	mg/L	5	<5	<5

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Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1816333**	Page	: 1 of 10
Amendment	: **2**		
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: LAURA SCHOFIELD	Contact	: Customer Services ES
Address	: PO BOX 175 92 HILL ST CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 2 4902 9200	Telephone	: +61-2-8784 8555
Project	: 13465	Date Samples Received	: 05-Jun-2018 16:52
Order number	: ----	Date Analysis Commenced	: 06-Jun-2018
C-O-C number	: ----	Issue Date	: 19-Jun-2018 18:09
Sampler	: CLIENT		
Site	: ----		
Quote number	: SYBQ/400/17		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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.

- MBAS is calculated as LAS, molecular weight 342
- Amendment (19/06/2018): This report has been amended and re-released to allow the reporting of dissolved Al, Cu, Pb, Zn, Mn, Sr and Fe as per Laura.
- Amendment (13/06/2018): This report has been amended to add dissolved metals to sample ES1816333-001 as per the request received from Laura Schofield on 13/06/2018.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**103**	**29**	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**86**	**13**	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**16**	**14**	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**38**	**10**	----	----	----
Magnesium	7439-95-4	1	mg/L		**2**	**1**	----	----	----
Sodium	7440-23-5	1	mg/L		**9**	**6**	----	----	----
Potassium	7440-09-7	1	mg/L		**4**	<1	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.04**	**0.04**	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.001**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.002**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	<0.001	----	----	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.010**	**0.008**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.003**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.163**	**0.029**	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**5.12**	**0.18**	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	<0.001	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.004**	<0.001	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.010**	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.019**	**0.002**	----	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.002**	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.004**	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.035**	**0.002**	----	----	----
Gallium	7440-55-3	0.001	mg/L		**0.002**	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.124**	**0.007**	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		**0.003**	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.588**	**0.037**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.003**	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.207**	**0.030**	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	----	----	----
Vanadium	7440-62-2	0.01	mg/L		**0.02**	<0.01	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	**0.05**	----	----	----
Iron	7439-89-6	0.05	mg/L		**4.77**	**0.17**	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EG049F: Dissolved Trivalent Chromium									
Trivalent Chromium	16065-83-1	0.01	mg/L		<0.01	<0.01	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.2**	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.01**	<0.01	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.02**	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.32**	**1.44**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.34**	**1.44**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.9**	**0.2**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.2**	**1.6**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.15**	**0.02**	----	----	----
EP041A: Nonionic Surfactants									
Nonionic Surfactants as CTAS	----	5	mg/L		<5	<5	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		**0.2**	<0.1	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	<1	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<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	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**99.6**	**72.0**	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**116**	**94.3**	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**85.1**	**78.3**	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**22.4**	**24.7**	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**61.5**	**53.3**	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**72.1**	**47.8**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SEDIMENT - 061813465001	PIT-061813465002	----	----	----
				Client sampling date / time	04-Jun-2018 00:00	04-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1816333-001	ES1816333-002	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**80.8**	**69.5**	**----**	**----**	**----**
Anthracene-d10	1719-06-8	1.0	%		**78.1**	**70.1**	**----**	**----**	**----**
4-Terphenyl-d14	1718-51-0	1.0	%		**85.7**	**93.2**	**----**	**----**	**----**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**110**	**113**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**93.0**	**94.4**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**86.0**	**89.4**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
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

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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
MAYFIELD WEST NSW 2304

Attention Dayne Steggles

Project:	RCA ref 13465-705/1		
Date:	27/06/2018		
Client reference:	n/a		
Received date:	12/06/2018,	**Number of samples:**	1
Client order number:	Not supplied	**Testing commenced:**	12/06/2018

REPLACEMENT REPORT

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Alkalinity	ENV-LAB112	mg/L	RCA Laboratories - Environmental	NATA	±6.97
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

This report supersedes report 13465-705/0 due to typographical error

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Pit
Water		
Sample Number	-	061813465003
Date Sampled	-	12/06/2018
Sampled By		LS
pH Value	pH unit	8.83
Conductivity	µS/cm	540
Total Suspended Solids	mg/L	204
Oil & Grease**	mg/L	40
Hydroxide Alkalinity as CaCO3	mg/L	<1
Carbonate Alkalinity as CaCO3	mg/L	<1
Bicarbonate Alkalinity as CaCO3	mg/L	68
Total Alkalinity as CaCO3	mg/L	68

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
12/06/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	7.00
12/06/2018	Conductivity	ENV-LAB010	µS/cm	1413	1385 - 1441	1418
12/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	72
12/06/2018	Total Alkalinity	ENV-LAB112	mg/L	100	80.-120	105
18/06/2018	Oil & Grease**	ENV-LAB115	mg/L	100	80 - 120	119

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
061813465003	12/06/2018	pH	ENV-LAB006	pH	-	8.83	8.81
061813465003	12/06/2018	Conductivity	ENV-LAB010	µS/cm	1	540	530
061813465003	12/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	204	209
061813465003	12/06/2018	Total Alkalinity	ENV-LAB112	mg/L	1	68	68

Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1817001**	Page	: 1 of 10
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: LAURA SCHOFIELD	Contact	: Customer Services ES
Address	: PO BOX 175 92 HILL ST CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 2 4902 9200	Telephone	: +61-2-8784 8555
Project	: 13465	Date Samples Received	: 12-Jun-2018 14:22
Order number	:	Date Analysis Commenced	: 13-Jun-2018
C-O-C number	: ----	Issue Date	: 20-Jun-2018 17:23
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/400/17		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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.

- MBAS is calculated as LAS, molecular weight 342
- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- Amendment (19/06/2018): This report has been amended and re-released to allow the reporting of Dissolved metals as per Laura.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**189**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**178**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**40**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**69**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**4**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**37**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**4**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.02**	----	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.006**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.003**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	----	----	----	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.002**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.012**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.216**	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Titanium	7440-32-6	0.01	mg/L		<0.01	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		**0.002**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		**0.01**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Boron	7440-42-8	0.05	mg/L		**0.06**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**6.94**	----	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		**0.001**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.012**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.013**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.037**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.003**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.008**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.058**	----	----	----	----
Gallium	7440-55-3	0.001	mg/L		**0.002**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.108**	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		**0.005**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.416**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.015**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.250**	----	----	----	----
Tin	7440-31-5	0.001	mg/L		**0.001**	----	----	----	----
Titanium	7440-32-6	0.01	mg/L		**0.10**	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		**0.002**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		**0.03**	----	----	----	----
Boron	7440-42-8	0.05	mg/L		**0.05**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**6.54**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		**0.0001**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EG049F: Dissolved Trivalent Chromium									
Trivalent Chromium	16065-83-1	0.01	mg/L		<0.01	----	----	----	----
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	----	----	----	----
EK025SF: Free CN by Segmented Flow Analyser									
Free Cyanide	----	0.004	mg/L		<0.004	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	----	----	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	0.004	mg/L		<0.004	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.5**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.05**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.21**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**1.83**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**2.04**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.2**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**3.2**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.38**	----	----	----	----
EP041A: Nonionic Surfactants									
Nonionic Surfactants as CTAS	----	5	mg/L		<5	----	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		**1.2**	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		**2.2**	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		**5.6**	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		**6.0**	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		**2.6**	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		**2.3**	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		**2.8**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		**1.3**	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		**2.0**	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		**2.2**	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		**2.6**	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		**29.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		**2.9**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**89.0**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465003	----	----	----	----
				Client sampling date / time	12-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817001-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**88.9**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**100**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**17.4**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**39.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**43.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**84.0**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**78.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**88.3**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**108**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**87.4**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**93.4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
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

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
MAYFIELD WEST NSW 2304

Attention Dayne Steggles

Project:	RCA ref 13465-706		
Date:	21/06/2018		
Client reference:	n/a		
Received date:	15/06/2018,	**Number of samples:**	1
Client order number:	Not supplied	**Testing commenced:**	15/06/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Alkalinity	ENV-LAB112	mg/L	RCA Laboratories - Environmental	NATA	±6.97
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Sediment Pond
Water		
Sample Number	-	061813465004
Date Sampled	-	15/06/2018
Sampled By		LS
pH Value	pH unit	7.04
Conductivity	µS/cm	289
Total Suspended Solids	mg/L	325
Oil & Grease**	mg/L	78
Hydroxide Alkalinity as CaCO3	mg/L	<1
Carbonate Alkalinity as CaCO3	mg/L	<1
Bicarbonate Alkalinity as CaCO3	mg/L	37
Total Alkalinity as CaCO3	mg/L	37

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
15/06/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	7.04
15/06/2018	Conductivity	ENV-LAB010	µS/cm	1413	1385 - 1441	1412
15/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	77
15/06/2018	Total Alkalinity	ENV-LAB112	mg/L	100	80.-120	105
18/06/2018	Oil & Grease**	ENV-LAB115	mg/L	100	80 - 120	119

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
061813465004	15/06/2018	pH	ENV-LAB006	pH	-	8.59	8.61
061813465004	15/06/2018	Conductivity	ENV-LAB010	µS/cm	1	289	306
061813465004	15/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	325	316
061813465004	15/06/2018	Total Alkalinity	ENV-LAB112	mg/L	1	37	37

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Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1817524**	Page	: 1 of 10
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: LAURA SCHOFIELD	Contact	: Customer Services ES
Address	: PO BOX 175 92 HILL ST CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 2 4902 9200	Telephone	: +61-2-8784 8555
Project	: 13465	Date Samples Received	: 15-Jun-2018 15:28
Order number	: ----	Date Analysis Commenced	: 16-Jun-2018
C-O-C number	: ----	Issue Date	: 21-Jun-2018 16:10
Sampler	: CLIENT		
Site	: ----		
Quote number	: SYBQ/400/17		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, 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.

- MBAS is calculated as LAS, molecular weight 342
- EK040-P: Poor spike recovery for Fluoride due to matrix interferences.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**96**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**63**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**12**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**35**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**2**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**13**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**4**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.04**	----	----	----	----
ø **Germanium**	7440-56-4	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		**0.001**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.003**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.006**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.005**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.122**	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**8.34**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		**0.001**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.016**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.003**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.030**	----	----	----	----
Gallium	7440-55-3	0.001	mg/L		**0.004**	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		**0.006**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.059**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.973**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.005**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.008**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.161**	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		**0.001**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		**0.03**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.154**	----	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**7.34**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG049F: Dissolved Trivalent Chromium									
Trivalent Chromium	16065-83-1	0.01	mg/L		<0.01	----	----	----	----
EG050F: Dissolved Hexavalent Chromium									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EG050F: Dissolved Hexavalent Chromium - Continued									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	----	----	----	----
EK025SF: Free CN by Segmented Flow Analyser									
Free Cyanide	----	0.004	mg/L		<0.004	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	----	----	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	0.004	mg/L		<0.004	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.3**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.04**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.05**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.61**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.66**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.0**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.7**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**1.14**	----	----	----	----
EP041A: Nonionic Surfactants									
Nonionic Surfactants as CTAS	----	5	mg/L		<5	----	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	----	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		71.0	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	061813465004 SEDIMENT POND	----	----	----	----
				Client sampling date / time	15-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1817524-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate - Continued									
Dibromo-DDE	21655-73-2	0.5	%		62.2	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		74.4	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		18.6	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		48.8	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		55.5	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		74.2	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		89.9	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		88.6	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		109	----	----	----	----
Toluene-D8	2037-26-5	2	%		105	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		99.6	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
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

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NATA Accredited Laboratory 9811
Corporate Site Number 18077
Accredited for compliance with ISO/IEC 17025

Benedict
1a McIntosh Drive,
MAYFIELD WEST NSW 2304

Attention Dayne Steggles

Project:	RCA ref 13465-707		
Date:	26/06/2018		
Client reference:	n/a		
Received date:	19/06/2018,	**Number of samples:**	1
Client order number:	Not supplied	**Testing commenced:**	19/06/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-LAB006*	pH	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±11.48
Oil & Grease**	ENV-LAB115	mg/L	RCA Laboratories – Environmental	NON-NATA	

***** The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards

****** Indicates NATA accreditation does not cover the performance of this service

2 RESULTS

ANALYSIS	UNITS	Sediment Pond
Water		
Sample Number	-	061813465005
Date Sampled	-	19/06/2018
Sampled By		LS
pH Value	pH unit	8.86
Conductivity	µS/cm	244
Total Suspended Solids	mg/L	100
Oil & Grease**	mg/L	<5

****** Indicates NATA accreditation does not cover the performance of this service

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA.

Analysis on samples is on an as received basis.

Note Sample received outside Technical Holing Time for pH

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
19/06/2018	pH	ENV-LAB006	pH	7.00	6.95 - 7.05	6.99
19/06/2018	Conductivity	ENV-LAB010	µS/cm	1413	1385 - 1441	1418
19/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	35	31.5 – 38.5	71
21/06/2018	Oil & Grease**	ENV-LAB115	mg/L	100	17.5 – 32.5	90

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
061813465005	19/06/2018	pH	ENV-LAB006	pH	-	8.86	8.84
061813465005	19/06/2018	Conductivity	ENV-LAB010	µS/cm	1	244	243
061813465005	19/06/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	100	98
06181465005	21/06/2018	Oil & Grease**	ENV-LAB115	mg/L	5	<5	<5

Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories – Environmental
Approved Signatory

Neena Tewari
Senior Environmental Microbiologist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories - Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data maybe available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample

Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.

2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.

3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

Appendix E

Trigger value assumptions

Table E.1 Terminology

Term	Description
Acute Toxicity	Rapid adverse effect (e.g. death) caused by a substance in a living organism. Can be used to define either the exposure or the response to an exposure (effect). Most acute toxicity values are established from laboratory testing based on 36 to 96 hours of exposure.
Acute to Chronic Ratio (ACR)	The species mean acute value divided by the chronic value for the same species.
Assessment Factor (AF)	A unitless number applied to the lowest toxicity figure for a chemical to derive a concentration that should not cause adverse environmental effects; also called 'application factor' or 'safety factor', the size of the AF varies with the type of data
Chronic	Lingering or continuing for a long time; often for periods from several weeks to years. Can be used to define either the exposure of an aquatic species or its response to an exposure (effect). Chronic exposure typically includes a biological response of relatively slow progress and long continuance, often affecting a life stage.
Chronic Value	The geometric mean of the lower and upper limits obtained from an acceptable chronic test or by analysing chronic data using a regression analysis. A lower chronic limit is the highest tested concentration that did not cause an unacceptable amount of adverse effect on any of the specified biological measurements, and below which no tested concentration caused unacceptable effect. An upper chronic limit is the lowest tested concentration that did cause an unacceptable amount of adverse effect on one or more biological measurements and above which all tested concentrations also caused such an effect.
Environmental Concern Level (ECL)	A low reliability trigger value that has been calculated using the methods described in Section 8.3.4.5 of ANZECC (2000).
EC50 (median effective concentration)	The concentration of material in water that is estimated to be effective in producing some lethal response in 50% of the test organisms. The LC50 is usually expressed as a time-dependent value (e.g. 24-hour or 96-hour LC50).
Guideline Trigger Value	These are the concentrations (or loads) of the key performance indicators measured for the ecosystem, below which there exists a low risk that adverse biological (ecological) effects will occur. They indicate a risk of impact if exceeded and should 'trigger' some action, either further ecosystem specific investigations or implementation of management/remedial actions.
High Reliability Trigger Value	Trigger values that have a higher degree of confidence because they are derived from an adequate set of chronic toxicity data (section 8.3.4) and hence require less extrapolation from the data to protect ecosystems.
Moderate Reliability Trigger Value	Trigger values that have a higher degree of confidence because they are derived from an adequate set of chronic toxicity data (section 8.3.4) and hence require less extrapolation from the data to protect ecosystems.
LC50 (median lethal concentration)	The concentration of material in water that is estimated to be lethal to 50% of the test organisms. The LC50 is usually expressed as a time-dependent value, e.g. 24-hour or 96-hour LC50, the concentration estimated to be lethal to 50% of the test organisms after 24 or 96 hours of exposure.
LOEL (Lowest observed effect level)	The lowest concentration that produces an observable effect in a test species. Below this concentration there are no observed effects in the test species.
Low Reliability Trigger Value	Trigger values that have a low degree of confidence because they are derived from an incomplete data set (section 8.3.4.1). They are derived using either assessment factors or from modelled data using the statistical method. They should only be used as interim indicative working levels.
LOEC (Lowest observed effect concentration)	The lowest concentration of a material used in a toxicity test that has a statistically significant adverse effect on the exposed population of test organisms as compared with the controls. When derived from a life-cycle or partial life-cycle test, it is numerically the same as the upper limit of the MATC.

Table E.1 Terminology

Term	Description
Mixing Zones	An explicitly defined area around an effluent discharge where effluent concentrations may exceed guideline values and therefore result in certain environmental values not being protected. The size of the mixing zone is site specific.
Moderate Reliability Trigger Value	Trigger values that have a moderate degree of confidence because they are derived from an adequate set of acute toxicity data (section 8.3.4) and hence require more extrapolation than high reliability trigger values, including an acute-to-chronic conversion.
Moderate Reliability Trigger Value	Trigger values that have a higher degree of confidence because they are derived from an adequate set of chronic toxicity data (section 8.3.4) and hence require less extrapolation from the data to protect ecosystems.
NOEC (No observed effect concentration)	The highest concentration of a toxicant at which no statistically significant effect is observable, compared to the controls; the statistical significance is measured at the 95% confidence level.

Table E.2 Acute trigger value assumptions

Analyte	Units	Maximum concentration	Trigger value (chronic exposure)	Trigger value (acute exposure)	Acute trigger source / assumptions
anionic surfactants	mg/L	1.2	0.28	1.82	An ACR of 6.5 is recommended for Anionic Surfactants (also referred to as LAS) in Environmental Toxicology and Risk Assessment (Landis et all, 1993). This ACR was applied to the chronic high reliability trigger value of 0.28 mg/l that is provided ANZECC (2000).
aluminium	mg/L	0.18	0.055	0.45	The chronic value for Aluminium (in freshwater with a pH >6.5) that is provided in ANZECC (2000) was calculated using an ACR of 8.2. An acute value of 0.451 mg/l is proposed using the ANZECC (2000) chronic value and the ACR of 8.2.
cobalt	mg/L	0.003	0.001	0.110	The technical report: Water Quality Guideline for Cobalt (Nagpal , 2004) was prepared for the British Columbia Government. This guideline recommends 0.004 mg/l and 0.110 mg/l as chronic and acute fresh water trigger values for cobalt. The document also concluded that "marine effects data indicates that marine species exhibit similar or somewhat less sensitivity to water-borne cobalt compared to freshwater species" The fresh water acute value of 0.110 mg/l has been adopted.
copper	mg/L	0.03	0.0013	0.007	The following acute trigger values are provided in north American guidelines (for water hardness of 50mg/l) • Alberta Guidelines – 0.0081 mg/l • USEPA – 0.0092 mg/l • British Columbia – 0.007 mg/l The USEPA (Aquatic Life Ambient Freshwater Criteria – Copper, 2007) applies a freshwater ACR of 3.22. An acute trigger value of 0.0094 mg/l was calculated from the ANZECC (2000) chronic trigger value of 0.0029 mg/l using this ACR. An acute trigger value of 0.007 mg/l was conservatively adopted based on the balance of data.

Table E.2 Acute trigger value assumptions

Analyte	Units	Maximum concentration	Trigger value (chronic exposure)	Trigger value (acute exposure)	Acute trigger source / assumptions
lanthanum	mg/L	0.006	0.004	0.012	No acute trigger levels for lanthanum could be found. An acute value of 0.012 mg/l is proposed using a conservative ACR of 3.
strontium	mg/L	0.216	0.15	1.50	Information on Strontium toxicity is not provided in ANZECC (2000). A chronic ECL value of 0.15 mg/l was calculated using the methods recommended in Section 8.3.4.5. ANZECC (2000). An acute trigger value of 1.5 mg/l is proposed using the ECL value and a default ACR of 10.
zinc	mg/L	0.154	0.015	0.045	ANZECC (2000) recommends an ACR of 3 for zinc in marine water (Volume 2 pg 8.3-153). This was applied to the high reliability marine trigger value of 0.015 mg/l to calculate an acute value of 0.045 mg/l.

Appendix F

Compliance certificate

TOOKER+ ASSOCIATES

Benedict Recycling Pty Ltd
Mayfield West Recycling Facility
1A McIntosh Drive, Mayfield West
Attention: Mr Peter Mills

22 June 2018

Dear Sir,

Area 1 Initial Tank and Holding Tanks Inspection

The expanded operations at the Mayfield West Recycling Facility were approved on the 13 March 2018 by the Minister of Planning as State Significant Development No. 7698. Schedule 2 Part B Consent Condition B25 entitled Surface Water Management System requires the water management system to be designed and constructed by a person endorsed by the Secretary. I have been endorsed by the Secretary for this purpose.

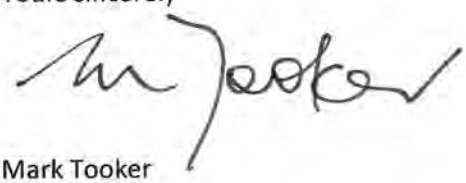
The surface water management system for the site has been divided into two separate areas. The bunded Area 1, "Potentially Contaminated Wastes Area", from which surface runoff will be captured in an initial tank (6m x 4m x 2m deep) and pumped to holding tanks with a capacity of 230,000L. Water in the holding tanks will be reused onsite for dust suppression and excess water will be discharged to the perimeter channel if the water has suitable quality. Any excess water which does not meet the water quality requirements will be discharged to the sewer.

The initial tank was proposed to be a three stage tank to aid settling of sediment. It was found that there was excessive turbulence in the first stage chamber so this chamber was enlarged to incorporate the first two stages into one stage with plan dimensions of 4m x 4m. This improves the initial settling behaviour in the tank. Also, the tank depth has been increased from 2m to 2.5m to further aid settling in the tank.

The Area 1 surface management equipment was inspected on the 21 June 2018. This letter is to confirm that the initial tank has been installed as a two stage tank with dimensions of 4m x 6m x 2.5m deep. Flocculation equipment has been installed to deliver flocculant to all areas of the tank to aid removal of particulate matter. A 29 L/s pump has been installed to transfer water from the initial tank to the holding tanks. Five holding tanks each with a capacity of 50,000L provides a storage capacity of 250,000L which is above the design volume required of 230,000m3. This volume was chosen because it suited the commercially available tank sizes. It is a favourable outcome because it will further reduce the potential for overflows. Drainage pipes are installed to deliver water from the tanks to the perimeter basin or to the sewer as required.

In accordance with Condition B26, I confirm that the Area 1 surface water management equipment has been installed to achieve the outcomes in the project approval.

Yours sincerely



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