Mayfield West Recycling Facility

Surface Water Characterisation and Mitigation Plan

Prepared for Benedict Recycling Pty Limited

July 2025

Mayfield West Recycling Facility

Surface Water Characterisation and Mitigation Plan

Benedict Recycling Pty Limited

J14152 RP27d

July 2025

Version	Date	Prepared by	Reviewed by	Comments
V1	11 September 2023	Chris Kuczera	Phil Towler	Draft for client review
V2	13 September 2023	Chris Kuczera	Phil Towler	Final
V3	30 April 2025	Zainab Ahmed	Chris Kuczera	Updated to include Modification 3 approval
V4	04 July 2025	Chris Kuczera	Zainab Ahmed	Updated to address DPHI comments on V3

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Executive Summary

Benedict Recycling Pty Ltd (Benedict) is the operator of the Mayfield West Recycling Facility (MWRF) located at 1A McIntosh Drive, Mayfield West. Development Consent (SSD 7698) granted on 13 March 2018, and most recently modified on 18 February 2025 (MOD3), permits the operation of the resource recovery facility, with a capacity to accept and process up to 315,000 tonnes per year of general solid waste (non-putrescible).

This report is a SWCMP that addresses Development Condition B33. It includes:

- a summary of completed studies and Condition B33 requirements
- a description of the water management system and operating protocols
- a monitoring and reporting plan, and
- a maintenance plan.

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1 Introduction

1.1 Background

Benedict Recycling Pty Ltd (Benedict) is the operator of the Mayfield West Recycling Facility (MWRF) located at 1A McIntosh Drive, Mayfield West.

Development Consent (SSD 7698) granted on 13 March 2018 permits the operation of the resource recovery facility, with a capacity to accept and process up to 315,000 tonnes per year of general solid waste (non-putrescible), including construction and demolition waste, commercial and industrial waste and acid sulphate soils and potentially acid sulphate soils materials. Subsequently, the following modifications have been approved:

- Modification 1: to amend the works boundary and relocate the public hand unloading area – approved 27 October 2021.
- Modification 2: to receive, treat and export up to 30,000 tonnes per annum of actual acid sulfate soils and potential acid sulfate soils – approved 13 June 2023.
- Modification 3: to relocate the approved actual and potential acid sulfate soils receival and processing from the main processing building to an existing vacant building (the Mag Shed) on the site.

The 'Development Consent (as modified)' is the consent as modified by Modification 1, 2 and 3.

Condition B33 of the Development Consent (as modified) requires the preparation of a Surface Water Characterisation and Mitigation Plan (SWCMP).

1.2 Report purpose and structure

This report is a SWCMP that addresses Condition B33. It includes:

- a summary of completed studies and assessment requirements (remainder of Chapter 1)
- a description of the water management system and operating protocols (Chapter 2)
- a monitoring and reporting plan (Chapter 3), and
- a maintenance plan (Chapter 4).

1.3 Completed water management plans and studies

The following water management plans and studies have been completed in consultation with the NSW Environment Protection Authority (EPA) since the Development Consent was originally granted on 13 March 2018:

- An initial SWCMP (EMM 2018) was prepared to address Condition B33 (the initial SWCMP).
- A Surface Water Validation Report (SWVR) (EMM 2020) was prepared to address Condition B35. This report included a commitment to update the site water balance and undertake a further review of the water management system once the water balance was finalised. This report is provided as Appendix A to address Condition B33f.
- A water balance update (EMM 2022a) was prepared to address the commitments made in the SWVR. The update was submitted to the EPA, who requested that a further review of the water management system.

- A water management update (EMM 2022b) was prepared to document the water management review that was requested by the EPA. This document included commitments to:
  - install a fixed sprinkler system
  - undertake a routine water quality monitoring program, and
  - prepare an operational water management plan.

The EPA endorsed the water management approach proposed in EMM (2022b) and varied Environment Protection Licence (EPL) 20771 (the EPL) accordingly. Associated correspondence is provided in Appendix B.

1.4 Assessment requirements

Table 1.1 reproduces Condition B33 and describes how each requirement is addressed in this SWCMP.

Table 1.1 Condition B33 assessment requirements

Condition	SWCMP reference
B33 Prior to the commencement of operations, the Applicant must prepare a Surface Water Characterisation and Mitigation Plan (SWCMP) to the satisfaction of the Planning 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	The initial SWCMP was prepared on 6 September 2018 to address this condition. This revised SWCMP has been prepared to address Condition C8, which requires that management plans are reviewed and if necessary revised within three months of an approval of a modification. It documents the water management approach for the facility that was endorsed by the EPA in 2022 (see Section 1.3).
a) be carried out by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Planning Secretary;	This SWCMP has been prepared by Chris Kuczera (Associate Water Resources Engineer) who was approved by DPE to prepare the initial SWCMP and the SWVR (see Section 1.3).
b) be prepared in consultation with the EPA	This SWCMP documents the water management approach for the facility that was endorsed by the EPA in 2022 (see Section 1.3).
c) detail the triggers of when the pump which transfers surface water from the three-stage pit to the holding tanks would be activated	This is described in Section 2.1.
d) detail the type and size of the bunding around the potentially contaminating waste area	This is described in Section 2.1.
e) detail the frequency of overflows from the three-stage pit and sediment basin	This is described in Section 2.1.
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	The SWVR report (V3) is provided as Appendix A. This report documents the results of the most recent surface water characterisation study, which included analysis of four samples from the basin and Area 1 tanks (which receive water pumped from the two-stage pit).
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	The SWVR is provided as Appendix A. This report documents the results of the most recent surface water characterisation study, which addressed the requirements of Condition 33g.

Table 1.1 Condition B33 assessment requirements

Condition		SWCMP reference
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	This SWCMP documents the water management approach for the facility that was endorsed by the EPA in 2022 (see Section 1.3). The water management approach was informed by the water characterisation studies undertaken for the initial SWCMP and the SWVR. When developing the water management approach, a range of management measures were assessed in consultation with the EPA. The outcomes of the options assessment process are described in EMM (2022b) and are summarised in Section 1.3.
i)	provide the Planning Secretary with a timeframe for and implement the measures identified in sub-clause (h)	Benedict implemented the measures agreed with the EPA in 2022 (see Section 1.3) within the timeframes proposed in EMM (2022b). There are no further measures to implement.
j)	consider the human health risks associated with the surface water reuse process at the site	This is described in Section 2.4.
k)	include details of the maintenance procedures of the sediment basins and surface water infrastructure	Maintenance procedures are described in Chapter 4.
l)	describe the procedures for maintaining vegetation along the perimeter drain and sediment basin	The perimeter drain and basin are concrete lined. A maintenance procedure to check and repair the perimeter drain and sediment basin for cracking and vegetation breakthrough is provided in Chapter 4.
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	A routine water monitoring program that was agreed with the EPA in 2022 is provided in Chapter 3. EPL Condition M requires that water quality monitoring is undertaken daily during discharge. The water monitoring program provided in Chapter 3 includes the EPL discharge monitoring requirements.
n)	identify measures for managing pollutant exceedances	The water management system minimises environmental risks associated with discharge by containing and reusing stormwater. This approach was endorsed by the EPA in 2022 (see correspondence provided in Appendix B).
o)	identify contingency options to account for any mitigation measures that do not adequately address the site water pollution risks	The trigger action plan provided in Chapter 3 will be implemented to address any water quality issues that are identified by the routine water monitoring program. The plan includes triggers to review the water management system and operating methods to establish appropriate measures to address identified issues.

2 Water management system

2.1 System description

The facility's water management system receives surface water runoff from Lot 1 DP874109 (the lot), which has a total area of approximately 7.9 ha.

Water within the lot is managed separately in the following areas:

- Area 1 – is a 0.52 ha bunded area where general solid waste that is considered to have a higher risk of contaminating stormwater is stockpiled and processed (the 'potentially contaminating waste area'). The bund has been formed by a concrete berm (approximately 0.3 m high) that has been constructed around the perimeter of Area 1. Runoff from Area 1 is managed as follows:
    - Surface water runoff drains to a sump (referred to as the two-stage pit). Water from the sump is pumped to a series of holding tanks (the Area 1 tanks). Pumping is controlled by a float switch in the pit, which is triggered when the pit is approximately 50% full. The Area 1 tanks comprise five connected 50-kL tanks, providing a total storage capacity of 250 kL.
    - Water in the Area 1 tanks is used for dust suppression following each rainfall event (discussed in Section 2.2). Water spills into the Area 2 water management system when the tanks are full.
- Area 2 – refers to the remainder of the lot which has a 7.4 ha area and includes site buildings, haul roads, stockpiles of material with low contamination risk and buildings, storage of empty customer bins and laydown areas that are not part of the recycling facility. Runoff from Area 2 is managed as follows:
    - Runoff is conveyed to a sedimentation basin (the basin) that is in the north-western corner of the lot. The basin has an estimated volume of 2.8 ML (EMM 2018).
    - Water collected in the basin is used for dust suppression following each rainfall event (discussed in Section 2.2).
    - When full, the basin will discharge via overflow. This overflow is referred as Point 1 in EPL 20771. Overflows are estimated to occur approximately 2.9 time per year (on average) when the five-day rainfall depth exceeds 92 mm (EMM 2022b).

Figure 2.1 shows the conceptual framework of the water management system and Figure 2.2 (whole of facility) and Figure 2.3 (north-western corner) show the water management system layout and locations of Area 1 and Area 2. The approximate extent of the original SSD and Mod 1 and Mod 3 areas is also provided in Figure 2.2 for context.

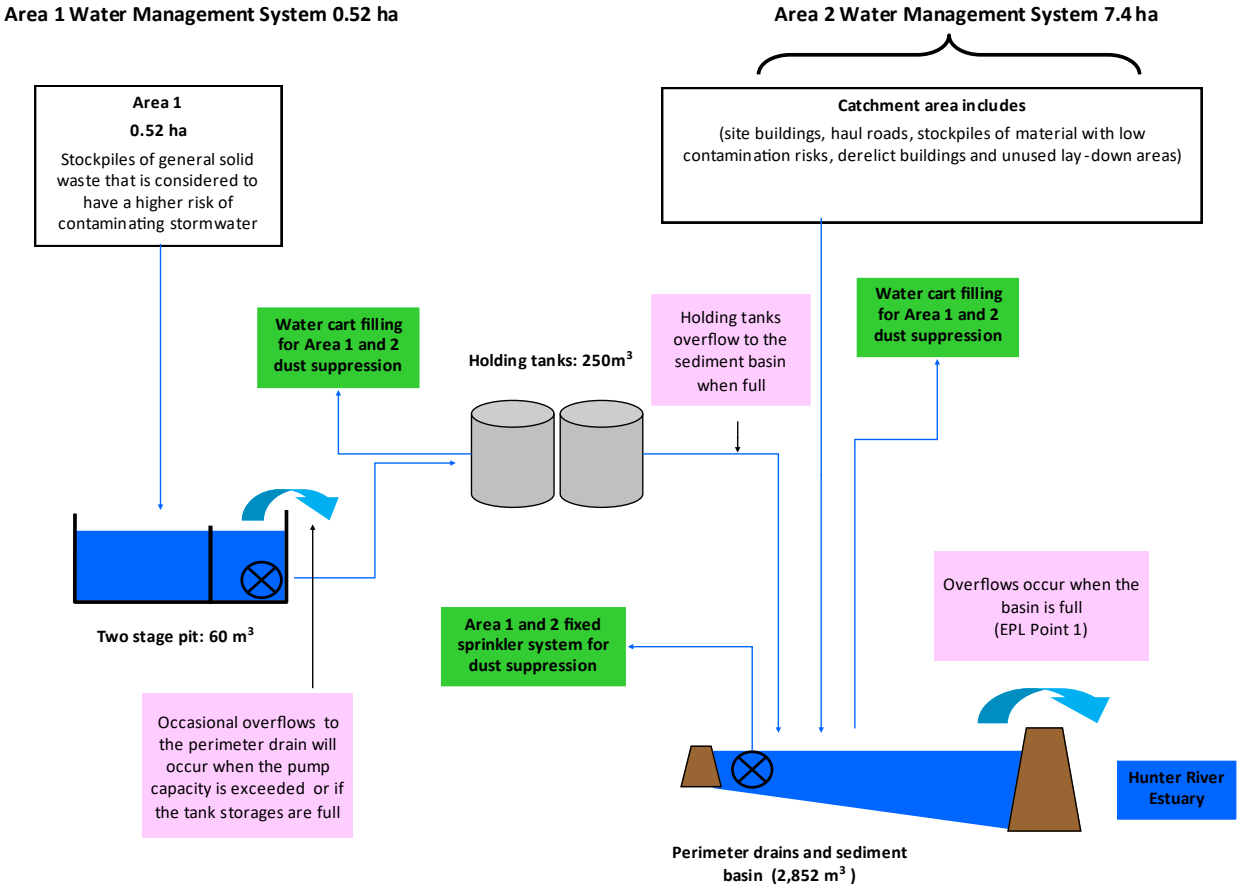

Figure 2.1 **Water management system framework**

With MOD3 approval, the facility will utilise some 1.61 ha of space that would be added to the SSD area which included within the existing enclosed Mag Shed building. The remaining 2.13 ha will remain as Ancillary waste area outside of the SSD area and subject to the Council Consent. There will be no change to water system management as part of the approval.

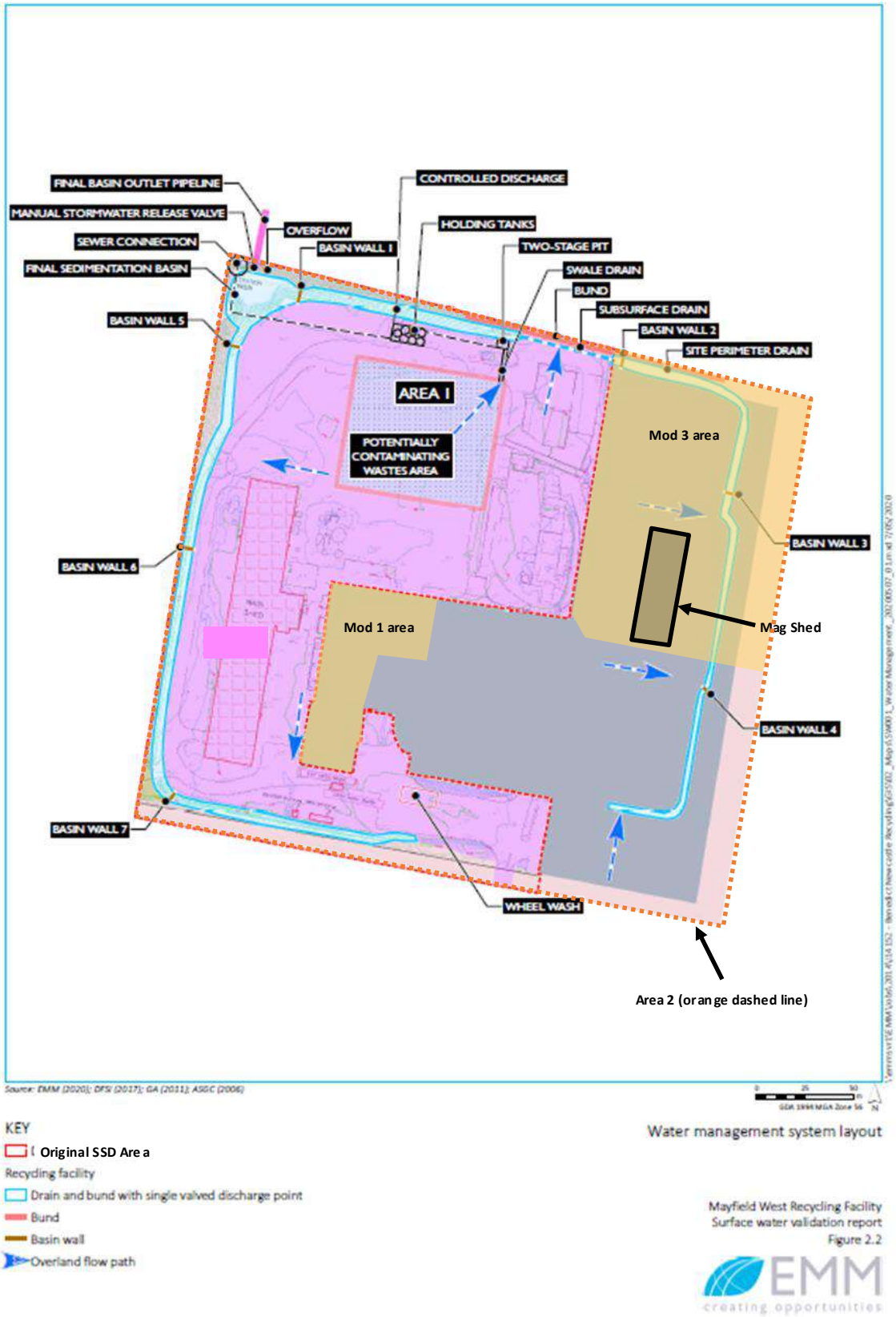

Figure 2.2 Water management system layout

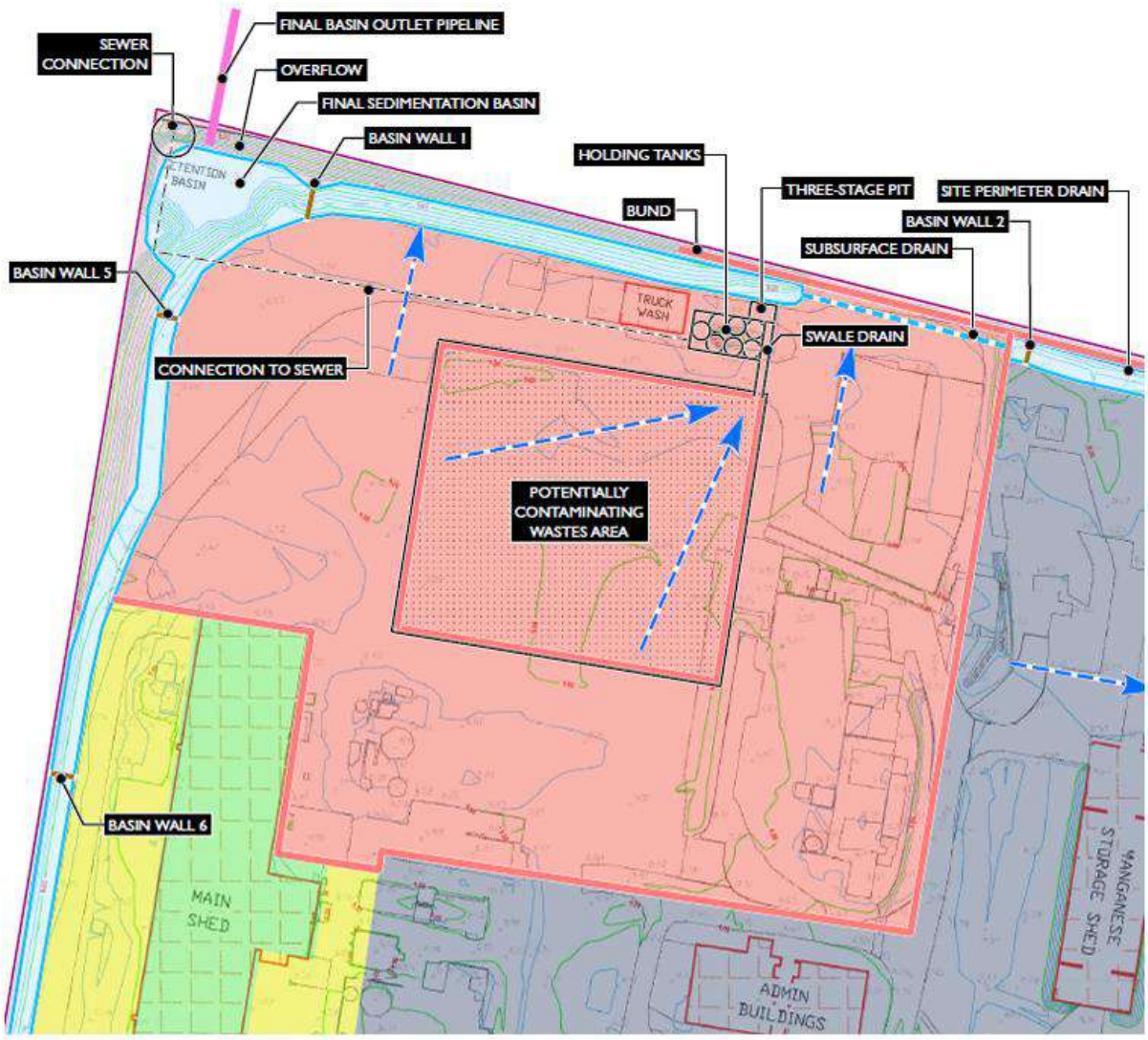

Figure 2.3 Water management system layout (north-wester corner)

2.2 Water application system

The water application system is operated to supress dust and to dewater the basin following rainfall to reduce the potential for site overflows to occur. The water application system includes:

- a fixed sprinkler system that applies water to approximately 3.4 ha of the site, and
- a 3.1 ha water cart application area.

Figure 2.4 shows the abovementioned areas. It is noted that the water application occurs in both SSD 7698 approval boundary (in which the waste management facility is operated) and the ancillary activities area, which is owned and operated by Benedict under a separate approval. Runoff from both areas drain to the basin via the perimeter drainage system.

Table 2.1 describes the system and operating protocols.

Table 2.1 System description

Aspect	Description
Water sources	The system is to be configured so that: • water supply to water carts can be sourced from the 250-kL Area 1 tanks and the basin. The Area 1 tanks will be emptied before water is sourced from the basin. • Water supply to the fixed sprinkler system is sourced from the basin.
Operation (during rainfall)	The system will not be operated during or shortly after material rainfall to avoid increasing the potential for pollutants to leach from stockpiles. Material rainfall is rainfall that produces surface water runoff into the facility's drainage system.
Operation (after rainfall)	Following rainfall, the system will be run at full capacity (ie to maximise the application area) until the Area 1 tanks are fully dewatered and the basin is dewatered to 50% capacity. Once this is achieved the water use rate will be adjusted based on weather forecast. If dry weather is forecast the use rate will be reduced to the minimum rate required for dust suppression purposes. If significant wet weather is forecast (i.e. more than 50 mm of rainfall forecast), the system will continue to be run at full capacity to restore the basin capacity ahead of rainfall. The fixed sprinkler system will be operated such that water is applied at similar rates to evaporation losses. This will avoid oversaturation of stockpiles and minimise runoff due to application.

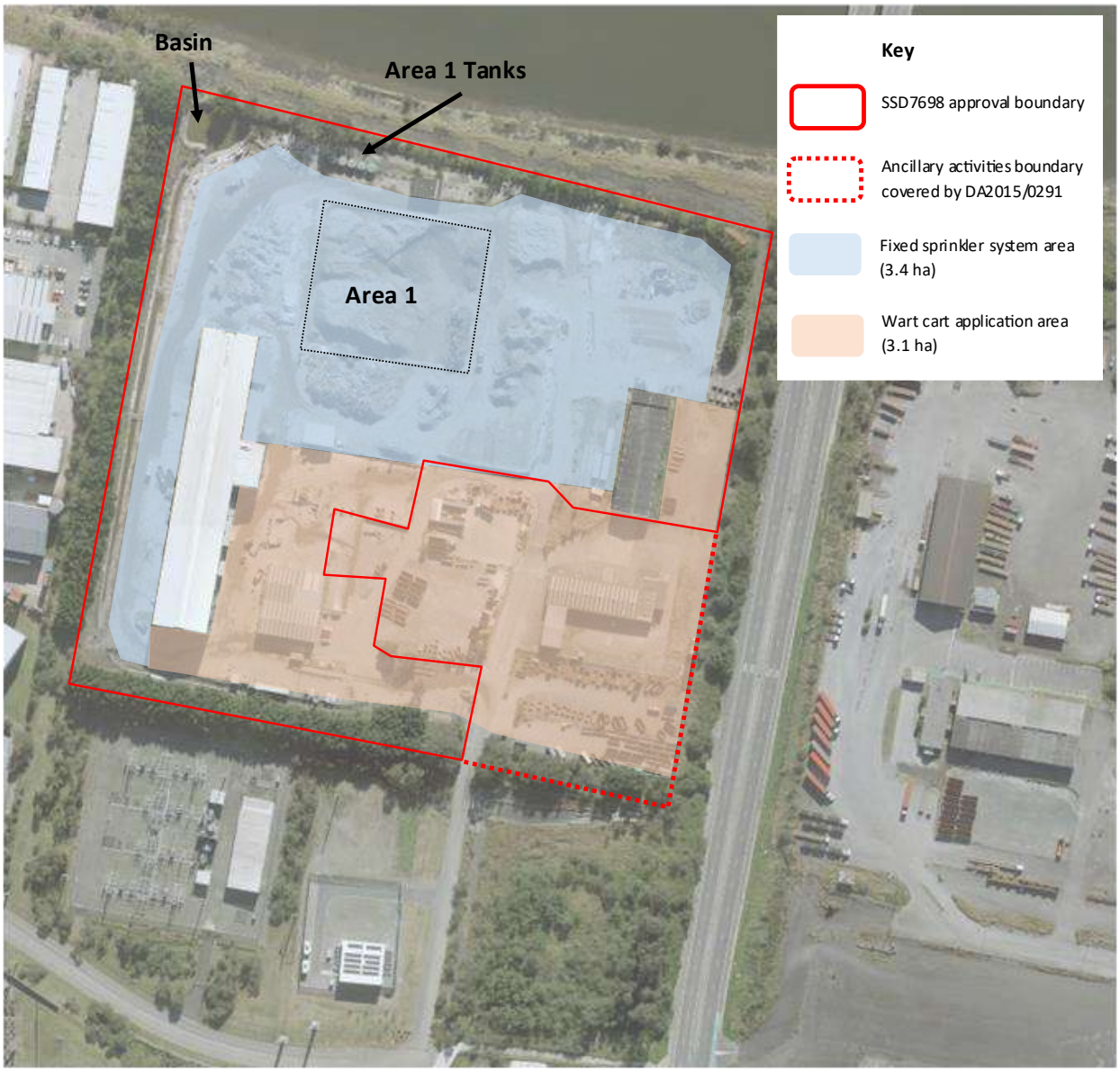

Figure 2.4 Water application areas

2.3 Acid sulfate soils

Following the approval of Modification 2, the facility can receive, treat and export up to 30,000 tonnes per annum of actual or potential acid sulfate soils (ASS).

In accordance with Condition A8(a), no more than 500 tonnes of actual or potential ASS may be stored on the site at any one time.

Following the approval of Modification 3 the approved actual and potential acid sulfate soils facility that receives and processes the soils has been relocated from the main processing building to a previously existing vacant building (the Mag Shed) on the site. Actual or potential ASS will be received, treated and loaded within the Mag Shed. Actual or potential ASS is to be neutralised via lime dosing within 24 hours of receiving the soils on site. The receival bays containing Actual or potential ASS must be equipped with fixed misting sprays (or similar systems), a mobile water cart and movable water cannons to keep the material damp at all times. There are no changes to water management approach due to Modification 3 system from changes approved in the modification as Actual or potential ASS material will continue to be received and processed in a covered area.

In accordance with Condition B76A, prior to accepting any actual or potential ASS, a 150-mm tall bund will be constructed around the perimeter of the tipping-off area and doorways of the shed designated for receiving actual or potential ASS.

Benedict will provide written evidence to the satisfaction of the Planning Secretary confirming the bund wall has been constructed, prior to receiving actual or potential ASS.

In accordance with Condition B76B, during treatment of actual or potential ASS, water from within the bunded ASS treatment area will drain to a sump from where it will be transferred to a holding tank. Water in the tank will be removed to a licensed facility or in accordance with a trade waste agreement.

2.4 Human health risks

Human health risks were assessed in Section 4.5.4 of the initial SWCMP (EMM 2018). There is no material change to the water quality of stormwater that is used onsite since the initial SWCMP. Hence, the conclusion from the initial SWCMP is valid and is reproduced below.

> 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.

3 Monitoring, action and reporting plan

3.1 Water monitoring

Table 3.1 describes a water monitoring plan that includes EPL monitoring requirements and the routine monitoring that was proposed in EMM (2022b).

Table 3.1 Water monitoring plan

Monitoring	Locations	Purpose
EPL monitoring • The basin will be inspected daily during wet weather to identify overflows or potential for overflows to occur. • Daily water quality monitoring will be undertaken during overflow. • Table 3.2 describes the monitoring analytes and methods that are listed in EPL Condition M2.2.	• Samples are to be collected from the basin near the outlet (EPL Point 1).	• To characterise the water quality of overflows from the basin (i.e. the storage) • To address EPL monitoring requirements.
Routine water quality monitoring (as proposed in EMM 2022b) • Routine water quality monitoring is to be undertaken after wet weather every six-months. • Wet weather is defined as any rainfall event that results in sufficient runoff from the facility such that the basin fills to above 1.3 m on the basin depth gauge (approximately 0.5 m below the basin full level). • Table 3.2 describes the monitoring analytes and methods (which are the same as the EPL monitoring). • Monitoring in a six-month period is not required if a suitable rainfall event does not occur.	• Basin (near the outlet). • Area 1 tanks (samples are to be collected from the initial tank that water is pumped into).	• Verify (or otherwise) that the quality of water captured in the Area 1 tanks is similar to water captured in the basin. • Assess water quality trends in the basin and identify any changes due to the operation of the water application system (described in Section 2.2). • Identify the need for changes to the operation of the water application system and other site management practices.

Table 3.2 describes monitoring analytes and methods.

Table 3.2 Monitoring analytes and methods

Category	Analytes	Sampling and analysis methods
Physio-chemical parameters	pH	Analysis is to be undertaken using a calibrated water quality meter OR by a NATA-certified laboratory.
	Total suspended solids Ammonia, oxidised nitrogen (NOx), total kjeldahl nitrogen (TKN) and total nitrogen Reactive and total phosphorus Oil and grease	Analysis is to be undertaken by a NATA-certified laboratory.

Table 3.2 Monitoring analytes and methods

Category	Analytes	Sampling and analysis methods
Metals (field filtered)	Aluminium, chromium, copper, lead, zinc	Analysis is to be undertaken by a NATA-certified laboratory. Samples are to be field-filtered using a 0.45 µm filter.

3.2 Trigger action response plan

The purpose of the routine water quality monitoring is to:

- verify (or otherwise) that the quality of water captured in the Area 1 tanks is similar to water captured in the basin
- assess water quality trends in the basin and identify any changes due to the operation of the new water application system, and
- identify the need for changes to the operation of the water application system and other site management practices.

The trigger action response plan (TARP) in Table 3.3 is to be applied when reviewing the routine water quality monitoring results.

Table 3.3 Trigger action response plan

Triggers	Risk	Action
The pH and concentration of any monitoring analyte in an Area 1 tank sample exceeds the historical Area 1 tank range (Table 3.4).	The application of Area 1 tank water in Area 2 could result in increased pollutant wash off to the basins.	Cease applying Area 1 water in Area 2 until future water quality monitoring demonstrates that the water quality has returned to the historical range.
The concentration of any of any monitoring analyte (except for pH) in a basin sample exceeds the historical basin water quality range (Table 3.4) by less than a factor of two, and/or The pH exceeds the historical basin water quality range (Table 3.4)	Increased environmental risks associated with overflows.	Undertake an additional routine water quality monitoring round shortly after the next suitable wet weather event.
The concentration of any of any monitoring analyte (except for pH) in a basin sample exceeds the historical basin water quality range (Table 3.4) by more than a factor of two.	Increased environmental risks associated with discharge.	Investigate the source of the exceedance. If a source is identified, implement measures to mitigate future water quality risks. Potential measures (also referred to as contingency measures) are described in Section 3.3. Undertake an additional routine water quality monitoring round shortly after the next suitable wet weather event.

Table 3.3 Trigger action response plan

Triggers	Risk	Action
The concentration of any of any monitoring analyte (except for pH) in a basin sample exceeds the historical basin water quality range (Table 3.4) by more than a factor of two in three consecutive samples, and/or The pH exceeds the historical basin water quality range (Table 3.4) in three consecutive samples.	Increased environmental risks associated with discharge.	Engage a suitably qualified person to investigate the change in water quality.

Table 3.4 presents the historical water quality range that is referenced in the trigger action plan.

Table 3.4 Historical water quality range

	Units	Historical range[1]	
		Basin	Area 1 tanks
pH	-	8.1 – 10.0	7.3 – 7.7
Total suspended solids	mg/L	6 - 160	78 – 266
Ammonia	mg/L	0.07 – 0.67	<0.01 – 0.24
Oxidised nitrogen	mg/L	0.14 – 0.31	0.19 – 1.20
Total nitrogen	mg/L	1.0 – 3.7	1.9 – 4.8
Reactive phosphorus	mg/L	<0.01 – 0.02	0.04 – 0.51
Total phosphorus	mg/L	0.05 – 0.034	0.36 – 0.68
Oil and grease	mg/L	<5 – 6	<5 - 6
Aluminium	mg/L	0.02 – 0.17	0.01 - 0.27
Chromium	mg/L	0.001 – 0.005	0.002 – 0.004
Copper	mg/L	0.002 – 0.006	0.002 – 0.010
Lead	mg/L	<0.001 – 0.007	<0.001 – 0.001
Zinc	mg/L	<0.005 – 0.010	0.006 – 0.018

1. Historical range sourced from data presented in the SWVR V3 (EMM 2020) and supplementary monitoring results (basin only) that were provided to the EPA with the water balance update (EMM 2022a)

3.3 Contingency measures

The following contingency measures could be implemented to address sources of pollution that are identified by the TARP process described in Table 3.3:

- Changes to waste storage and handling practices. For example, if a type of waste that is stored in Area 2 is identified as being a source of stormwater pollution the waste could be moved to Area 1.

- Changes to the water application methods. For example, if water application is found to be mobilising pollution from part of the facility the application method could be adjusted.

3.4 Reporting

3.4.1 Overflow monitoring results

Basin overflow monitoring results are to be reported in accordance with EPL conditions.

3.4.2 Incident reporting

Any incidents that cause or threaten to cause material environmental harm are to be reported to the EPA in accordance with EPL Condition R2.

3.4.3 Annual report

A Water Quality and Discharge Report will be prepared each year that addresses the EPL Condition R4.1. The report will be included in the Annual Return.

4 Maintenance plan

Table 4.1 is a maintenance plan for the facility's water management system.

Table 4.1 Maintenance plan

ID	Action	Frequency	Responsibility
1	Maintain a visible depth marker in the basin.	Ongoing	Site Supervisor or Manager
2	Maintain the fixed water application system in good working order.	Ongoing	Site Supervisor or Manager
3	Inspect the perimeter drain and basin for any cracking and vegetation breakthrough. Any vegetation is to be removed and any identified cracks are to be repaired.	Monthly (as required by EPL condition O5.5 and consent condition B29)	Site Supervisor or Manager
4	Remove accumulated sediment and floating debris from the two-stage pit, perimeter drains and basin.	As needed	Site Supervisor or Manager
5	Maintain the rock check dams in the perimeter drain in good working order.	Ongoing	Site Supervisor or Manager
6	Maintain the manual discharge valve in good working order.	Ongoing	Site Supervisor or Manager
7	Maintain the Area 1 bund so that all runoff from Area 1 drains to the two-stage Pit.	Ongoing	Site Supervisor or Manager
8	Maintain the pump that transfers water from the two-stage Pit to the Area 1 Tanks in good working order.	Ongoing	Site Supervisor or Manager

References

EMM 2018, Mayfield West Recycling Facility, Surface Water Characterisation and Mitigation Plan (Version 4) – the Initial SWCMP

EMM 2020, Mayfield West Recycling Facility, Surface Water Validation Report (Version 3)

EMM 2022a, Mayfield West Recycling Facility, Water Balance Update (Version 3)

EMM 2022b, EPL 20771 - Water Management Update (Version 2)

Appendix A
Surface water validation report

EMM
creating opportunities

Mayfield West Recycling Facility

Surface water validation report

Prepared for Benedict Recycling Pty Limited
November 2020

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Mayfield West Recycling Facility

Surface water validation report

Report Number

J14152 RP19

Client

Benedict Recycling Pty Limited

Date

2 November 2020

Version

v3 Final

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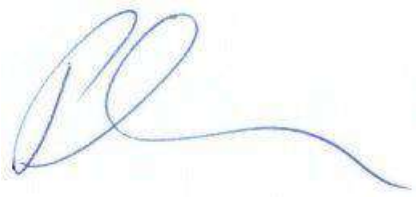
2 November 2020

Approved by



Dr Philip Towler
Associate Director
2 November 2020

Executive Summary

Benedict Recycling Pty Ltd (Benedict) owns and operates a resource recovery facility at 1a McIntosh Drive, Mayfield West (the facility). In 2018 the Minister for Planning approved a consent modification (SSD 7698) enabling the facility to increase the processing capacity to 315,000 tonnes per year of general solid waste (non-putrescible). Schedule 2 of the consent includes several water management related conditions. This report addresses Consent Condition B35, which requires the preparation of a Surface Water Validation Report (SWVR).

The SWVR included: collection of water samples and field observations on four occasions between August 2019 to March 2020; laboratory analyses of the collected water samples; and collation and interpretation of the results to characterise the quality of surface water within the site. The results are compared to:

- default guideline values (DGVs) presented in the ANZECC/ARMCANZ (2000) guidelines, which are the same as the more recent ANZG (2018) guidelines for the analytes considered.
- concentration limits specified in the facility's Environment Protection Licence (EPL); and
- water characterisation results presented in the Surface Water Characterisation and Mitigation Plan (SWCMP) that was prepared by EMM in 2018 (EMM 2018).

All samples were collected during or shortly after separate wet weather events where rainfall totals ranged from 72 to 182 mm, generating surface runoff from some areas of the facility. During each event, samples were collected from the following locations:

- Holding tanks that receive (via pumping) runoff from a bunded area (referred to as Area 1) where general solid waste that is considered to have a higher risk of contaminating stormwater is stockpiled and processed. When full, the holding tanks overflow into the facility's greater water management system.
- The facility's sedimentation basin (the basin) that receives runoff from the waste management facility as well as an adjoining area that comprises derelict buildings and unused laydown areas. When full, the basin overflows to the Hunter River Estuary.

The basin's water quality was characterised as being slightly alkaline and having elevated turbidity, and nutrients, aluminium and copper concentrations relative to DGVs. The concentrations of all organic, inorganic and metal toxicants tested, other than aluminium and copper, were below detection limits and/or DGVs in all samples. The suspended solids concentration exceeded the EPL discharge limit of 50 mg/L in all four samples, although there were no discharges required from the site at the time of sampling. The water quality has improved relative to the SWCMP results. This is despite the operations being expanded post SSD approval.

The water quality of runoff from Area 1 was characterised poorer/higher risk than basin water quality due to:

- Higher turbidity and suspended sediment levels/concentrations.
- Higher concentrations of nutrients (nitrogen and phosphorus).
- A higher risk of metal toxicants exceeding DGVs.
- An increased risk of hydrocarbon related contamination (ie total recoverable hydrocarbons and total petroleum hydrocarbons).

Chapter 4 of this report reviews the existing water management system and provides recommendations to improve the operational effectiveness of the system.

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Figures

1 Introduction

1.1 Background and purpose

Benedict Recycling Pty Ltd (Benedict) owns and operates a resource recovery facility at 1a McIntosh Drive, Mayfield West (the facility). In 2018 the Minister for Planning approved a consent modification (SSD 7698) enabling the facility to increase the processing capacity to 315,000 tonnes per year of general solid waste (non-putrescible). Schedule 2 of the consent includes several water management related conditions. This report addresses Consent Condition B35, which requires the preparation of a Surface Water Validation Report (SWVR).

1.2 Surface Water Characterisation and Mitigation Plan

This report references a Surface Water Characterisation and Mitigation Plan (SWCMP) that was prepared by EMM in 2018 (EMM 2018). The SWCMP formed part of the State Significant Development (SSD) application and included:

- A description of water management system upgrades proposed as part of the SSD application.
- A surface water characterisation assessment that was informed by sampling completed between March and June 2018 (the SWCMP sampling). It is noted that this sampling was mostly completed prior to the completion of water management system upgrades.
- A framework for this SWVR.

1.3 ANZECC guidelines

As required by consent condition B35, this report references information from the ANZECC/ARMCANZ (2000) guidelines. At the time of writing, these guidelines are the same as the more recent ANZG (2018) guidelines for the analytes considered.

1.4 Consent Condition B35

Table 1.1 reproduces the requirements of Consent Condition B35 and explains how each requirement is addressed in the document.

Table 1.1 Summary of Consent Condition B35

Condition	Assessment overview
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;	This SWVR has been prepared by Chris Kuczera, an Associate Water Resources Engineer at EMM. The Department of Primary Industry and Environment endorsed Chris in a letter dated 11 July 2019.

Table 1.1 Summary of Consent Condition B35

Condition	Assessment overview
b) be prepared in consultation with the EPA;	The framework for the SWVR was prepared in consultation with the Environmental Protection Agency (EPA) during the finalisation of the SWCMP. The EPA reviewed V2 of the SWVR and provided comments in a letter dated 16 October 2020. The EPA comments were discussed in a meeting held on 28 October 2020 and the SWVR was updated (to V3) to address agreed actions from this meeting.
c) collect a minimum of four surface water samples from the sediment basin and four from the two-stage pit system;	Four surface water samples have been collected during independent rainfall events from the sediment basin and holding tanks that receive water pumped from the two-stage pit.
d) characterise the surface water data (samples) and detail the potential impact of discharges on receiving surface waters with reference to ANZECC[/ARMCANZ] (2000) assessment criteria;	All surface water sampling results have been characterised relative to the relevant default values from the ANZECC/ARMCANZ (2000) guidelines. Refer to Section 3.2.
e) compare the results with the surface water characterisation in the SWCMP (Condition B33);	All surface water sampling results from the sedimentation basin have been compared to the relevant results presented in the SWCMP. Refer to Section 3.2.
f) ensure surface water is being managed in accordance the EPL;	All water quality sampling results have been characterised relative to the relevant default values from the ANZECC/ARMCANZ (2000) guidelines and concentration limits described in the Environment Protection Licence (EPL 20771).
g) provide an assessment of the effectiveness of implemented mitigation measures;	The effectiveness of the current water management system is reviewed in Section 4.2.
h) if necessary, provide additional mitigation measures to control and/or treat all pollutants to ensure the ANZECC[/ARMCANZ] (2000) assessment criteria can be met including further storage or the installation of a water treatment plant; and	Recommendations are made in Section 4.2.
i) update the SWCMP to reflect any changes to the surface water management system.	The SWCMP will be updated following finalisation of this SWVR.

1.5 Report structure

This report is structed as follows:

- Chapter 2 describes the existing water management system.
- Chapter 3 describes the SWVR monitoring methods and results.
- Chapter 4 reviews the existing water management system and makes recommendations.
- Chapter 5 describes a commitment to update the site water balance and undertake a further review of the water management system once the water balance update is finalised.

2 Water management system

This chapter describes the facility's existing water management system. Chapter 4 reviews the functionality of the existing system and recommends some changes, which are discussed separately in Section 4.2.

The facility's water management system receives surface water runoff from Lot 1 DP874109 (the lot), which has a total area of approximately 7.9 ha. The materials handling portion of the recycling facility is operated in the western portion of the lot, within a 3.7 ha area. The remaining 4.2 ha of the lot is used for ancillary activities approved under Newcastle City Council Development Application DA2015/0291 and includes buildings, storage of empty customer bins and laydown areas.

Water within the lot is managed separately in the following areas:

- Area 1 – is a 0.52 ha bunded area where general solid waste that is considered to have a higher risk of contaminating stormwater is stockpiled and processed. Runoff from Area 1 is managed as follows:
    - Surface water runoff drains to a sump (referred to as the two-stage pit). Water from the sump is pumped to a series of holding tanks (the Area 1 tanks). The Area 1 tanks comprise five connected 50-kL tanks, providing a total storage capacity of 250 kL (EMM 2018).
    - Water in the Area 1 tanks is used for dust suppression following each rainfall event. Surplus water either spills into the Area 2 water management system or is discharged to the sewer as trade waste (it is noted that this is subject to a trade waste agreement being finalised).
- Area 2 – refers to the remainder of the lot which includes site buildings, haul roads, stockpiles of material with low contamination risk and buildings, storage of empty customer bins and laydown areas that are not part of the recycling facility. Runoff from Area 2 is managed as follows:
    - Runoff is conveyed to a sedimentation basin (the basin) that is in the north-western corner of the lot. The basin has an estimated volume of 2.8 ML (EMM 2018).
    - A 'pump and treat' style water treatment system is manually operated during wet weather conditions. The treatment system extracts water from near the basin outlet and adds a coagulant at a controlled rate. Water is returned to the western perimeter drain, immediately upstream of the basin. The Ultrion coagulant was used during the SWVR period. Ultrion is a low molecular weight cationic coagulant that contains aluminium chloride hydroxide. 'Pump and treat' style systems are typically used to treat water captured in a basin and typically need to run for 1–2 days following the cessation of rainfall to achieve effective treatment.
    - Water collected in the basin is used for dust suppression following each rainfall event.
    - When full, the basin will discharge via overflow. The SWCMP describes a framework for controlled discharges (if water quality is suitable). Benedict have advised that no controlled discharges have been implemented since SSD approval. Any discharged water flows into the southern arm of the Hunter River Estuary via a drainage system.

Figure 2.1 shows the conceptual framework of the water management system and Figure 2.2 shows the water management system layout and locations of Area 1 and Area 2.

EMM site observations during monitoring undertaken to inform the SWVR are described in Section 3.1.2.

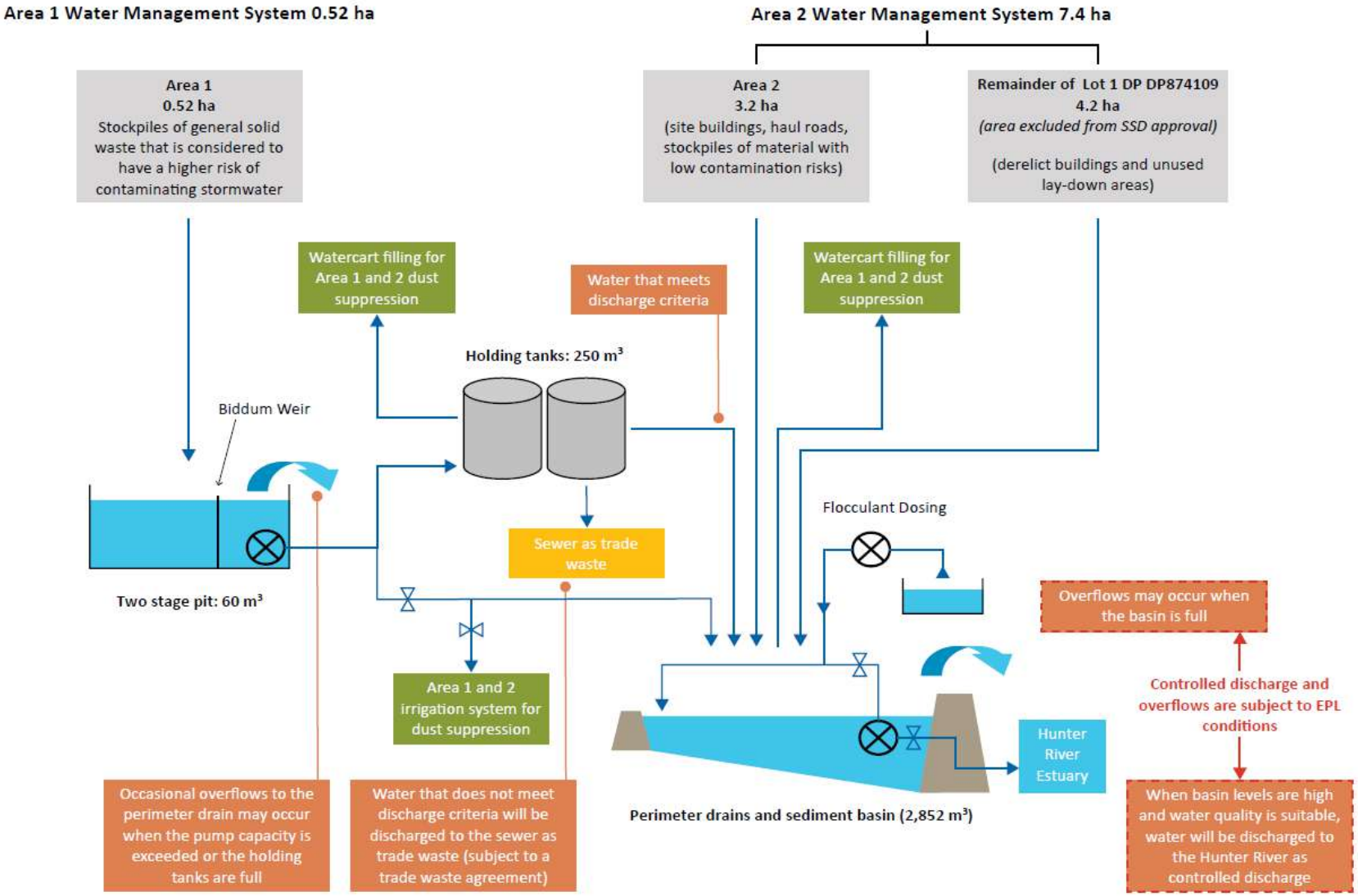
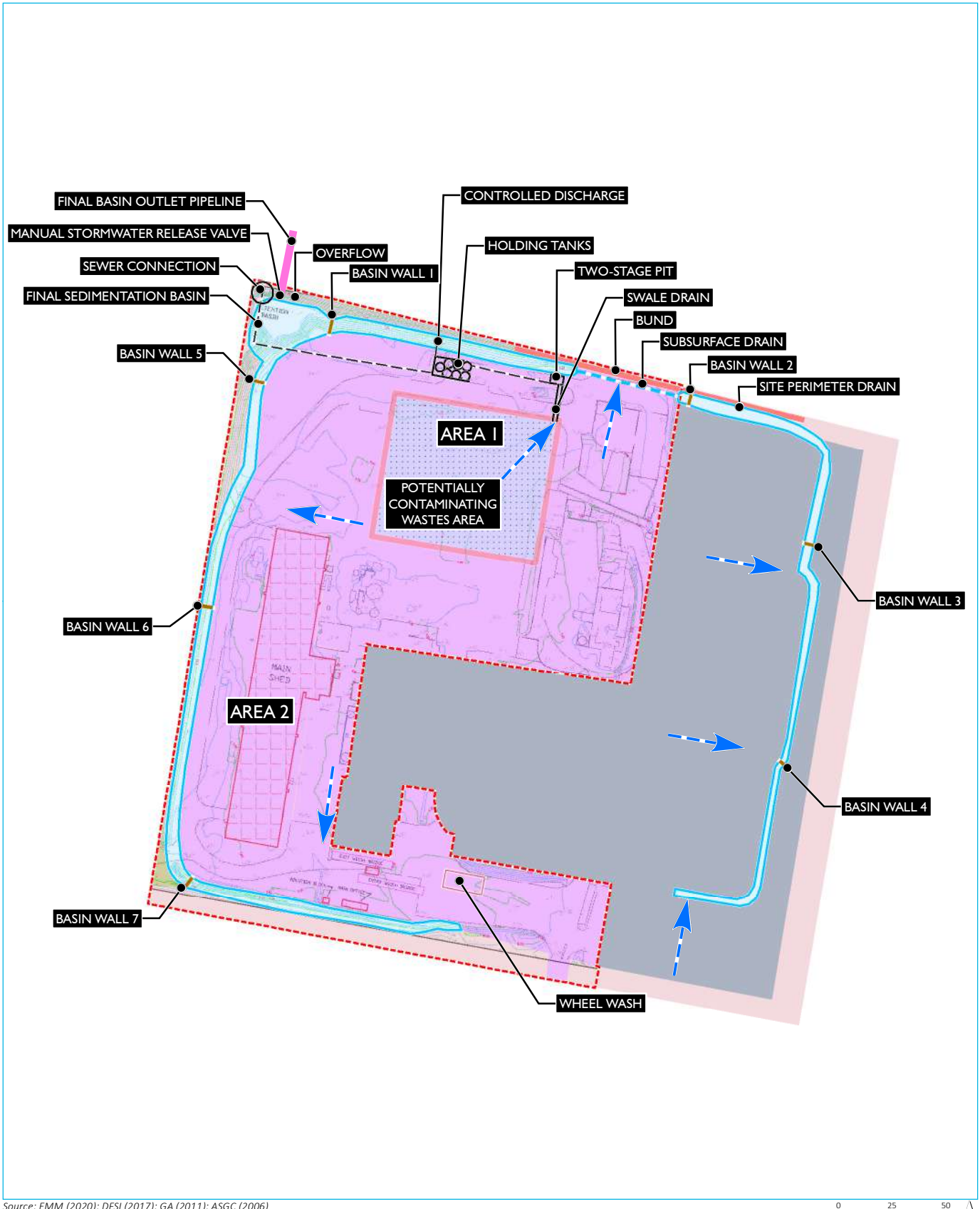


Figure 2.1 **Existing water management system framework**



Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)

0 25 50 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

Water management system layout

Mayfield West Recycling Facility
Surface water validation report
Figure 2.2

EMM creating opportunities

\\emmsvr1\EMMJobs\2014\J14152 - Benedict Newcastle Recycling\GIS\02_Maps\SW001_WaterManagement_20200507_01.mxd 7/05/2020

3 Validation monitoring program

A surface water quality monitoring program was completed by EMM to inform this SWVR. The program comprised sampling and analysis of surface water within the facility from four independent rainfall events between August 2019 and March 2020 (the SWVR period).

Section 3.1 describes the sampling locations, methods and weather and site context for each sampling event. Results are presented in Section 3.2 and discussed in Section 3.3.

3.1 Completed monitoring

3.1.1 Locations

For each sampling event, water quality samples were collected from the following locations:

- The basin – samples were collected near the sedimentation basin outlet.
- Area 1 tanks – samples were collected from the top of the first tank that receives water pumped from the two-stage pit.

3.1.2 Rainfall and site context

A summary of the rainfall estimates, site observations and sampling locations for each sampling event are provided in Table 3.1. It is also noted that Benedict advised that no discharges occurred during the SWVR period.

Table 3.1 Sampling context and site observation

Sampling event	Rainfall context[1]	Site observations (at time of sampling)	Sampling locations
Event 1 31 August 2019 and 2 September 2019	**Wet weather**: **significant rainfall** • 110 mm of rainfall was recorded in the 36 hours prior to sampling on 31 August 2019. • 124 mm of rainfall was recorded in the 3 ½ days prior to sampling on 2 September 2019.	31 August 2019 • The water level in the basin was 200 mm below the outlet. • The water treatment plant had been operating for 2–3 hours prior to sampling. The water in the basin appeared to be turbid. 2 September 2019 • One and a half of the five 50-kL Area 1 tanks were full of water.	• Basin sampled on 31 August 2019 • Area 1 tank sampled on 2 September 2019
Event 2 17 September 2019	**Wet weather**: **significant rainfall** • 72 mm of rainfall was recorded in the 36 hours prior to sampling.	• The water level in the basin was 200 mm below the outlet. • The water treatment plant had been operating for 2–3 hours prior to sampling. The water in the basin appeared to be turbid. • One and a half of the five 50-kL Area 1 tanks were full of water.	Basin and Area 1 tank
Event 3 10 February 2020	**Wet weather**: **significant rainfall** • 113 mm of rainfall was recorded in the 36 hours prior to sampling. • 182 mm of rainfall was recorded in the week prior to sampling.	• The water level in the basin was 300 mm below the outlet. • The water treatment plant had been operating for 24 hours prior to sampling. The water in the basin appeared to be moderately turbid. • Two and a half of the five 50-kL Area 1 tanks were full of water.	Basin and Area 1 tank

Table 3.1 Sampling context and site observation

Sampling event	Rainfall context[1]	Site observations (at time of sampling)	Sampling locations
Event 4 27 March 2020	**Wet weather**: **significant rainfall** • 95 mm of rainfall was recorded in the 48 hours prior to sampling.	• The water level in the basin was 300 mm below the outlet. • The water treatment plant had been operating for 36 hours prior to sampling. The water in the basin appeared to be moderately turbid. • All five of the 50-kL Area 1 tanks were full of water. Benedict advised that the tanks had not been dewatered since Event 3.	Basin and Area 1 tank

1. The rainfall depths were recorded by Benedict's on-site weather station. The recorded depths are similar to totals recorded at local Bureau of Meteorology operated gauges.

3.1.3 Methods

Table 3.1 describes monitoring analytes and methods.

Table 3.2 Monitoring analytes and methods

Category	Analytes	Sampling and analysis methods
Physico-chemical parameters	pH, turbidity, electrical conductivity, total suspended solids and total dissolved solids Total alkalinity and hardness	Analysis was undertaken by a NATA-certified laboratory.
Nutrients	Ammonia, nitrite, nitrate, oxidised nitrogen (NOx), total kjeldahl nitrogen (TKN) and total nitrogen Reactive and total phosphorus	Analysis was undertaken by a NATA-certified laboratory.
Metals and metalloids	Aluminium (Al), arsenic (As), Boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silver (Ag), vanadium (V) and zinc (Zn)	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 Total petroleum hydrocarbons (TPH) Total recoverable hydrocarbons (TRH)	Samples were filtered in the field using a 0.45 µm filter. Analysis was undertaken by a NATA-certified laboratory.
Inorganics	Fluoride and cyanide	Analysis was undertaken by a NATA-certified laboratory.
Surfactants	Anionic surfactants	Analysis was undertaken by a NATA-certified laboratory.

3.2 Monitoring results

Water quality results are presented in Table 3.3 (basin) and Table 3.4 (Area 1 tanks). The results are compared to default guideline values (DGVs) and EPL concentration limits, noting that the EPL concentration limits apply to discharges from the site (which did not occur). The approach to selecting DGVs is discussed further below.

The basin results (presented in Table 3.3) are compared to the results from the SWCMP sampling (EMM 2018). For each analyte, the range in water quality values between the SWVR and SWCMP monitoring programs are described as either trending lower, being similar or trending higher.

The Area 1 tank results (Table 3.4) are compared to the SWVR basin results to enable a comparison of water quality from Area 1 and Area 2. It is noted that the Area 1 tanks were not installed during the SWCMP sampling.

Laboratory certificates are provided in Appendix A.

i Selecting guideline values

The approach applied in the SWCMP (EMM 2018) to selecting DGVs was adopted. This approach is described below.

- **Stressors** – values for physical and chemical stressors in south-east Australia (estuaries) from the ANZECC/ARMCANZ (2000) guidelines were adopted.

- **Toxicants** – as a first preference, values for slightly-to-moderately disturbed ecosystems from the ANZECC/ARMCANZ (2000) guidelines were adopted (where available). Given the receiving water is the Hunter River Estuary, DGVs for marine water were preferentially used for analytes that have high reliability DGVs for marine water. The following approach was applied to establish DGVs for analytes that do not have high reliability trigger values for marine water:

    - 2nd preference – high reliability DGVs for freshwater (where available).

    - 3rd preference – low reliability DGVs for marine water that are reported in Volume 2 of ANZECC/ARMCANZ (2000).

    - 4th preference – low reliability DGVs for freshwater that are reported in Volume 2 of ANZECC/ARMCANZ (2000).

The table notes describe the assumptions applied to selecting each DGV. It is also noted that the DGVs for toxicants are based on chronic (ie long term) exposure to toxicants. This is discussed further in Section 3.3.

Table 3.3 Water quality summary – Basin

	Unit	EPL limit[4]	DGV[1,2]		SWVR sampling (basin)					SWCMP (basin)	SWVR to SWCMP comparison[6]
			Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range	
Physico-chemical parameters											
pH	-	6.5 – 8.5	-	7.0 – 8.5	8.3	**8.6**	8.1	8.3	8.1 – **8.6**	6.9 – **8.6**	Similar
Electrical conductivity	µS/cm	-	-	-	434	444	349	294	294 – 444	289 – 305	Higher
Total dissolved solids	mg/L	-	-	-	302	336	231	230	230 – 336	Not sampled	-
Turbidity	NTU	-	-	10	**228**	**271**	**110**	**169**	**110 – 271**	Not sampled	-
Suspended solids	mg/L	50	-	-	**100**	**160**	**79**	**101**	**79 – 160**	**147 – 1,015**	Lower
Total hardness (as $CaCO_3$)	mg/L	-	-	-	183	172	113	106	113 – 183	45 – 189	Similar
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	33	42	49	48	33 – 49	37 – 104	Similar
Analytical results – nutrients (as N or P)											
Ammonia	mg/L	-	-	0.91 (toxicant) 0.015 (stressor)	<0.01	<0.01	**0.67**	0.03	<0.01 – **0.67**	<0.01 – **0.12**	Higher
Oxidised nitrogen	mg/L	-	-	0.015	**0.19**	**0.23**	**0.30**	**0.26**	**0.19 – 0.30**	**0.34 – 1.70**	Lower
Total kjeldahl nitrogen	mg/L	-	-	-	1.0	1.1	3.4	1.2	1.0 – 3.4	0.7 – 1.2	Higher
Total nitrogen	mg/L	-	-	0.30	**1.2**	**1.3**	**3.7**	**1.5**	**1.2 – 3.7**	**0.8 – 1.7**	Higher
Reactive phosphorus	mg/L	-	-	0.005	**0.03**	**<0.01**	**0.02**	**0.10**	**<0.01 – 0.10**	Not sampled	-
Total phosphorus	mg/L	-	-	0.030	**0.22**	**0.34**	**0.15**	**0.31**	**0.15 – 0.34**	**0.12 – 1.14**	Lower
Analytical results – inorganics											
Cyanide	mg/L	-	**0.007**	**0.004**	-	-	-	<0.004	<0.004	Not sampled	-
Fluoride	mg/L	-	**2.4**[5]	**-**	0.3	0.2	0.3	0.1	0.1 – 0.3	0.2 – 0.3	Similar
Surfactants											
Anionic Surfactants as MBAS	mg/L		**0.28**	**0.0001**[3]	<0.1	0.2	<0.1	<0.1	<0.1 – 0.2	<0.1 – 0.2	Similar

Table 3.3 Water quality summary – Basin

			DGV[1,2]		SWVR sampling (basin)					SWCMP (basin)	SWVR to SWCMP comparison[6]
	Unit	EPL limit[4]	Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range	
Organics											
Oil and Grease	mg/L	10	-	-	-	<5	6	<5	<5 - 6	<5 – **78**	Lower
TRH	µg/L	-	-	-	All below detection					Below detection	Similar
TPH	µg/L	-	-	-	All below detection					Below detection	Similar
BTEX	µg/L	-	-	-	All below detection					Below detection	Similar
Phenols	µg/L	-	-	-	All below detection					Below detection	Similar
Naphthalene	µg/L	-	16	50	<5	<5	<5	<1	<5	Not sampled	-
Other PAHs	µg/L	-	-	-	-	-	-	below detection	below detection	Not sampled	-
Analytical results – metals (0.45µm field filtered)											
Aluminium (Al)	mg/L	-	0.055	0.0005[3]	0.03	**0.17**	**0.09**	0.04	0.03 – **0.17**	0.04 – **0.18**	Similar
Arsenic (As)	mg/L	-	0.024(As III) 0.013 (As V)	0.0023 (As III)[3] 0.0045(As V)[3]	0.002	0.002	0.003	0.002	0.002 – 0.003	<0.001 – 0.001	Higher, but below DGV
Boron (B)	mg/L	-	0.37	-	0.07	0.06	0.08	<0.05	<0.05 – 0.08	<0.05	Higher, but below DGV
Cadmium (Cd)	mg/L	-	0.0002	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Similar
Chromium – Total (Cr)	mg/L	-	0.003[3] Cr (III) 0.001 (Cr VI)	0.027 (Cr III) 0.004 (Cr VI)	0.002	-	0.003	0.002	0.002 – 0.003	<0.001 – **0.016**	Lower
Cobalt (Co)	mg/L	-	0.0028[3]	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Similar
Copper (Cu)	mg/L	-	0.0014	0.0013	**0.006**	**0.006**	**0.005**	**0.002**	**0.002 – 0.006**	**0.002 – 0.030**	Lower
Iron (Fe)	mg/L	-	0.3[3]	-	<0.05	0.11	<0.05	<0.05	<0.05 – 0.11	<0.05	Similar
Lead (pb)	mg/L	-	0.0034	0.0044	<0.001	0.001	<0.001	<0.001	<0.001 – 0.001	<0.001 – **0.059**	Lower
Mercury (Hg)	mg/L	-	0.00006	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Similar

Table 3.3 Water quality summary – Basin

			DGV[1,2]		SWVR sampling (basin)					SWCMP (basin)	SWVR to SWCMP comparison[6]
	Unit	EPL limit[4]	Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range	
Molybdenum (Mo)	mg/L	-	0.034[3]	0.23[3]	0.003	0.003	0.002	0.003	0.002 – 0.003	0.002 – 0.005	Lower
Silver (Ag)	mg/L	-	0.00005	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Similar
Vanadium (V)	mg/L	-	0.006[3]	0.100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 – 0.03	Lower
Zinc (Zn)	mg/L	-	0.008	0.015	<0.005	0.010	0.009	<0.005	<0.005 – 0.010	<0.005 – **0.154**	Lower

Notes:
1. The DGV for physico-chemical parameters and nutrients refer to the values for physical and chemical stressors in south-east Australia (estuaries) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). DGV for toxicants refer to the values for slightly–moderately disturbed freshwater and marine ecosystems that are reported in Table 3.4.1 of ANZECC/ARMCANZ (2000) unless otherwise stated.
2. Unless otherwise stated, the DGV 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/ARMCANZ (2000). It is noted that no hardness adjustments have been made.
3. The DGV refers to a low reliability trigger values that are provided in Volume 2 of ANZECC/ARMCANZ (2000).
4. Refers to an EPL concentration limit (EPL 20771).
5. The DGV was provided by the EPA (August 2018).
6. Comparison is SWVR to SWCMP ranges (ie 'Higher' refers to the SWVR range being materially greater than the SWCMP range).

Bold denotes a DGV or Range is exceeded.
Red denotes the adopted DGV. 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 freshwater trigger value is available.

Table 3.4 Water quality summary – Area 1 tanks

			DGV		SWVR sampling – Area 1 tanks					SWVR sampling (basin)	SWVR sampling Area 1 tanks to basin comparison[6]
	Unit	EPL limit	Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range[6]	
Physico-chemical parameters											
pH	-	6.5 – 8.5	-	7.0 – 8.5	7.3	7.8	7.7	7.7	7.3 – 7.7	8.1 – **8.6**	Lower pH
Electrical conductivity	µS/cm	-	-	-	618	807	664	629	618 – 807	294 – 444	Higher
Total dissolved solids	mg/L	-	-	-	464	535	590	528	464 – 590	230 – 336	Higher
Turbidity	NTU	-	-	10	**152**	**159**	**580**	**231**	**152 – 580**	**110 – 271**	Higher
Suspended solids	mg/L	50	-	-	**100**	**78**	**266**	**136**	**78 – 266**	**79 – 160**	Similar
Total hardness (as $CaCO_3$)	mg/L	-	-	-	215	264	177	181	177 – 264	113 – 183	Higher
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	84	95	80	65	65 – 95	33 – 49	Higher
Analytical results – nutrients (as N or P)											
Ammonia	mg/L	-	-	0.91 (toxicant) 0.015 (stressor)	<0.01	<0.01	0.07	**0.24**	**<0.01 – 0.24**	<0.01 – **0.67**	Similar
Oxidised nitrogen	mg/L	-	-	0.015	<0.01	**0.03**	**1.09**	**1.20**	**<0.01 – 1.20**	**0.19 – 0.30**	Higher
Total kjeldahl nitrogen	mg/L	-	-	-	2.9	1.9	3.7	2.3	1.9 – 3.7	1.0 – 3.4	Higher
Total nitrogen	mg/L	-	-	0.30	**2.9**	**1.9**	**4.8**	**3.5**	**1.9 – 4.8**	**1.2 – 3.7**	Higher
Reactive phosphorus	mg/L	-	-	0.005	**0.07**	**0.04**	**0.26**	**0.51**	**0.04 – 0.51**	**<0.01 – 0.10**	Higher
Total phosphorus	mg/L	-	-	0.030	**0.67**	**0.36**	**0.61**	**0.68**	**0.36 – 0.68**	**0.15 – 0.34**	Higher
Analytical results – inorganics											
Cyanide	mg/L	-	0.007	0.004	-	-	-	<0.004	-	<0.004	Similar
Fluoride	mg/L	-	2.4[5]	-	0.4	0.3	1.0	0.5	0.3 – 1.0	0.1 – 0.3	Similar
Surfactants											
Anionic Surfactants as MBAS	mg/L	-	0.28	0.0001[3]	<0.1	0.2	<0.1	<0.1	<0.1 – 0.2	<0.1 – 0.2	Similar

Table 3.4 Water quality summary – Area 1 tanks

			DGV		SWVR sampling – Area 1 tanks					SWVR sampling (basin)	SWVR sampling Area 1 tanks to basin comparison[6]
	Unit	EPL limit	Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range[6]	
Organics											
Oil and Grease	mg/L	**10**	-	-	-	<5	6	<5	<5 - 6	<5 - 6	Similar
TRH (sum of total)	µg/L	-	-	-	360	Events 2 to 4 were below detection				Below detection	Higher
TPH (sum of total)	µg/L	-	-	-	360	Events 2 to 4 were below detection				Below detection	Higher
BTEX	µg/L	-	-	-	All below detection					Below detection	Similar
Phenols	µg/L	-	-	-	All below detection					Below detection	Similar
Naphthalene	µg/L	-	16	50	<5	<5	<5	<1.0	<5	<5	Similar
Other PAHs	µg/L	-	-	-	-	-	-	below detection	below detection	below detection	Similar
Analytical results – metals (0.45 µm field filtered)											
Aluminium (Al)	mg/L	-	0.055	0.0005[3]	0.04	**0.06**	**0.27**	0.01	**0.01 – 0.27**	0.03 **– 0.17**	Similar
Arsenic (As)	mg/L	-	0.024(As III) 0.013 (As V)	0.0023 (As III)[3] 0.0045(As V)[3]	0.006	0.004	0.005	0.005	0.004 – 0.006	0.002 – 0.003	Higher, but below DGV
Boron (B)	mg/L	-	0.37	-	<0.05	0.07	0.07	0.06	<0.05 – 0.07	<0.05 – 0.08	Similar
Cadmium (Cd)	mg/L	-	0.0002	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Similar
Chromium – Total (Cr)	mg/L	-	0.003[3] (Cr III) 0.001 (Cr VI)	0.027 (Cr III) 0.004 (Cr VI)	0.004	-	0.003	0.002	0.002 – 0.004	0.002 – 0.003	Lower
Cobalt (Co)	mg/L	-	0.0028[3]	0.001	0.001	<0.001	<0.001	<0.001	<0.001 – 0.001	<0.001	Similar
Copper (Cu)	mg/L	-	0.0014	0.0013	**0.005**	**0.002**	**0.010**	**0.008**	**0.002 – 0.010**	**0.002 – 0.006**	Higher
Iron (Fe)	mg/L	-	0.3[3]	-	0.16	0.10	0.12	<0.05	<0.05 – 0.16	<0.05 – 0.11	Higher, but below DGV
Lead (pb)	mg/L	-	0.0034	0.0044	<0.001	<0.001	0.001	<0.001	<0.001 – 0.001	<0.001 – 0.001	Similar
Mercury (Hg)	mg/L	-	0.00006	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	Similar

Table 3.4 Water quality summary – Area 1 tanks

			DGV		SWVR sampling – Area 1 tanks					SWVR sampling (basin)	SWVR sampling Area 1 tanks to basin comparison[6]
	Unit	EPL limit	Fresh	Marine	Event 1	Event 2	Event 3	Event 4	Range	Range[6]	
Molybdenum (Mo)	mg/L	-	0.034[3]	0.23[3]	0.006	0.007	0.004	0.008	0.004 – 0.008	0.002 – 0.003	Higher, but below DGV
Silver (Ag)	mg/L	-	0.00005	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Similar
Vanadium (V)	mg/L	-	0.006[3]	0.100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Similar
Zinc (Zn)	mg/L	-	0.008	0.015	0.018	0.012	0.008	0.006	0.006 – **0.018**	<0.005 – 0.010	Higher

Notes:
1. The DGV for physico-chemical parameters and nutrients refer to the values for physical and chemical stressors in south-east Australia (estuaries) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). DGV for toxicants refer to the values for slightly–moderately disturbed freshwater and marine ecosystems that are reported in Table 3.4.1 of ANZECC/ARMCANZ (2000) unless otherwise stated.
2. Unless otherwise stated, the DGV 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/ARMCANZ (2000). It is noted that no hardness adjustments have been made.
3. The DGV refers to a low reliability trigger values that are provided in Volume 2 of ANZECC/ARMCANZ (2000).
4. Refers to an EPL concentration limit (EPL 20771).
5. The DGV was provided by the EPA (August 2018).
6. Comparison is SWVR Area 1 tanks to SWVR basin ranges (ie 'Higher' refers to the SWVR Area 1 tanks range being materially greater than the SWVR basin range).

Bold denotes a DGV or Range is exceeded.
Red denotes the adopted DGV. 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 freshwater trigger value is available.

3.3 Results discussion

This section discusses the basin and Area 1 tanks water quality results that are presented in Table 3.3 and Table 3.4.

3.3.1 Basin results

As discussed in Chapter 2, the basin receives surface water runoff from a 7.9 ha catchment that comprises of Area 1 and Area 2.

The basin water quality is characterised as being slightly alkaline and having elevated (relative to DGVs) turbidity levels and nutrients, aluminium (2 of 4 samples) and copper (all samples) concentrations (Table 3.3). It is noted that all organics (PAHs, TRH, TPH, BTEX and Phenols) and metal and inorganic toxicants tested, other than aluminium and copper, were below detection limits and/or DGVs in all samples. Benedict has advised that there were no discharges from the basin during the SWVR period.

i Comparison to EPL concentration limits

Comparison of the SWVR basin water quality to concentration limits from the EPL (Table 3.3) indicates that:

- Suspended solids concentrations exceed the EPL limit of 50 mg/L in all four samples.
- pH and oil and grease concentrations were generally within the EPL limits.

ii Comparison to SWCMP results

Comparison of the SWVR and SWCMP basin water quality results (Table 3.3) indicate that:

- Salinity levels have increased.
- Turbidity and suspended sediment levels/concentrations are lower but still exceed DGV and EPL limits.
- Organic nitrogen (ammonia and total kjeldahl nitrogen) have increased. However, oxidised nitrogen and phosphorus are lower.
- Metal toxicants are generally lower with less metals exceeding DGVs and exceedances were generally of lower magnitude.

In summary, the SWVR results indicate that the water quality has improved relative to the SWCMP results. This is despite the operations being expanded post SSD approval and indicates that the water management system is improving water quality at the site.

iii Water treatment chemicals

As noted in Chapter 2, Ultrion coagulant was used to treat water in the basin during the SWVR period. Ultrion is a modern low molecular weight cationic coagulant that contains aluminium chloride hydroxide. The use of this coagulant has potential to increase both water salinity and aluminium concentrations. With reference to Table 3.3:

- While aluminium concentrations exceeded the DGV in 2 out of 4 samples, the range in concentrations were similar to the SWCMP sampling range. Hence, there is no evidence that aluminium concentrations have increased as a result of coagulant use.
- The increase in salinity is likely to be due to the coagulant use. It is noted that the receiving water (the Hunter River Estuary) would not be sensitive to changes in salinity.

3.3.2 Area 1 tank results

As discussed in Chapter 2, Area 1 is a 0.52 ha bunded area where general solid waste that is considered to have a higher risk of contaminating stormwater is stockpiled and processed. Runoff from Area 1 drains to a sump (referred to as the two-stage pit). Water from the sump is pumped to the Area 1 tanks, which comprise five connected 50-kL tanks, providing a total storage capacity of 250 kL. The Area 1 tanks were observed by EMM to be less than 50% utilised during the SWVR monitoring events 1 to 3, which comprised up to 182 mm of rainfall in the week prior to sampling (see Table 3.1). This is likely to be due to significant rainfall absorption in stockpiles and rainfall storage in puddles between stockpiles within the bunded area.

Water quality samples were collected from the top of the first tank that receives water pumped from the two-stage pit. The water quality (Table 3.4) is characterised as having a near neutral pH and elevated (relative to DGVs) turbidity, nutrients, aluminium (2 of 4 samples), copper (all samples) and zinc (1 of 4 samples). TRHs and TPHs were also detected in one sample. TRHs and TPHs are hydrocarbon related chemicals.

Comparison to the SWVR basin results indicates that the water quality of runoff from Area 1 is poorer/higher risk than runoff from Area 2 due to:

- Higher turbidity and suspended sediment levels/concentrations.
- Higher concentrations of nutrients (nitrogen and phosphorus).
- A higher risk of metal toxicants with additional metals exceeding DGVs and generally higher magnitudes of exceedance.
- An increased risk of hydrocarbon related contamination (ie TRH and TPHs).

4 Water management system review

This chapter reviews receiving water risks and the functionality of the existing water management system.

4.1 Receiving water risks

As described in Chapter 2, discharges from the facility's water management system can occur from the basin via overflows (when full) or controlled discharge (if water quality is suitable). Any discharged water flows into the southern arm of the Hunter River Estuary via a drainage system. No basin overflows were observed by EMM during the SWVR site inspections (see Table 3.1). Benedict have also advised that no overflows or controlled discharges from the basin occurred over the SWVR period.

Overflows from the basin may occur occasionally for short periods under certain rainfall conditions. The water quality characterisation results presented in Table 3.3 were collected during or shortly after significant rainfall events and are considered to be representative of the water quality of any potential basin overflows. The water quality is characterised as being slightly alkaline and having elevated (relative to DGVs) turbidity and nutrient aluminium and copper concentrations. All organics (PAHs, TRH, TPH, BTEX and phenols) and metal and inorganic toxicants other than aluminium and copper tested were below detection limits and/or DGVs in all samples.

As basin overflows are expected to occur occasionally for short periods (ie less than 4 days), receiving water quality risks associated with overflows are considered to be acute (ie due to short-term exposure) rather than chronic (ie due to long-term exposure). Acute trigger values for aluminium and copper were established in the SWCMP using information provided in ANZECC/ARMCANZ (2000) guidelines, international guidelines and eco-toxicity literature.

The maximum concentrations of aluminium and copper that were recorded during the SWVR sampling exceeded the DGVs but were below the acute trigger values (Table 4.1).

Table 4.1 Chronic and acute trigger values

Analyte	Units	Maximum concentration	DGV (chronic exposure)	Trigger value[1] (acute exposure)	Acute trigger value exceeded
Aluminium	mg/L	0.17	0.055	0.45	No
Copper	mg/L	0.006	0.0013	0.007	No

Notes: 1. Sourced from SWCMP (Table 4.4). Refer to SWCMP Appendix E for further information on the assumptions applied to calculate acute trigger values.

In summary the risks to receiving water from site discharges are low because of:

- the infrequent nature and short duration of any basin overflows; and
- concentrations of toxicants being below acute trigger values.

4.2 System functionality review

The functionality and effectiveness of the existing water management system has been reviewed to address Consent Condition B35(g). The review considered:

- the water quality data presented in this report;
- site observations made by EMM during the collection of water quality samples (see Table 3.1);

- information provided by Benedict; and
- feedback from the EPA in the meeting dated 28 October 2020.

The following aspects of the water management system have not been reviewed:

- Drainage system effectiveness (ie drainage system capacity).
- Matters addressed in the groundwater monitoring program, which is presented separately as required by Consent Condition B40.
- Compliance with consent conditions. This will be addressed in the Surface Water Audit that is required by Consent Condition B38.

The effectiveness of key elements of the facility's water management system are reviewed in Table 4.2. Recommendations are made to improve both the effectiveness and operational aspects of the system.

Table 4.2 Water management system review

Aspect	Observed effectiveness	Recommendations
1 – Area 1 water management system		
1.1 – System functionality	• During Events 1 to 3 the Area 1 water management system was observed to be operating effectively as: – runoff from the bunded area was being captured in the Area 1 tanks; and – no overflows from the Area 1 tanks into the Area 2 water management system were observed (see Table 3.1). • The effectives during Event 4 is discussed below (see aspect 1.3).	• Nil
1.2 – Trade waste discharges	• EMM understands that a trade waste discharge agreement is yet to be finalised. • Based on the observation that the Area 1 tanks were only 50% utilised during events 1 to 3 (despite significant rainfall occurring), discharges to trade waste are not considered to be necessary.	• The trade waste discharge agreement is not pursued. • Trade waste discharges are removed from the water management plan.
1.3 – Area 1 tank dewatering	• Benedict advised that the Area 1 tanks were not dewatered between events 3 and 4 (see Table 3.1). This may have resulted in some surplus water spilling into the Area 2 water management system.	• Water captured in the Area 1 tanks should be dewatered (via dust suppression use) following each rainfall event to ensure volume is available to capture runoff from the next rainfall event.

Table 4.2 Water management system review

Aspect	Observed effectiveness	Recommendations
2 – Area 2 water management system		
2.1 – Basin water treatment system	The 'pump and treat' style treatment system was observed to have limited effectiveness as: • turbidity and suspended sediments exceeded relevant DGV or EPL discharge limits (although water was not being discharged) in all samples (see Table 3.3); and • the system is manually operated and therefore requires the site to be staffed when it is required and for the staff to observe that action is required. 'Pump and treat' style treatment systems are typically used to treat captured water following a rainfall event, with the treatment system generally needing to run for 1–2 days to achieve effective results. As evidenced by the monitoring results (see Table 3.3), this style of system provides limited treatment during basin overflow conditions (should they occur), when water may overflow shortly after entering the basin. There is no benefit in treating captured water as it can be used for dust suppression following a rainfall event.	• The existing treatment system/approach is discontinued. • Benedict update the site water balance to more reliably estimate the frequency and magnitude of overflows from the basin. Alternative management measures may be required if overflows are assessed to occur more than 2–4 time per year (on average). This is a typical overflow frequency for a sedimentation basin that is sized to capture the 5-day 90th percentile rainfall event (DECC 2008). It is noted that: – the 5-day 90th percentile rainfall event is referenced in consent condition B25 as an acceptable design capacity for the basin; and – risks to receiving water from site discharges are assessed to be low due to the infrequent nature and short duration of any basin overflows and concentrations of toxicants being below acute trigger values (see Section 4.1). The water balance update is discussed further in Chapter 5.
2.2 – Controlled discharges from the basin water treatment system	As described in Figure 2.1, the water management plan makes provision for controlled discharges from the basin when water quality is suitable. The current management practice is to use water captured in both the basin and the Area 1 tanks for dust suppression following rainfall. This is the most practical management approach as it avoids the need for rapid water quality testing and potentially water treatment.	• Controlled discharges are removed from the water management plan and the basin is managed to minimise the frequency and magnitude of overflows by maximising the on-site use of water captured in the basin. • Monitoring of key analytes of concern is undertaken when basin overflows occur.

Figure 4.1 shows an updated conceptual framework of the water management system with the above recommendations implemented.

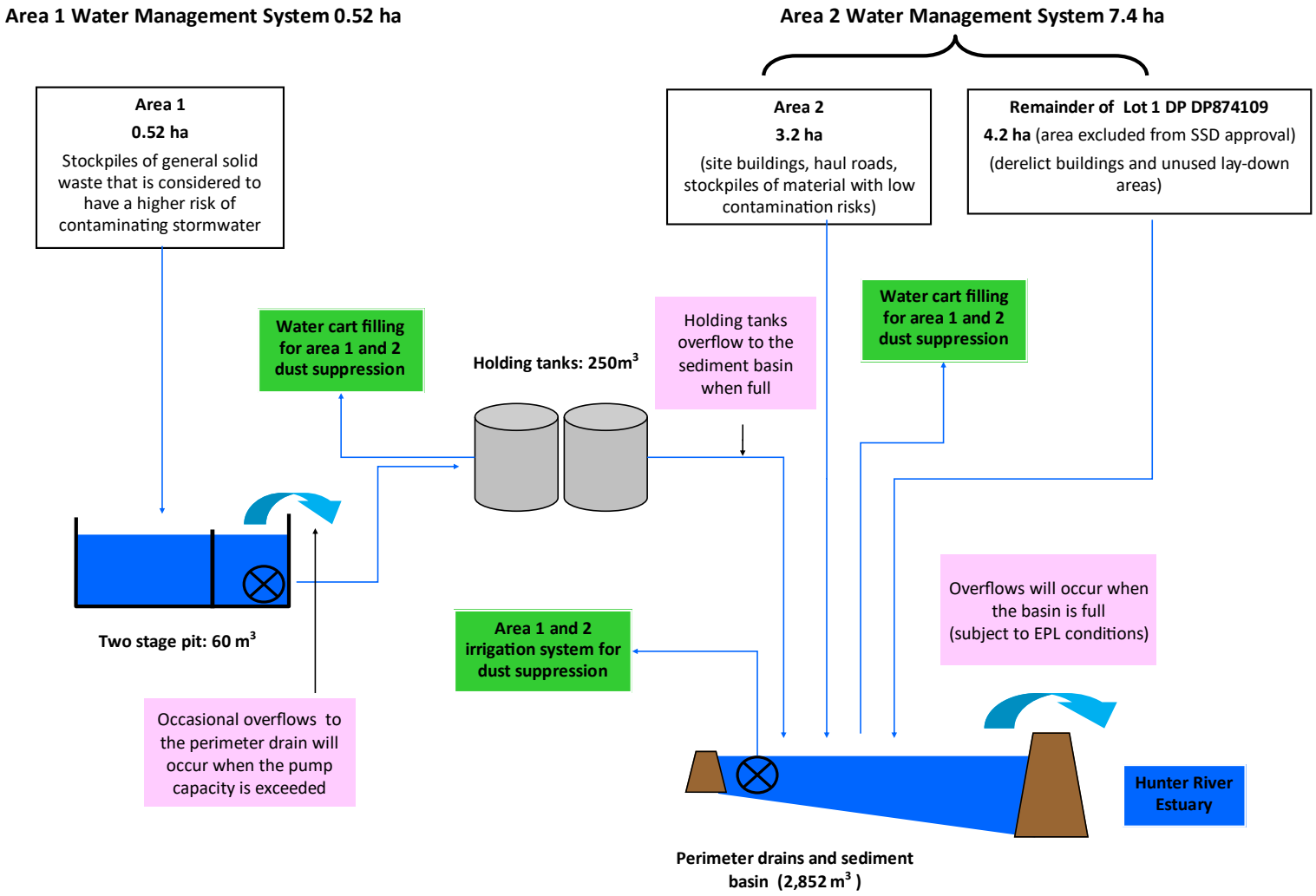


Figure 4.1 **Revised water management system framework**

5 Water balance update

Benedict proposes to update the site water balance and undertake a further review of the water management system once the water balance update is finalised. This chapter describes:

- data that will be collected to inform the water balance update and water management system review;
- the water balance model update methodology; and
- the terms of reference for the water management system review.

5.1 Data collection

The data that will be collected to inform the water balance update and water management system review is described in Table 5.1. Data from several material rainfall events of varying magnitudes will be required to enable the water balance model to be reliably updated. While the timeframe is weather dependent, it is expected that six months of data collection will be required.

Table 5.1 Proposed data collection

Data	Data collection method	Reason for data collection
Data to inform a water balance update		
Rainfall	• The site weather station will continue to be operated.	To quantify site specific rainfall conditions at the site.
Area 1 tanks	• Following each material rainfall event, the volume of water stored in the Area 1 tanks will be measured to the nearest ½ tank.	This data will allow the Area 1 runoff characteristics to be established and the adequacy of the Area 1 storage system to be assessed.
Area 1 tank overflow	• If there are overflows from the Area 1 tanks to the sediment basin, the date time and duration of each overflow will be recorded.	If an overflow occurs, this data will enable the rainfall thresholds for overflows to be established.
Sediment basin level and overflows	• A water level logger will be installed in the sediment basin. The logger will continuously measure the water level in the basin. • Runoff volumes and the occurrence, duration and volume of overflows can be identified/calculated from the basin level data.	This data will enable runoff volumes, basin dewatering rates and the occurrence, duration and volume of overflows to be quantified.
Water quality monitoring		
Overflows from the sediment basin	The following key water quality parameters will be monitored near the basin outlet during or shortly after an overflow event: • Total suspended solids • Turbidity • pH • Oil and grease • Nutrients – ammonia, oxidised nitrogen, total Kjeldahl nitrogen, total nitrogen, reactive phosphorus and total phosphorus • Metals – aluminium, chromium, copper, lead and zinc (field filtered using a 0.45µm filter)	To characterise the water quality of any overflows.

5.2 Water balance update

Once the data collection phase is complete, a site water balance model will be developed using industry standard methods. The model will be calibrated using the data described in Table 5.1 and will be applied to assess the system overflow characteristics for a full range of rainfall conditions.

5.3 Water management system review

The key outcomes from the water balance update and other data collected will be applied to review:

- the receiving water risk assessment documented in Section 4.1; and
- the recommendations in Table 4.2.

A report will be prepared that documents the water balance update and review outcomes.

6 References

ANZECC/ARMCANZ 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment Conservation Council and Agriculture and Resource Management Council of Australian and New Zealand.

ANZG 2018, *Australian and New Zealand Guidelines for Fresh & Marine Water Quality*. Australian and New Zealand governments.

DECC 2008, *Managing Urban Stormwater – Soils and Construction Vol 2B: Waste Landfills*. Department of Environment and Climate Change

EMM 2018, *Mayfield West Recycling Facility – Surface Water Characterisation and Mitigation Plan.* Prepared for Benedict Recycling Pty Ltd by EMM Consulting Pty Limited.

Appendix A

Laboratory certificates of analysis

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2010659**	Page	: 1 of 7
Amendment	: **1**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR CHRIS KUCZERA	Contact	: Customer Services ES
Address	: 6/146 Hunter Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J14152 BENEDICT NEWCASTLE	Date Samples Received	: 27-Mar-2020 11:23
Order number	: ----	Date Analysis Commenced	: 27-Mar-2020
C-O-C number	: ----	Issue Date	: 06-Apr-2020 11:45
Sampler	: JASON O'BRIEN		
Site	: ----		
Quote number	: SY/327/16		
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
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- Amendment (06/04/2020): This report has been amended and re-released to allow the reporting of additional analytical data.
- MBAS is calculated as LAS, molecular weight 348
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- 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	BASIN	TANK	----	----	----
			Client sampling date / time	27-Mar-2020 10:20	27-Mar-2020 10:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2010659-001	ES2010659-002	--------	--------	--------
				Result	Result	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**8.27**	**7.72**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**294**	**629**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**230**	**528**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**101**	**136**	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**169**	**231**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**48**	**65**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**48**	**65**	----	----	----
ED093F: SAR and Hardness Calculations								
Total Hardness as CaCO3	----	1	mg/L	**106**	**181**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.04**	**0.01**	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.005**	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.015**	**0.038**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.002**	**0.002**	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	**0.008**	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.003**	**0.008**	----	----	----
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	**0.175**	**0.235**	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	**0.006**	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	**0.06**	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	----	----	----
EG035F: Dissolved Mercury by FIMS								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	27-Mar-2020 10:20	27-Mar-2020 10:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2010659-001	ES2010659-002	--------	--------	--------
					Result	Result	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	<0.004	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	**0.5**	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.03**	**0.24**	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.06**	**0.60**	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.20**	**0.60**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.26**	**1.20**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.2**	**2.3**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.5**	**3.5**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.31**	**0.68**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.10**	**0.51**	----	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		<0.1	<0.1	----	----	----
EP075(SIM)A: Phenolic Compounds									
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	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	27-Mar-2020 10:20	27-Mar-2020 10:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2010659-001	ES2010659-002	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	27-Mar-2020 10:20	27-Mar-2020 10:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2010659-001	ES2010659-002	--------	--------	--------
					Result	Result	----	----	----
EP080: BTEXN - Continued									
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**21.2**	**20.4**	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**43.5**	**45.2**	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**38.2**	**45.1**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**59.1**	**63.3**	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**61.7**	**65.4**	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**78.0**	**83.8**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**111**	**107**	----	----	----
Toluene-D8	2037-26-5	2	%		**102**	**102**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**96.8**	**94.0**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2004247**	Page	: 1 of 7
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR CHRIS KUCZERA	Contact	: Customer Services ES
Address	: 6/146 Hunter Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J14152 BENEDICT NEWCASTLE	Date Samples Received	: 10-Feb-2020 12:00
Order number	: ----	Date Analysis Commenced	: 10-Feb-2020
C-O-C number	: ----	Issue Date	: 17-Feb-2020 16:33
Sampler	: Jason O'Brien		
Site	: ----		
Quote number	: EN/112/18 - Primary work only		
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
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

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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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- MBAS is calculated as LAS, molecular weight 348
- TDS by method EA-015 may bias high for samples 1 and 2 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- 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	Basin	Tank	----	----	----
			Client sampling date / time	10-Feb-2020 10:45	10-Feb-2020 10:30	----	----	----
Compound	CAS Number	LOR	Unit	ES2004247-001	ES2004247-002	--------	--------	--------
				Result	Result	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**8.13**	**7.70**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**349**	**664**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**231**	**590**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**79**	**266**	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**110**	**580**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**49**	**80**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**49**	**80**	----	----	----
ED093F: SAR and Hardness Calculations								
Total Hardness as CaCO3	----	1	mg/L	**113**	**177**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.09**	**0.27**	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.003**	**0.005**	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.017**	**0.041**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.003**	**0.003**	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.005**	**0.010**	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	**0.001**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.002**	**0.004**	----	----	----
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	**0.193**	**0.215**	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.009**	**0.008**	----	----	----
Boron	7440-42-8	0.05	mg/L	**0.08**	**0.07**	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	**0.12**	----	----	----
EG035F: Dissolved Mercury by FIMS								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Basin	Tank	----	----	----
			Client sampling date / time	10-Feb-2020 10:45	10-Feb-2020 10:30	----	----	----
Compound	CAS Number	LOR	Unit	ES2004247-001	ES2004247-002	--------	--------	--------
				Result	Result	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.3**	**1.0**	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.67**	**0.07**	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.04**	**0.06**	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.26**	**1.03**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.30**	**1.09**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**3.4**	**3.7**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**3.7**	**4.8**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.15**	**0.61**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.02**	**0.26**	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	**6**	**6**	----	----	----
EP050: Anionic Surfactants as MBAS								
Anionic Surfactants as MBAS	----	0.1	mg/L	<0.1	<0.1	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Basin	Tank	----	----	----
				Client sampling date / time	10-Feb-2020 10:45	10-Feb-2020 10:30	----	----	----
Compound	CAS Number	LOR	Unit		ES2004247-001	ES2004247-002	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
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	----	----	----
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**21.5**	**18.0**	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**45.1**	**37.2**	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**58.8**	**64.0**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**65.8**	**64.7**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Basin	Tank	----	----	----
				Client sampling date / time	10-Feb-2020 10:45	10-Feb-2020 10:30	----	----	----
Compound	CAS Number	LOR	Unit		ES2004247-001	ES2004247-002	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)T: PAH Surrogates - Continued									
Anthracene-d10	1719-06-8	1.0	%		**98.4**	**79.5**	**----**	**----**	**----**
4-Terphenyl-d14	1718-51-0	1.0	%		**78.6**	**64.9**	**----**	**----**	**----**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**100**	**91.3**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**113**	**123**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**87.4**	**89.1**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
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
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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1930176**	Page	: 1 of 6
Amendment	: **1**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR CHRIS KUCZERA	Contact	: Customer Services ES
Address	: 6/146 Hunter Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J14152 BENEDICT NEWCASTLE	Date Samples Received	: 18-Sep-2019 16:39
Order number	: ----	Date Analysis Commenced	: 18-Sep-2019
C-O-C number	: ----	Issue Date	: 25-Sep-2019 13:56
Sampler	: CHRIS KUCZERA		
Site	: ----		
Quote number	: SY/327/16		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

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Signatories

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Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

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ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- Amendment (25/09/2019): This report has been amended and re-released to allow the reporting of additional analytical data.
- 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	BASIN	TANK	----	----	----
			Client sampling date / time	18-Sep-2019 00:00	18-Sep-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1930176-001	ES1930176-002	--------	--------	--------
				Result	Result	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**8.57**	**7.76**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**444**	**807**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**336**	**535**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**160**	**78**	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**271**	**159**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**42**	**95**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**42**	**95**	----	----	----
ED093F: SAR and Hardness Calculations								
Total Hardness as CaCO3	----	1	mg/L	**172**	**264**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.17**	**0.06**	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.004**	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.024**	**0.049**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.003**	**0.002**	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.006**	**0.002**	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.001**	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.003**	**0.007**	----	----	----
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	**0.285**	**0.351**	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.010**	**0.012**	----	----	----
Boron	7440-42-8	0.05	mg/L	**0.06**	**0.07**	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.11**	**0.10**	----	----	----
EG035F: Dissolved Mercury by FIMS								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	18-Sep-2019 00:00	18-Sep-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1930176-001	ES1930176-002	--------	--------	--------
					Result	Result	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EK010: Chlorine									
Chlorine - Total Residual	----	0.2	mg/L		**4.6**	<0.2	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.3**	----	----	----
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		<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.23**	**0.03**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.23**	**0.03**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.1**	**1.9**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.3**	**1.9**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.34**	**0.36**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.04**	----	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	----	----	----
EP050: Anionic Surfactants as MBAS									
Anionic Surfactants as MBAS	----	0.1	mg/L		**0.2**	**0.2**	----	----	----
EP075(SIM)A: Phenolic Compounds									
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	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	18-Sep-2019 00:00	18-Sep-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1930176-001	ES1930176-002	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**22.2**	**22.9**	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**49.9**	**37.7**	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**41.2**	**38.0**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**82.0**	**79.4**	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**68.0**	**67.3**	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**69.5**	**66.4**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**72.8**	**83.5**	----	----	----
Toluene-D8	2037-26-5	2	%		**105**	**124**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**110**	**125**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1927907-AA**	Page	: 1 of 6
Amendment	: **1**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR CHRIS KUCZERA	Contact	: Customer Services ES
Address	: 6/146 Hunter Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J14152 BENEDICT NEWCASTLE	Date Samples Received	: 02-Sep-2019 10:59
Order number	: ----	Date Analysis Commenced	: 02-Sep-2019
C-O-C number	: ----	Issue Date	: 05-May-2020 14:20
Sampler	: ----		
Site	: ----		
Quote number	: SY/327/16		
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
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 348
- TDS by method EA-015 may bias high for sample 5due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Amendment (05/05/2020): This report has been amended and re-released to allow the reporting of specific samples as requested by Chris Kuczera.
- 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	BASIN	TANK	----	----	----
			Client sampling date / time	31-Aug-2019 10:00	02-Sep-2019 10:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1927907-001	ES1927907-002	--------	--------	--------
				Result	Result	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**8.32**	**7.28**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**434**	**618**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**302**	**464**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**100**	**100**	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**228**	**152**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**33**	**84**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**33**	**84**	----	----	----
ED093F: SAR and Hardness Calculations								
Total Hardness as CaCO3	----	1	mg/L	**183**	**215**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.03**	**0.04**	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.006**	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.015**	**0.047**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.002**	**0.004**	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	**0.001**	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.006**	**0.005**	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.003**	**0.006**	----	----	----
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	**0.292**	**0.217**	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	**0.018**	----	----	----
Boron	7440-42-8	0.05	mg/L	**0.07**	<0.05	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	**0.16**	----	----	----
EG035F: Dissolved Mercury by FIMS								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BASIN	TANK	----	----	----
			Client sampling date / time	31-Aug-2019 10:00	02-Sep-2019 10:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1927907-001	ES1927907-002	--------	--------	--------
				Result	Result	----	----	----
EG035F: Dissolved Mercury by FIMS - Continued								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EK010: Chlorine								
Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.3**	**0.4**	----	----	----
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	**0.17**	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.19**	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.0**	**2.9**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ **Total Nitrogen as N**	----	0.1	mg/L	**1.2**	**2.9**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.22**	**0.67**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.03**	**0.07**	----	----	----
EP050: Anionic Surfactants as MBAS								
Anionic Surfactants as MBAS	----	0.1	mg/L	<0.1	<0.1	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	**160**	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	**200**	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	**360**	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BASIN	TANK	----	----	----
				Client sampling date / time	31-Aug-2019 10:00	02-Sep-2019 10:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1927907-001	ES1927907-002	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	100	µg/L		<100	**190**	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	**170**	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	**360**	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	**190**	----	----	----
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	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**90.0**	**87.8**	----	----	----
Toluene-D8	2037-26-5	2	%		**98.0**	**101**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**91.5**	**89.3**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
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

Appendix B
EPA correspondence

EMM
creating opportunities

Section 58(5) Protection of the Environment Operations Act 1997

Licence Variation

Licence - 20771

BENEDICT RECYCLING PTY LIMITED
ABN 71 123 156 507 ACN 123 156 507
BY EMAIL: compliance@benedict.com.au

Attention: Ms Alycia O'Brien

Notice Number	1623853
File Number	DOC23/39807, EF16/3389
Date	20-Jan-2023

NOTICE OF VARIATION OF LICENCE NO. 20771

BACKGROUND

A. BENEDICT RECYCLING PTY LIMITED (the licensee) is the holder of Environment Protection Licence No. 20771 (the licence) issued under the *Protection of the Environment Operations Act 1997* (the Act). The licence authorises the carrying out of activities at 1A MCINTOSH DRIVE, MAYFIELD WEST, NSW, 2304 (the Premises).

B. On 21 July 2022, a meeting was held between the licensee and the EPA to discuss the Premises water management system. During this meeting it was agreed that the licensee would provide the EPA with detailed information on potential water management system improvements that would be practical and reasonable to implement at the Premises.

C. On 12 August 2022, the licensee provided the EPA with the memorandum titled 'EPL 20771 - Water management update' prepared by EMM Consulting (the Memo). The Memo described the water management system improvements and an updated water balance model. It also included commitments regarding the installation of a fixed sprinkler system and preparation of a water management plan.

D. This licence variation has been initiated by the EPA to formalise the requirement to operate the fixed sprinkler system and to require reporting of water discharges from the Premises to aid in the review of the efficacy of the water management measures to minimise discharges.

E. This Notice does not authorise a significant increase in the environmental impact of the activities authorised or controlled by the licence.

VARIATION OF LICENCE NO. 20771

1. By this notice the EPA varies licence No. 20771. The attached licence document contains all variations that are made to the licence by this notice.

2. The following variations have been made to the licence:
   - Condition O3.5 - Added - A condition has been added to require the operation of the fixed water sprays in a manner to minimise dust emission from the premises.
   - Condition O5.8 - Added - A condition has been added to require the operation of the fixed water sprays in a manner to reuse water and minimise surface water discharges.
   - Condition R4.1 and R4.2 - Added - A condition has been added to require the licensee to prepare a report for each Annual Return period that provides data to allow a review of the effectiveness of the premises water management system.

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Peter Jamieson

Head Regional Operations Unit

Environment Protection Authority

(by Delegation)

INFORMATION ABOUT THIS NOTICE

- This notice is issued under section 58(5) of the Act.
- Details provided in this notice, along with an updated version of the licence, will be available on the EPA's Public Register (http://www.epa.nsw.gov.au/prpoeo/index.htm) in accordance with section 308 of the Act.

Appeals against this decision

- You can appeal to the Land and Environment Court against this decision. The deadline for lodging the appeal is 21 days after you were given notice of this decision.

When this notice begins to operate

- The variations to the licence specified in this notice begin to operate immediately from the date of this notice, unless another date is specified in this notice.
- If an appeal is made against this decision to vary the licence and the Land and Environment Court directs that the decision is stayed the decision does not operate until the stay ceases to have effect or the Land and Environment Court confirms the decision or the appeal is withdrawn (whichever occurs first).

Environment Protection Licence

Licence - 20771

Licence Details	
Number:	20771
Anniversary Date:	25-May

Licensee
BENEDICT RECYCLING PTY LIMITED
PO BOX 431
FRENCHS FOREST NSW 1640

Premises
BENEDICT RECYCLING MAYFIELD WEST
1A MCINTOSH DRIVE
MAYFIELD WEST NSW 2304

Scheduled Activity
Resource recovery
Waste storage

Fee Based Activity	Scale
Recovery of general waste	Any general waste recovered
Waste storage - other types of waste	Any other types of waste stored

Contact Us
NSW EPA
4 Parramatta Square
12 Darcy Street
PARRAMATTA NSW 2150
Phone: 131 555
Email: info@epa.nsw.gov.au
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PARRAMATTA NSW 2124

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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

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The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

BENEDICT RECYCLING PTY LIMITED
PO BOX 431
FRENCHS FOREST NSW 1640

subject to the conditions which follow.

Environment Protection Licence

Licence - 20771

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Resource recovery	Recovery of general waste	Any general waste recovered
Waste storage	Waste storage - other types of waste	Any other types of waste stored

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
BENEDICT RECYCLING MAYFIELD WEST
1A MCINTOSH DRIVE
MAYFIELD WEST
NSW 2304
LOT 1 DP 874109
LICENSED AREA IS SHOWN ON THE MAP TITLED "DEVELOPMENT LAYOUT PLAN" AND REFERRED TO AS "APPENDIX A PLANS" IN THE SSD 7698 - MAYFIELD WEST RRF - DEVELOPMENT CONSENT (DOC21/538931).

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Environment Protection Licence

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge & Monitoring	Discharge & Monitoring	Final sediment basin in north-western corner of the site. (See DOC18/798710)

P1.2 The following points referred to in the table below are identified in this licence for the purposes of weather and/or noise monitoring and/or setting limits for the emission of noise from the premises.

Noise/Weather

EPA identification no.	Type of monitoring point	Location description
2	Noise monitoring	R1 - Kerr Street
3	Noise monitoring	R2 - Woodstock Street - north/east
4	Noise monitoring	R3 - Woodstock Street - north/west
5	Noise monitoring	R4 - Simpson Court
6	Noise monitoring	R5 - Shelley Close
7	Noise monitoring	R6 - Groongal Street - East
8	Noise monitoring	R7 - Groongal Street
9	Noise monitoring	R8 - Groongal Street
10	Noise monitoring	R9 - Gregson Avenue
11	Noise monitoring	R10 - Gregson Avenue
12	Noise monitoring	R11 - 80 Gregson Avenue
13	Noise monitoring	R12 - Terry Street
14	Noise monitoring	R13 - Olearia Cresent
15	Noise monitoring	Mayfield West Primary School
16	Noise monitoring	Church of Christ
17	Noise monitoring	Scout Hall

18	Meteorological Station – to determine meteorological conditions for noise monitoring

Note: Locations referred to in the table above are consistent with the Noise Impact Assessment - Recycling Facility, 80 Tourle Street, Mayfield West by EMM Consulting (Report J14152RP1) dated 15 September 2016.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

POINT 1

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
pH	pH				6.5-8.5
Total suspended solids	milligrams per litre				50

L3 Waste

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L3.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General solid waste (non-putrescible)	Basic Oxygen Slag Electric Arc Furnace Slag Electric Arc Ladle Slag Granulated Blast Furnace Slag Rail Ballast	Resource recovery Waste storage	These waste types can only be received at the premises if the waste does not contain any contaminant levels exceeding the limits for General Solid Waste stated in the EPA's Waste Classification Guidelines Part 1: Classifying Waste.
NA	General solid waste (non-putrescible)	Excavated Natural Material	Resource recovery Waste storage	These waste types can only be received at the premises if the waste does not contain any contaminant levels exceeding the limits for General Solid Waste stated in the EPA's Waste Classification Guidelines Part 1: Classifying Waste.
NA	General solid waste (non-putrescible)	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"	Resource recovery Waste storage	Arsenic: 40mg/kg Cadmium: 2mg/kg Copper: 200mg/kg Mercury 1.5mg/kg Zinc: 600mg/kg Petroleum Hydrocarbons C6-C9: 150mg/kg Petroleum

		column		Hydrocarbons C10-C36: 1600mg/kg Polycyclic aromatic hydrocarbons: 80mg/kg Polychlorinated biphenyls (individual): 1mg/kg No acid sulphate soil is to be received at the premises.
NA	General solid waste (non-putrescible)	Grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids.	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Biosolids categorised as unrestricted use, or restricted use 1,2 or 3.	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Household waste from municipal clean-up that does not contain putrescible waste.	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Cement Fibre Board	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Concrete Batch Plant Waste	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Paper or cardboard	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Glass, plastics, rubber, plasterboard, ceramics, brick, concrete or metal	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Wood waste	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Garden waste	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Asphalt Waste	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Virgin Excavated Natural Material	Resource recovery Waste storage	
NA	General solid waste (non-putrescible)	Building and demolition waste	Resource recovery Waste storage	

L3.2 The premises may accept up to 315,000 tonnes of general solid waste (non-putrescible) per annum

Environment Protection Licence

Authorised Amount

L3.3 Notwithstanding any limit specified in the above table, the licensee shall not exceed the authorised amount specified in this licence. Where the authorised amount is less than the total of all wastes listed above, the authorised amount will take precedent.

L3.4 The authorised amount of waste permitted on the premises cannot exceed 53,733 tonnes at any one time.

L3.5 All waste stockpiles occurring as part of the operation at the premises must be no greater than 7.0 metres in height.

L3.6 All waste activities, including unloading, loading, processing and stockpiling of wastes, is only permitted within the area as identified as the Development Area in the State Significant Development 7698 - Appendix A Plans - Development Layout Plan.

L4 Noise limits

L4.1 Noise limits

LOCALITY	DAY LAeq (15 minutes)	Evening LAeq (15 minutes)	Night LAeq (15 minutes)	Night Amax
R1	48	40	40	51
R2	49	41	41	52
R3	47	39	39	51
R4	47	39	39	50
R5	50	42	42	53
R6	48	41	41	51
R7	48	41	41	52
R8	48	40	40	52
R9	49	42	42	52
R10	49	41	41	51
R11	49	42	42	52
R12	42	41	41	48
R13	40	36	36	47
Mayfield West Primary School	Internal 35 dB(A) - Noisiest 1 hour period (when in use)			
Church of Christ	Internal 40 dB(A) - Noisiest 1 hour period (when in use)			
Scout Hall	External 55 dB(A) - (when in use)			

L4.2 For the purpose of condition L4.1:
- Day is defined as the period from 7 a.m. to 6 p.m. Monday to Saturday and 8 a.m. to 6 p.m. Sunday and Public Holidays.
- Evening is defined as the period 6 p.m. to 10 p.m.
- Night is defined from 10 p.m. to 7 a.m. Monday to Saturday and 10 p.m. to 8 a.m. Sunday and Public Holidays.

L4.3 The noise limits set out in condition L4.1 apply under all meteorological conditions except for the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

L4.4 To determine compliance:
a) the Leq(15 minute) noise limits in condition L4.1, the noise measurement equipment must be located:
- approximately on the property, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
- within 30 metres of a dwelling façade, but not closer than 3 metres, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or where applicable
- within approximately 50 metres of the boundary of a National Park or Nature Reserve.
b) with any LAmax in condition L4.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
c) with the noise limits in condition L4.1, the noise measurement equipment must be located:
- at the most affected point at a location where there is no dwelling at the location; or
- at the most affected point within an area at a location prescribed by conditions L4.4(a) or L4.4(b).

L4.5 A non-compliance of conditions L4.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- at a location other than an area prescribed by conditions L4.4(a) and L4.4(b); and/or
- at a point other than the most affected point at a location.

L4.6 For the purposes of determining the noise generated at the premises, the modification factors in *Fact Sheet C - Corrections for Annoying Noise Characteristics* of the *NSW Noise Policy for Industry* must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L4.7 The crusher and shredder are only permitted to be operated in the segregated heavy waste processing and stockpiling area, no further south than 130 m from the northern site boundary in accordance with the State Significant Development 7698 - Appendix A Plans - Location of Crusher, Shredder and Screens.

L4.8 The mobile screens in the segregated heavy waste processing area and stockpiling area must not be operated simultaneously with the crusher or shredder.

L5 Hours of operation

L5.1 Hours of operation

ACTIVITY	DAY	TIME
Construction	Monday to Friday	7 a.m. to 6 p.m.
	Saturday	8 a.m. to 1 p.m.
	Sundays and Public Holidays	Not Permitted
Waste Receival	Monday to Friday	6 a.m. to 6 p.m.
	Saturday	6 a.m. to 5 p.m.
	Sundays and Public Holidays	7 a.m. to 3 p.m.
Waste Processing	Monday to Friday	6 a.m. to 6 p.m.
	Saturday	6 a.m. to 5 p.m.
	Sundays and Public Holidays	Not Permitted
Waste Despatch	Monday to Friday	6 a.m. to 6 p.m.
	Saturday	6 a.m. to 5 p.m.
	Sundays and Public Holidays	Not Permitted

L5.2 Works outside the hours identified in condition L5.1 may be undertaken in the following circumstances:
i. the works are inaudible at the nearest sensitive receivers; or
ii. for the delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons; or
iii. where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

L5.3 Waste receival is permitted on a 24-hour per day basis on limited occasions to facilitate major infrastructure projects. Limited occasions is defined as:
i) no greater than six times per year; and
ii) only for a period of less than two weeks in length for each occasion.

L5.4 The EPA must be notified no later than 48 hours prior to each of the 24-hour waste receival periods referred to in condition L5.3 along with a description of the major infrastructure projects which necessitate the 24-hour operations.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and

b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.

O3.2 Trucks entering and leaving the premises that are carrying loads of dust generating materials must have their loads covered at all times, except during loading and unloading.

O3.3 No material, including sediment, is permitted to be tracked from the premises.

O3.4 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O3.5 Fixed water sprays must be maintained and operated at the premises in a manner that will minimise the generation and emission of dust from the premises.

O4 Emergency response

Note: The licensee must maintain, and implement as necessary, a current Pollution Incident Response Management Plan (PIRMP) for the premises. The PIRMP must be developed in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations (POEO) Act 1997 and POEO regulations. The licensee must keep the incident response plan on the premises at all times. The incident response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. The PIRMP must be tested at least annually or following a pollution incident.

O5 Processes and management

O5.1 A litter management program must be implemented, which includes litter patrol to ensure that the local amenity is not degraded.

Bunding

O5.2 All above ground tanks containing material capable of causing harm to the environment must be stored within a bund or within an alternative spill containment system that achieves the same outcome.

O5.3 Bunds must:
a) have walls and floors constructed of impervious materials;
b) be of sufficient capacity to contain 110% of the volume of the tank (or 110% volume of the largest tank where a group of tanks are installed);
c) have floors graded to a collection sump; and
d) not have a drain valve incorporated in the bund structure,

or be constructed and operated in a manner that achieves the same environmental outcome.

Surface Water Management

O5.4 A surface water management system must be operated and maintained at the premises at all times.

O5.5 The surface water management system must be maintained to minimise the infiltration of surface water to groundwater. This includes inspecting the surface water infrastructure monthly for cracking and vegetation breakthrough, removing the vegetation and sealing the surface water infrastructure.

O5.6 The final sediment basin must be maintained 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.

O5.7 A visible marker must be installed and maintained in the final sediment basin in a position that shows 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.

O5.8 Fixed water sprays must be maintained and operated at the premises in a manner that will maximise water reuse on site and minimise surface water discharges from the premises.

Note: The Licensee's submission on minimising polluted water discharges from the premises, titled "EPL 20771 Water Management Update" and dated 12 August 2022 (filed as EPA document DOC22/708750), stated that following rainfall, the fixed water spray system that has been installed over approximately 3.4 ha of the site will be run at full capacity until the Area 1 Tanks are fully dewatered and the Final Sediment Basin is dewatered to 50 % capacity.

O6 Waste management

O6.1 All putrescible waste received at the premises must be:
a) stored in an enclosed vessel; and
b) disposed of, to a place that can lawfully receive that waste, within 24 hours of receipt.

O6.2 Waste collected at the premises that is unable to be recycled, must not be stored at the premises and must be taken to a lawful waste facility at least once a week.

O6.3 All co-mingled waste (to include but not limited to metals, shredded wood products, glass and non-recyclable residues) received at the Premises must be unloaded, processed and stockpiled within an enclosed processing shed.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

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M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Water and/ or Land Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium	milligrams per litre	Daily during any discharge	Grab sample
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Chromium	milligrams per litre	Daily during any discharge	Grab sample
Copper	milligrams per litre	Daily during any discharge	Grab sample
Lead	milligrams per litre	Daily during any discharge	Grab sample
Nitrogen (total)	micrograms per litre	Daily during any discharge	Grab sample
Oil and Grease	milligrams per litre	Daily during any discharge	Grab sample
Oxidised nitrogen	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Phosphorus (total)	micrograms per litre	Daily during any discharge	Grab sample
Reactive Phosphorus	milligrams per litre	Daily during any discharge	Grab sample
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

Zinc	milligrams per litre	Daily during any discharge	Grab sample

M3 Testing methods - concentration limits

M3.1 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Weather monitoring

M4.1 At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below, using the corresponding sampling method, units of measure, averaging period and sampling frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively.

POINT 18

Parameter	Sampling method	Units of measure	Averaging period	Frequency
Temperature at 2 metres	AM-4	degrees Celsius	1 hour	Continuous
Temperature at 10 metres	AM-4	degrees Celsius	1 hour	Continuous
Wind Direction at 10 metres	AM-2 & AM-4	Degrees	15 minutes	Continuous
Wind Speed	AM-2 & AM-4	metres per second	15 minutes	Continuous
Sigma Theta	AM-2 & AM-4	Degrees	15 minutes	Continuous
Rainfall	AM-4	millimetres	15 minutes	Continuous
Relative humidity	AM-4	percent	1 hour	Continuous

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;

e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until one month after the date of the issue of this licence.

M7 Noise monitoring

M7.1 To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.

POINT 5,9,12

Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period
Day	Yearly	15 minutes	1 operation day
Evening	Yearly	15 minutes	1 operation day
Night	Yearly	15 minutes	1 operation day

M7.2 The noise monitoring required by the condition above must be conducted during a period of normal or above average throughput at the premises. The noise consultancy report generated as a result of the above noise monitoring must stipulate the activities being undertaken at the premises at the time of the noise monitoring and the daily throughput compared to average daily throughput.

6 Reporting Conditions

Environment Protection Licence

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R1 Annual return documents

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

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

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R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

Annual water management review

R4.1 The licensee must prepare an annual Water Quality and Discharge Report that provides the following information for each Annual Return reporting period:
a) the number of surface water overflows from the premises compared to the design overflow regime of 2.9

overflows per year, as provided in the memorandum titled 'EPL 20771 - Water management update' prepared by EMM Consulting dated 12 August 2022 (EPA reference DOC22/708750) (hereafter referred to as the Update Memo);
b) a summary of the rainfall data that preceded and contributed to each surface water overflow;
c) a review of the water balance model provided in the Update Memo, including design rainfall, against actual site conditions; and
d) a review of any water quality data collected in accordance with the licence and the premises Water Management Plan as committed to in the Update Memo, including: a review of trends in water quality since monitoring began; a comparison of water captured in Area 1 Tanks to the Final Sedimentation Basin water for each pollutant parameter; and identification of any threshold exceedances of ANZG (2018) criteria for further investigation.

R4.2 The report required by the above condition must be submitted to the EPA with each years Annual Return.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Contact number for incidents and responsible employees

G2.1 The licensee must nominate to the EPA a representative of the licensee that is available at all times and is capable of providing immediate assistance or response during emergencies or any other incidents at the premises. The name of the nominated representative and their contact details, including their telephone number, must be current at all times. The nomination and contact details must be provided to the EPA by email at info@epa.nsw.gov.au.

8 Special Conditions

E1 Financial Assurance

E1.1 A financial assurance in the form of an unconditional and irrevocable and on demand guarantee from a bank, building society or credit union operating in Australia as “Authorised Deposit-taking Institutions” under the*Banking Act 1959* of the Commonwealth of Australia and supervised by the Australian Prudential regulatory Authority (APRA) must be provided to the EPA prior to the issue of the licence. The financial assurance must be in favour of the EPA in the amount of three hundred and thousand dollars ($300,000). The financial assurance is required to secure or guarantee funding for works or programs required by or under this licence.

The licensee must provide to the EPA an initial financial assurance in favour of the EPA the amount of one hundred thousand dollars ($100,000) within one (1) month of the issue of this licence.

An additional one hundred thousand dollars ($100,000) must be provided in favour of the EPA to the EPA within 12 months from the licence issue dates.
A final one hundred thousand dollars ($100,000) must be provided in favour of the EPA to the EPA within 24 months from the licence issue date.

E1.2 The licensee must provide to the EPA, along with the original counterpart guarantee, confirmation in writing that the financial institution providing the guarantee is subject to supervision by the Australian Prudential Regulatory Authority (APRA).

E1.3 The financial assurance must contain a term that provides that any money claimed can be paid to the EPA or, at the direction of the EPA, to any other person.

E1.4 The financial assurance must be maintained during the operation of the facility, and thereafter, until such time as the EPA is satisfied the premises is environmentally secure.

E1.5 The financial assurance must be replenished by the full amount claimed or realised if the EPA has claimed on or realised the financial assurance or any part of it to undertake a work or program required to be carried out by the licence which has not been undertaken by the licence holder.

E1.6 The EPA may require an increase in the amount of the financial assurance at any time as a result of reassessment of the total likely costs and expenses of rehabilitation of the premises.

E1.7 The licensee must provide to the EPA the original counterpart guarantee within five working days of the issue of:
a) the financial assurance required by condition E1.1, and
b) the adjusted financial assurance, also required by condition E1.1.

E1.8 The EPA may claim on a financial assurance under s303 of the POEO Act if a licensee fails to carry out any work or program required to comply with the conditions of this licence.

E2 Environmental Obligations of Licensee

E2.1 While the licensee's premises are being used for the purpose to which the licence relates, the licensee must:
a) Clean up any spill, leak or other discharge of any waste(s) or other material(s) as soon as practicable after it becomes known to the licensee or to one of the licensee's employees or agents;
b) In the event(s) that any liquid and non-liquid waste(s) is unlawfully deposited on the premises, such waste(s) must be removed and lawfully disposed of as soon as practicable or in accordance with any direction given by the EPA; and
c) Provide all monitoring data as required by the conditions of this licence or as directed by the EPA.

E2.2 In the event of an earthquake, storm, fire, flood or any other event where it is reasonable to suspect that a pollution incident has occurred, is occurring or is likely to occur, the licensee (whether or not the premises continue to be used for the purposes to which the licence relates) must:
a) make all efforts to contain all firewater on the licensee's premises;
b) make all efforts to control air pollution from the licensee's premises;

c) make all efforts to contain any discharge, spill or run-off from the licensee's premises;
d) make all efforts to prevent flood water entering the licensee's premises;
e) remediate and rehabilitate any exposed areas of soil and/or waste;
f) lawfully dispose of all liquid and solid waste(s) stored on the premises that is not already securely disposed of;
g) at the request of the EPA monitor groundwater beneath the licensee's premises and its potential to migrate from the licensee's premises;
h) at the request of the EPA monitor surface water leaving the licensee's premises; and
i) ensure the licensee's premises is secure.

E2.3 After the licensee's premises cease to be used for the purpose to which the licence relates or in the event that the licensee ceases to carry out the activity that is the subject of this licence, that licensee must:
a) remove and lawfully dispose of all liquid and non-liquid waste stored on the licensee's premises; and
b) rehabilitate the site so that its contamination status is no worse than that described in the Site Audit Report - Former EMD Facility Mayfield West, prepared for Delta EMD, prepared by ENVIRON Australia Pty Ltd, November 2009, Audit Number: GN 397.

E3 EPA may claim on financial assurance

E3.1 The EPA may claim on a financial assurance under s303 of the POEO Act if a licensee fails to carry out any work or program required to comply with the conditions of this licence or clean up notice issued under section 91 of the POEO Act.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste
Wellhead	Has the same meaning as in Schedule 1 to the Protection of the Environment Operations (General) Regulation 2021.

Ms Jenny Lange

Environment Protection Authority

(By Delegation)

Date of this edition: 25-May-2016

End Notes

2	Licence varied by notice	1544732 issued on 11-Oct-2016
3	Licence varied by notice	1563285 issued on 08-Nov-2018
4	Licence varied by notice	1598044 issued on 11-Dec-2020
5	Licence varied by notice	1610190 issued on 08-Jul-2021
6	Licence varied by notice	1616094 issued on 23-Feb-2022

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