Appendix H

Surface Water Impact Assessment

FIFTEEN50

RPS Australia East Pty Ltd

GreenSPOT Recycling Facility EIS: Surface Water Report

16 August 2019

RPS Australia East Pty Ltd

GreenSPOT Recycling Facility EIS: Surface Water Report

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1. Introduction

Bettergrow Pty Ltd (Bettergrow) currently operates the GreenSPOT Hunter Valley Recycling Facility (the 'facility'), under Development Approval DA140/2016 (as modified on 16 April 2018) and EPA Licence EPL 7654 (as varied on 14 June 2018), on the filled and capped Void 3 of the former Ravensworth No. 2 mine owned by AGL Macquarie Pty Ltd (the 'site'). DA140/2016 authorises the receipt of up to 76,000 tonnes per annum of organic materials such as biosolids and garden organics to be composted and used in remediation on the site or transferred for use in rehabilitation of AGL Macquarie lands. The current development approval and EPA licence are provided in Appendix A.

The Applicant for DA140/2016 was Bettergrow Pty Ltd (Bettergrow). Bettergrow are contracted by AGL Macquarie (the landowner) to supply manufactured soil ameliorant and rehabilitation products to be used as part of the approved rehabilitation works at Ravensworth No. 2 mine and Ravensworth South mine.

Bettergrow now proposes to expand the existing composting facility to authorise the receipt of up to 200,000 tonnes per annum of organic materials including new feed sources of food waste in order to facilitate the proposed sale of the composted material to third parties.

The proposal constitutes a State Significant Development under the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it involves composting 200,000 tonnes of organics, a trigger under the Act. Section 4.12 (8) of the EP&A Act requires that *"A development application for State Significant Development or designated development is to be accompanied by an Environmental Impact Statement prepared by or on behalf of the applicant in the form prescribed by the regulations"*. The purpose of this report is to provide a surface water assessment to support the preparation of an Environmental Impact Statement (EIS) assessing the expansion of the existing Ravensworth composting facility (the proposal).

This section of the EIS presents surface water characterisation of the site of the proposed development. The information and assessments within this report describe:

- Relevant legalisation for surface water management
- Assessment of the existing hydrological environment, water quality characterisation, flooding, water balance and surface water usage
- Baseline (existing) surface water environment and associated environmental values
- Assessment of the proposed development to identify and evaluate potential impacts to surface water
- Identification of mitigation and management measures.

1.1 SEARs

This surface water assessment has been prepared in accordance with the requirements of the Secretary's Environmental Assessment Requirements (SEARs) issued 11 July 2018 for the proposal. These requirements are included in Appendix B.

The EIS must address the following specific issues, as outlined in the SEARs, relevant to water resources:

- *A description of erosion and sediment controls*
- *Consideration of salinity and acid sulphate soil impacts*
- *An assessment of potential impacts to soil and water resources, topography, hydrology, groundwater, drainage lines, watercourses and riparian lands on or nearby to the site, including mapping and description of existing background conditions and cumulative impacts*

- *A detailed site water balance, including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise the use of water at the site*
- *Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from waste into the wastewater, proposed mitigation measures to manage any impacts to receiving waters, and monitoring activities and methodologies)*
- *Details of stormwater/wastewater/leachate management systems including the capacity of onsite detention systems and measures to treat, reuse or dispose of water.*

Table 1 indicates the location within the report where each specific requirement has been addressed.

Table 1: SEARs addressed

SEAR	Related section(s)
Erosion and sediment controls	Sections 4.10 and 5.3
Salinity and acid sulphate soils	Sections 4.6 and 4.7
Surface water	Section 4
Water courses and drainage lines	Section 4.1
Groundwater	Refer Groundwater Report
Riparian lands	Sections 4.1 and 4.3
Site water balance- water requirements and minimisation	Sections 4.4.2.1 and 5.2
Water quality and discharge	Sections 4.4.3 and 4.8
Stormwater/wastewater/leachate management	Section 4.8 and 5
Impacts to surface and ground water	Section 6 and Groundwater Report
Mitigation measures	Section 7

1.1.1 Specific requirements

The NSW Office of Environment and Heritage (OEH) have prepared Standard SEARs for the proposed development in relation to water and soils. These are attached in Appendix B.

The NSW Department of Industry (DoI) have identified the following assessments as being required for review of the proposal:

- Identification of an adequate and secure water supply for the life of the project. This includes confirmation that water can be sourced from an appropriately authorised and reliable supply. This is also to include an assessment of the current market depth where water entitlement is required to be purchased (refer Sections 4.4 and 5.2)
- A detailed and consolidated site water balance (refer Sections 4.4.2.1 and 5.2)

- Assessment of impacts on surface and groundwater sources (both quality and quantity), related infrastructure, adjacent licenced water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts (refer Section 6)
- Proposed surface and groundwater monitoring activities and methodologies (refer Section 7).

2. Site and proposal description

2.1 Site location

The site is located at Ravensworth No.2 mine and is approximately 20 kilometres north of Singleton, in the Hunter Valley NSW. The site is formally described as Lot 10 DP1204457 at 74 Lemington Road, Ravensworth in the Singleton Local Government Area (LGA). The Proposal area covers approximately 57 hectares (ha) and is located on part of a capped open cut mining void which has been filled with ash from Bayswater Power Station. The site location is shown in Figure 1.

2.2 Current operations

Bettergrow currently operate the site in accordance with DA140/2016 (as modified) and Environmental Protection Licence (EPL) 7654 as varied on 14 June 2018. The composting of waste (mineral-fortified and humified compost) at the facility is predominately used for onsite soil rehabilitation campaigns performed by AGL Macquarie at its Ravensworth No.2 and Ravensworth South mine sites.

Under the current EPL, the operation of the facility involves the composting of 76,000 tonnes per annum of the materials listed in Table 2.

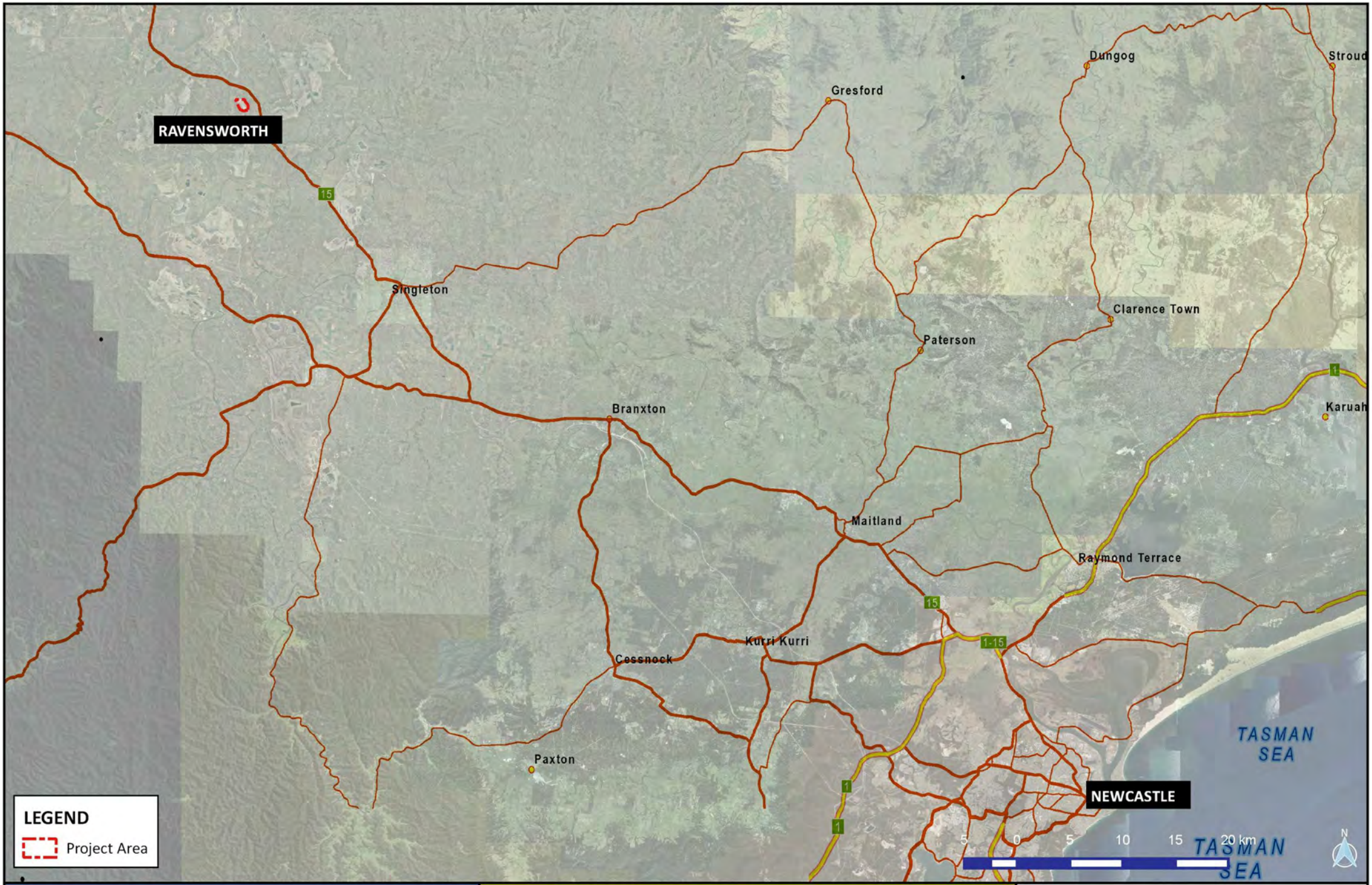
Table 2: EPL wastes permitted to be received at the facility

Waste	Description	Activity
General or specific exempted waste	Paper Crumble	Composting
General solid waste (non-putrescible)	Urban wood residues (as defined in 'The compost order 2016')	Composting
Liquid waste	Wastewater from Bayswater mine void 4	Composting
General solid waste (non-putrescible)	Natural organic fibrous material (as defined Schedule 1 of the POEO Act)	Composting
Power Station Bottom Ash	Coal ash which meets the conditions of 'The coal ash order 2014'	Composting
General solid waste (non-putrescible)	Biosolids (as defined in Schedule 1 of the POEO Act)	Composting
General solid waste (non-putrescible)	Garden Waste (as defined in Schedule 1 of the POEO Act)	Composting

The existing composting facility has been designed and approved as a staged development by DA140/2016. Two stages form the overall development. Currently Stage 1 has been developed and is operational. Stage 2 has not been developed or constructed to date and is outlined in Section 2.4. The existing site operations are shown in Figure 2.

A Surface and Groundwater Management Plan (Section 4.10) has been prepared and implemented for the existing Stage 1 development to mitigate impacts to water resources and to meet the requirements of EPL 7564.

FIGURE 1



SITE LOCATION

REVISION NO.: B

CLIENT: RPS AUSTRALIA EAST PTY LTD
JOB NO.: 19007
CREATED BY: R CHEOK ON 17/05/2019

LOCATION: RAVENSWORTH, NSW
GEOGRAPHIC COORDINATE SYSTEM: WGS84
DATA SOURCES: RPS (CLIENT), NSW GOVT 2019

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FIGURE 2

EXISTING SITE LAYOUT

REVISION NO.: C

CLIENT: RPS AUSTRALIA EAST PTY LTD
JOB NO.: 19007
CREATED BY: R CHEOK ON 15/08/2019

LOCATION: RAVENSWORTH, NSW
GEOGRAPHIC COORDINATE SYSTEM: WGS84
DATA SOURCES: RPS, GOOGLE 2019

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2.2.1 Composting process

Composting of materials occurs in windrows parallel to the gradient of the hardstand pad (approximately 20 hectares). Leachate generated from the windrows is shed down slope to a leachate dam where it is captured and stored for reuse in the composting process. The leachate dam has been designed in accordance with AS 3798-2007 *Guidelines on Earthworks on Commercial and Residential Developments*. Surface water is managed on site through the diversion of clean surface water around the composting operation area (refer Section 4.8 below) in accordance with the Surface and Groundwater Management Plan (Section 4.10).

The contained leachate is re-used for the composting process, which is a net user of water. Additional water for the composting process is sourced from Void 4 to the south of the site. Water sourced from Void 4 is also used for dust suppression of haulage roads within the composting facility complex.

The composting process takes approximately eight weeks, after which maturation occurs. The finished compost material is then stored on site and may be screened and blended to create the final product. The final compost product is then loaded onto trucks and transported to relevant areas for rehabilitation.

It is noted that, of the infrastructure components authorised under DA140/2016 (refer Appendix A and Appendix C), the compacted earth processing pad and surface water drainage infrastructure has been constructed for Stage 1 only.

2.3 The proposal

Bettergrow currently operate the site as the GreenSPOT Hunter Valley Recycling Facility to receive 76,000 tonnes per annum of organic materials to be composted and used in remediation of the Ravensworth No. 2 mine (on site) or transferred for use in rehabilitation of AGL Macquarie Lands. This is shown in Figure 2.

The proposal is to expand the existing operations of the site to receive 200,000 tonnes of organics per annum to facilitate further remediation of AGL Macquarie owned lands as well as supplying commercial customers in the Upper Hunter Valley. The proposal includes:

- The continued operation of the existing facility in accordance with DA140/2016 as modified
- Development of Stage 2 infrastructure as described in Section 2.4 below
- Receipt of up to 200,000 tonnes of organics per annum
- Transfer of the composted material to other AGL Macquarie sites such as the Liddell Ash Dam, Liddell Power Station and Bayswater Power Station for use in rehabilitation as per existing approval
- Sale of a portion of the finished compost to third parties.

The proposed site layout, including existing built features, are shown in Figure 3 and Figure 4. Construction of the proposal is expected to be completed over a six-month period with a commencement date in 2019.

2.4 Expansion infrastructure

As indicated in Section 2.2, not all infrastructure authorised by DA140/2016 has been constructed. The remaining Stage 2 infrastructure will be constructed as part of the expanded 200,000 tonne operations (the Proposal) and will include:

- Extension to the processing pad area (identified as Stage 2 in DA140/2016, shown in Figure 3), comprising the following works:

  - Preparation of an operations area by placing and compacting a sub-base of 300-400 mm of site won overburden with 100-150 mm compacted gravel as a wearing course. The overburden will be placed over the existing capping layer that has been constructed over Void No.3
- Expansion of the existing surface water drainage system, comprising the following works:
  - Extension of perimeter bunding for Stage 2 to divert clean water runoff away from the composting area to the surrounding voids
  - Bunding will be constructed using overburden and will be stabilised using compost produced onsite and a suitable grass seed mix
  - Expansion of the leachate dam as approved as part of the Stage 2 development application (DA140/2016)
- Installation of a Mobile Aerated Floor (MAF) (or equivalent) on a portion of the processing pad to allow for composting of FOGO waste streams. A MAF is a compost aeration system that uses a computer-controlled fan that pushes air through movable perforated pipes underneath the compost pile
- Construction of an equipment and machinery storage shelter (approximately 15 metres long, 6 metres wide and 5 metres high), consisting of two shipping containers, a curved tarped roof and a compacted earth or road base floor
- Construction of a product receival and blending shelter, consisting of two shipping containers, a tarped curved roof and a compacted earth floor
- Installation of a weighbridge, consisting of a reinforced concrete foundation, steel substructure and concrete deck raised above the surrounding ground surface
- Installation of a dedicated truck/trailer wash bay
- Installation of two concrete 10,000 litre drill water receival tanks for the storage and re-use of recycled water.

The location of the above infrastructure and modifications are illustrated in Figure 4. The construction works described above do not include any new clearing of vegetation and/or significant ground disturbance, as the site is already cleared and compacted being part of the existing capped layer over the Void 3 ash dam.

Figure 3: Proposed site layout (as approved under DA140/2016)

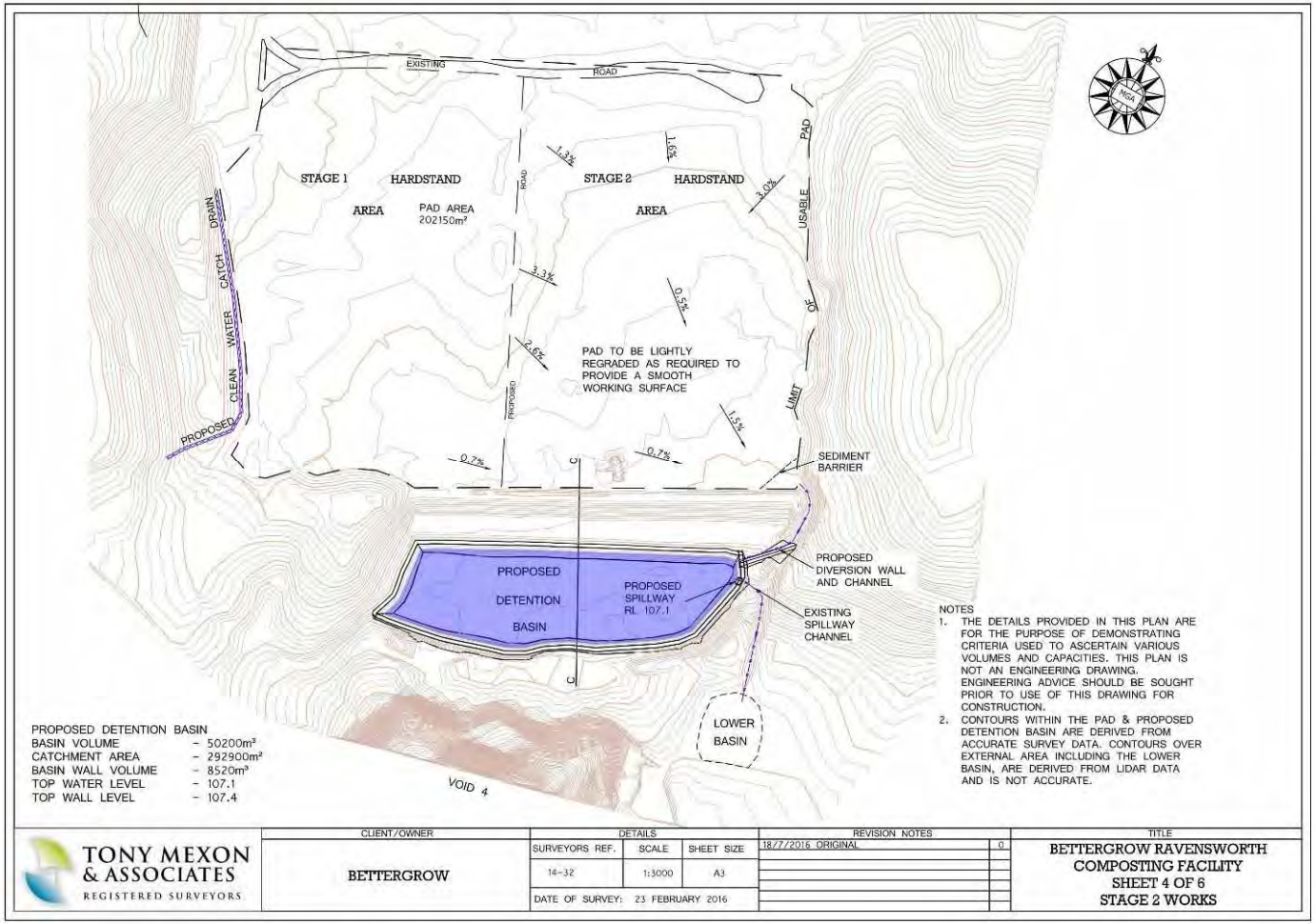
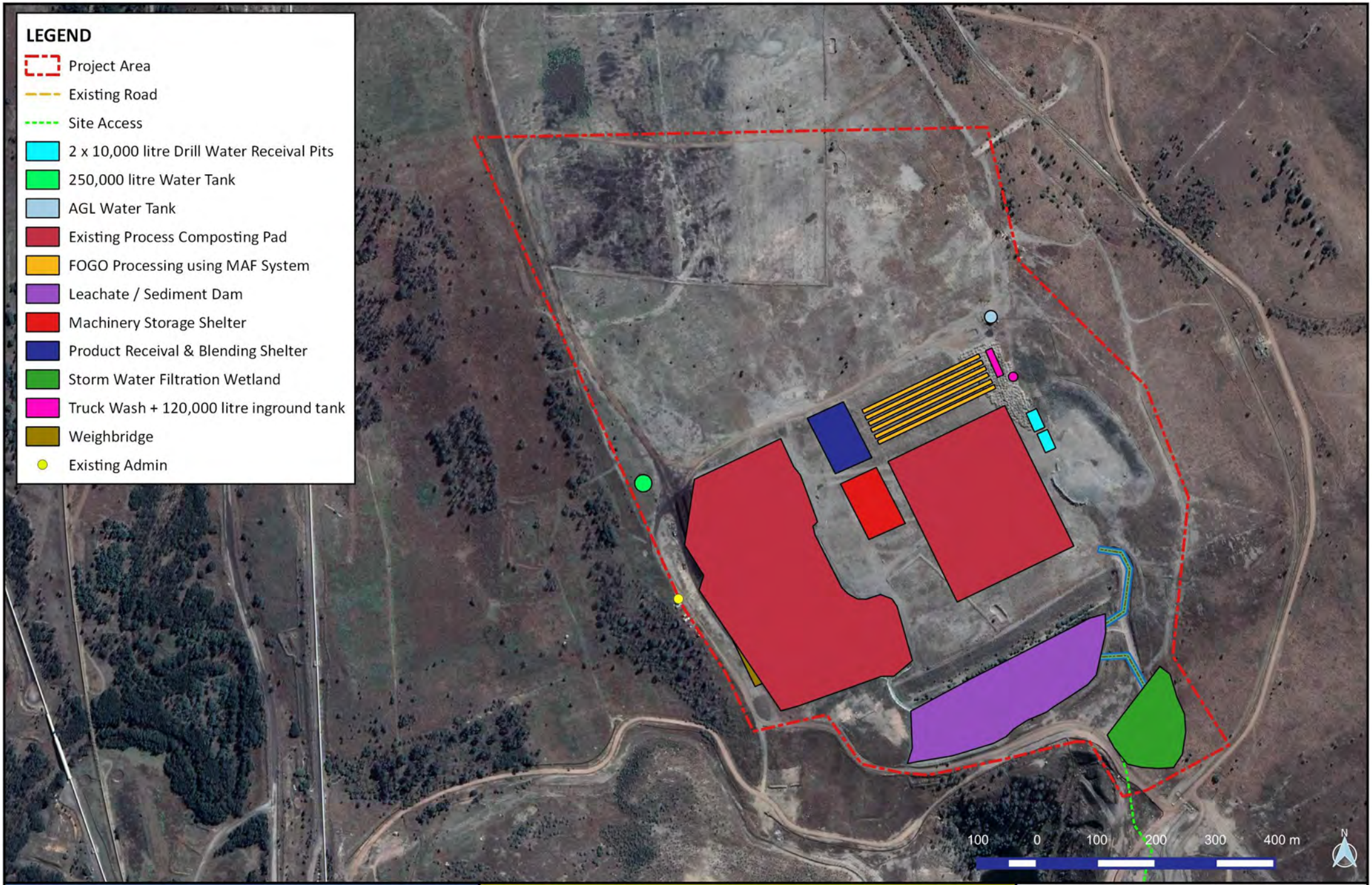


FIGURE 4



PROPOSED INFRASTRUCTURE PLAN

REVISION NO.: C

CLIENT: RPS AUSTRALIA EAST PTY LTD
JOB NO.: 19007
CREATED BY: R CHEOK ON 15/08/2019

LOCATION: RAVENSWORTH, NSW
GEOGRAPHIC COORDINATE SYSTEM: WGS84
DATA SOURCES: RPS, GOOGLE 2019

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3. Statutory framework and guidelines

The legislative environment concerning the protection of water resources in relation to the proposal is described briefly in Table 3 below.

Table 3: Applicable Legislation

Jurisdiction	Legislation / Instrument	Purpose	Statement of Compliance
Commonwealth	*Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*	The EPBC Act provides for the management and protection of flora and fauna of national environmental significance, referred to as Matters of National Environmental Significance (MNES). Large developments have the potential to impact on aquatic species, water resources and Ramsar wetland sites. Any action with the potential for a significant impact on these MNES must be referred to the Minister for the Commonwealth Department of the Environment and may require approval under the EPBC Act.	The proposal is not within the vicinity of MNES. An EPBC referral is not required.
State NSW	*Environmental Planning and Assessment Act (EP&A act)*	The EP&A act establishes the planning and approvals process in NSW.	The proposal is considered state significant development under the *Protection of Environmental Operations Act 1997* as the activity exceeds the 10,000 tonne threshold for resource recovery activities. An EIS is required for state significant development under Section 4.12(8) of the EP&A Act.
	NSW Water Management Act 2000	The WMA is the main instrument for the sustainable and integrated management of NSW's water resources. The Act allocates and provides water for the environmental health of NSW's rivers and groundwater systems, while also providing licence holders with more secure access to water and greater opportunities to trade water through the separation of water licences from land	Under Section 4.41 of the EP&A Act, a water use approval under section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the WMA does not apply to state significant development. The site is within the Water Sharing Plan- Hunter unregulated and alluvial water sources.

	Water Sharing Plan- Hunter Unregulated and Alluvial Water Sources	The water sharing plan governs the long-term average annual extraction limit and use of water within the catchment. More specific rules in the Plan determine when licence holders can and cannot pump on a daily basis. Except for basic landholder rights, all other water extraction must be authorised under a water access licence.	The facility does not access water from the Hunter catchment. Water usage for composting and site operations is sourced from Void 4 under agreement from AGL as part of mine water management (refer Section 4.4). No water access licences are required.
	Protection of the Environment Operations Act 1997 (POEO Act)	The POEO Act aims to protect, restore and enhance the quality of the environment in NSW, having the regard to the need to maintain ecologically sustainable development. Scheduled activities under Schedule 1 of the POEO Act require a licence for the premises at which the activity is carried out.	Bettergrow hold EPL No.7654 (as varied) for the premises covering composting and waste activities on site. The expansion of the operations would require a variation to the EPL issued by the EPA to receive up to 200,000 tonnes p/a
Local Government Singleton Council	*Singleton Local Environmental Plan 2013*	Local environmental planning provisions for development of land within Singleton Council. Development provisions in the LEP specific to water resources for this proposal include flood planning, drinking water catchments and riparian land and watercourses.	The proposed infrastructure is approved works under existing DA 140/2016, demonstrating compliance with local government requirements.

4. Existing environment

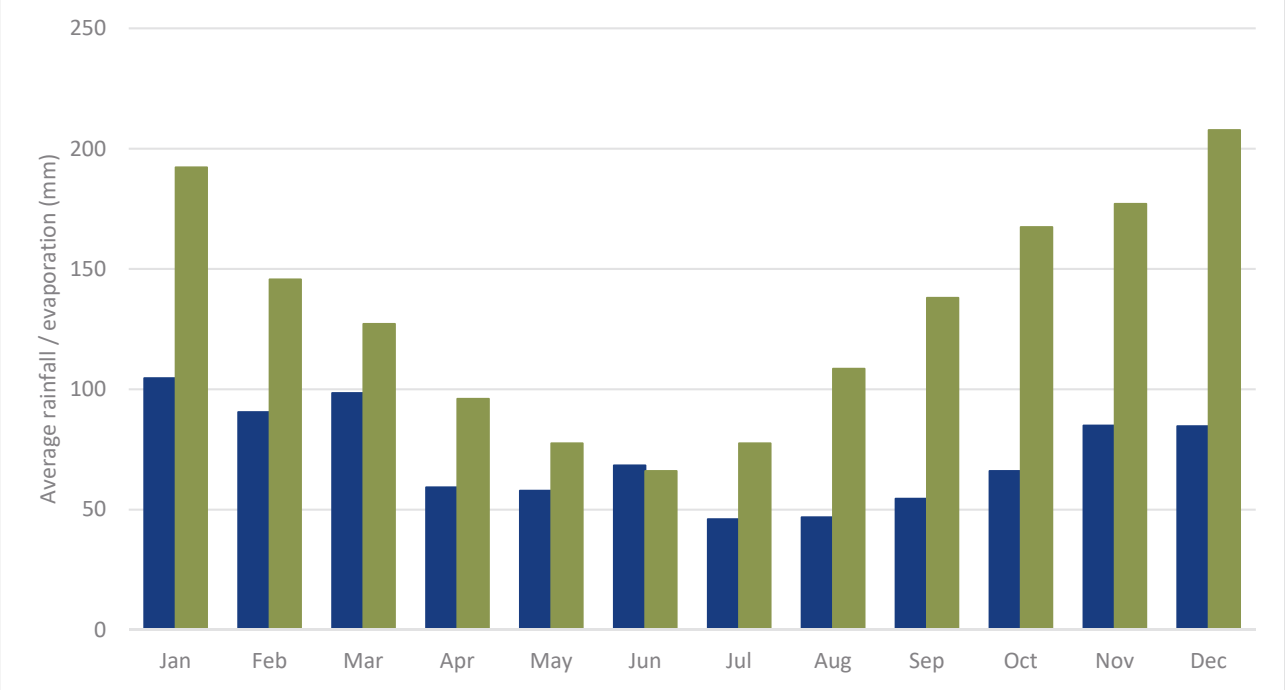
The existing composting facility is located on a graded hardstand area totalling 20 hectares, surrounded by perimeter bunding. The site is located on a capped open cut mining void (Void 3) which has been filled with fly ash from the AGL Bayswater Power Station and rehabilitated. The Ravensworth No. 2 mine was decommissioned in 1993 following the completion of coal mining.

4.1 Surface water hydrology

4.1.1 Rainfall

Average rainfall at the site, approximated from the BoM Station 61270 Bowmans Creek (Grenell), 20 kilometres from the site, is shown in Figure 5. Annual rainfall patterns are consistent with that of the summer climate zone (higher rainfall in warmer months and vice-versa) despite being on the boundary of the summer and uniform climate zones as defined by BoM. There is a rainfall deficit in all months apart from June.

Figure 5: Average rainfall (BoM Station Bowmans Creek (Grenell) 61270) and evaporation (Lostock Dam, 061288)



4.1.2 Catchment, watercourses, topography and drainage

The site is in the Hunter River catchment, within the Hunter Local Land Services Region (LLS) and the South East Coast (NSW) Drainage Division (Figure 6). The Hunter River is located six kilometres south and Lake Liddell about five kilometres north of the site.

The Hunter River drains the largest coastal catchment in New South Wales, covering some 22,000 square kilometres. The Hunter region supports a range of agricultural and industrial activities, large coal mining operations and three power stations.

The site, located on Ravensworth Void 3 (refer Figure 2) , sits atop a 40 metre (approx.) high ridge that runs approximately north south in between Bayswater Creek, 600 metres west and Bowmans Creek, 1,200 metres east of

the site. As a result of the natural topography, and due to modification from mining and power generation activities, there is little upstream catchment draining toward the site and no waterways running through the site. Diversion bunds are in place to exclude minor upstream catchment flows from entering the site. Any runoff generated upstream is diverted to the clean stormwater infiltration wetland. Void 4 is located to the south of the site.

Both creeks are highly modified due to mining and power generation activities and exhibit elevated salinity levels and generally low flows (refer Section 4.1.3). Both creeks flow from north to south to discharge into the Hunter River six kilometres to the south of the site.

There is no surface water discharge from the site into local waterways due to the highly modified nature of the site from historical mining operations. All (mine) site runoff is managed and captured in the surface water management system (refer Figure 2) and ultimately Void 4 for extreme events.

Watercourses and water bodies nearby to the site are illustrated in Figure 7. It is noted that both Void 3 and Void 4 are classified as prescribed dams under the NSW Dam Safety Act (1978).

Figure 6: Hunter River catchment and surface water features

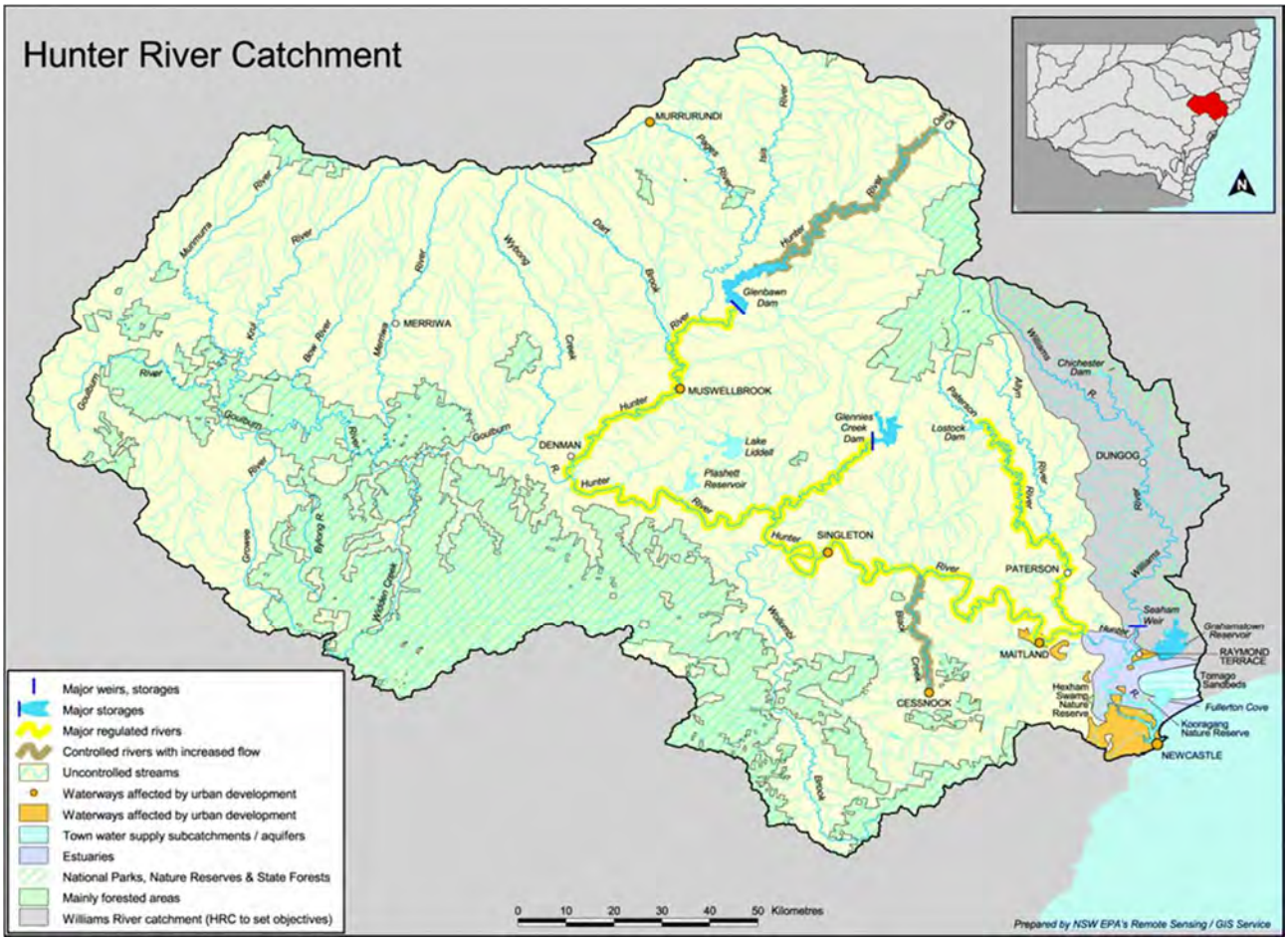
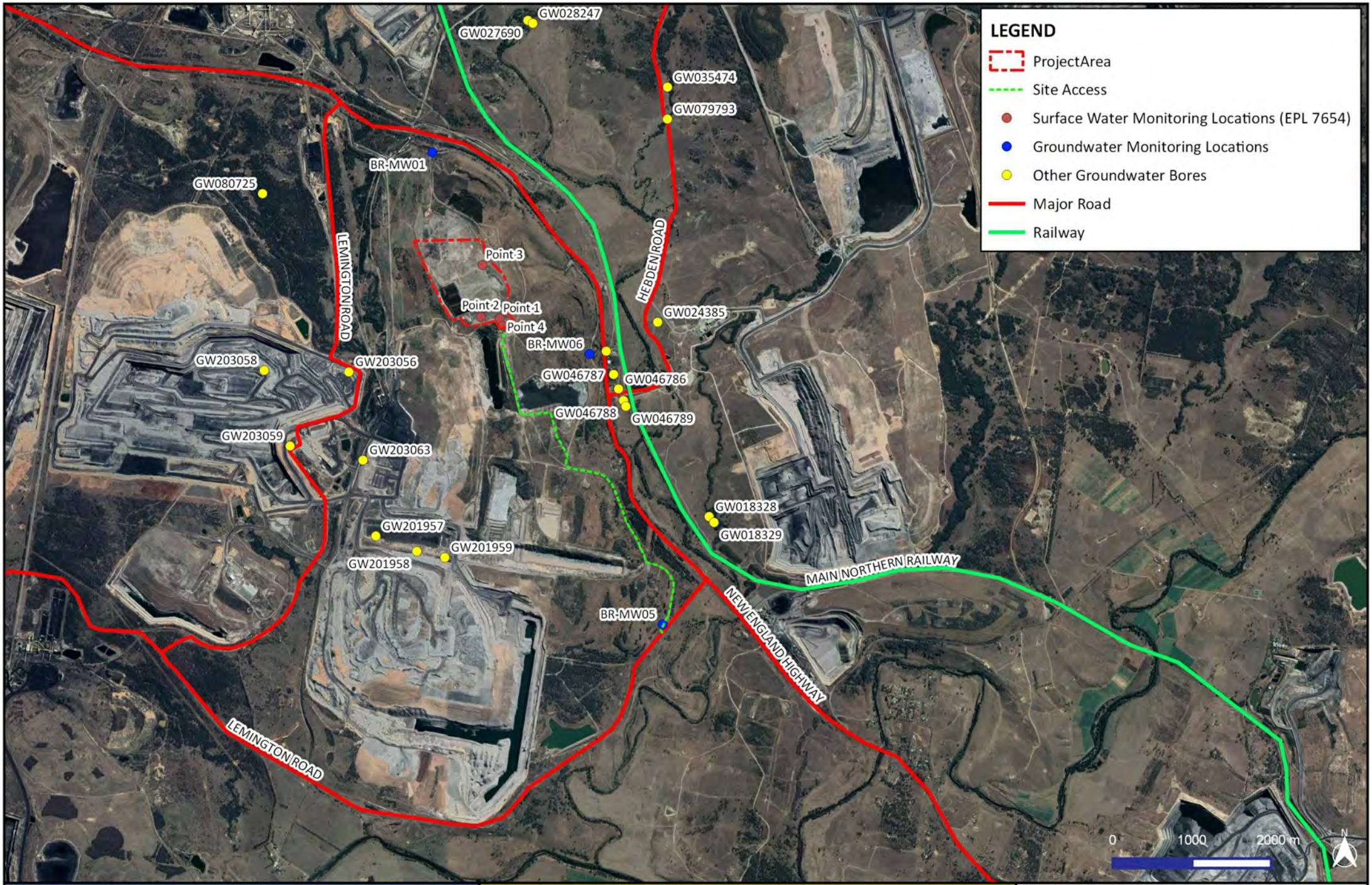


FIGURE 7



WATERCOURSES AND WATERBODIES PLAN

REVISION NO.: C

CLIENT: RPS AUSTRALIA EAST PTY LTD
JOB NO.: 19007
CREATED BY: R CHEOK ON 15/08/2019

LOCATION: RAVENSWORTH, NSW
GEOGRAPHIC COORDINATE SYSTEM: WGS84
DATA SOURCES: RPS, GOOGLE 2019

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4.1.3 Water quality and flow

Both Bayswater and Bowmans Creeks are highly modified due to mining and power generation activities and exhibit elevated salinity levels and generally low flows.

Plots of water quality and flow for relevant monitoring stations on both creeks (refer Figure 7) for the full period of record are included in Figure 8 and Figure 9 and are consistent with the findings of NSW EPA (2013) as described below.

Bayswater Creek flows are generally low (median flow of less than 1 megalitre per day) and are influenced by discharges from Lake Liddell and Bayswater Power Station. Bayswater Creek is saline with median electrical conductivity (EC) measurements above 3,000 µS/cm (Bayswater Creek 210110 Station; NSW EPA, 2013).

Bowmans Creek is also saline (Foy Brook Downstream Bowmans 210130 Station) with median EC measurements of 1,297 µS/cm (NSW EPA, 2013) and a median flow of 2.8 megalitres per day.

These median EC values are well in excess of the ANZECC water quality trigger values for upland/lowland south-eastern Australian streams (upland 30-350 µS/cm; lowland 125-220 µS/cm).

Figure 8: Monitoring data (Bayswater Creek Station ID 210110)

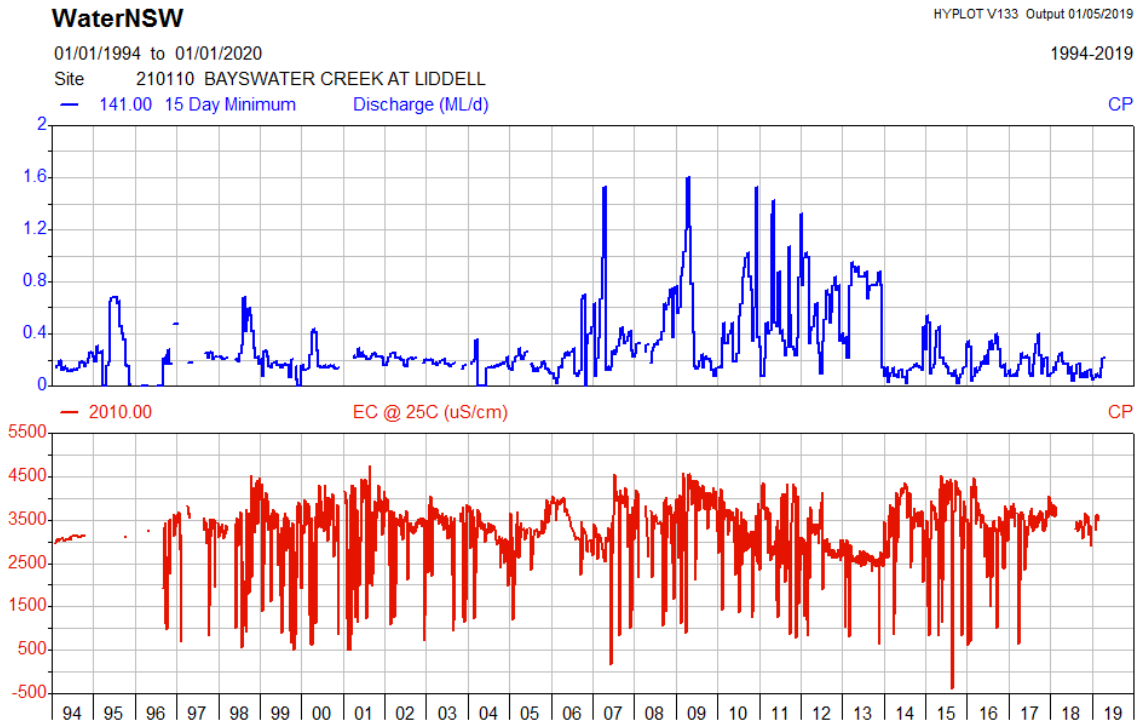
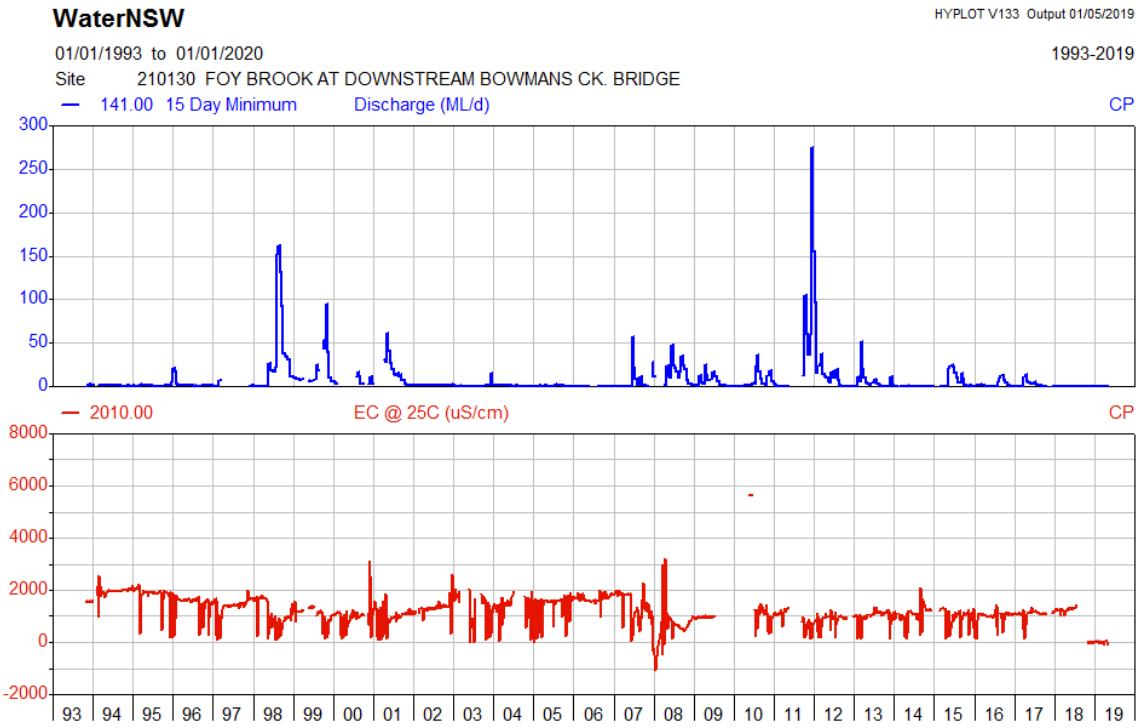


Figure 9: Monitoring data (Bowmans Creek Station ID 210130)



Glencore also undertake routine surface water monitoring of Bowmans and Bayswater Creeks. The Ravensworth Complex Annual Review (Glencore, 2018) describes the water quality sampling results for 2018. The testing shows consistency with the WaterNSW monitoring, with pH in Bowmans and Bayswater Creeks being generally alkaline (ranging from 7.8 - 9.0) and EC values in the brackish to saline range, from 1,500 - 6,000 µs/cm.

4.2 Flooding

The site is well elevated at approximately 40 metres higher than surrounding watercourses. There is no outside flood risk to the site and the area is not shown as flood prone land or within flood planning areas within *the Singleton Local Environment Plan 2013 – Flood Planning Maps*. Ravensworth Void 3 and Void 4 are listed as prescribed dams under the NSW Dam Safety Act (1978) and in the Singleton LGA Local Flood Plan and are managed accordingly.

The site is not flood prone, thereby negating the need for a detailed flood impact assessment. Responses to the NSW OEH specific requirements regarding flooding are provided in Table 4.

Table 4: Response to NSW OEH specific requirements regarding flooding

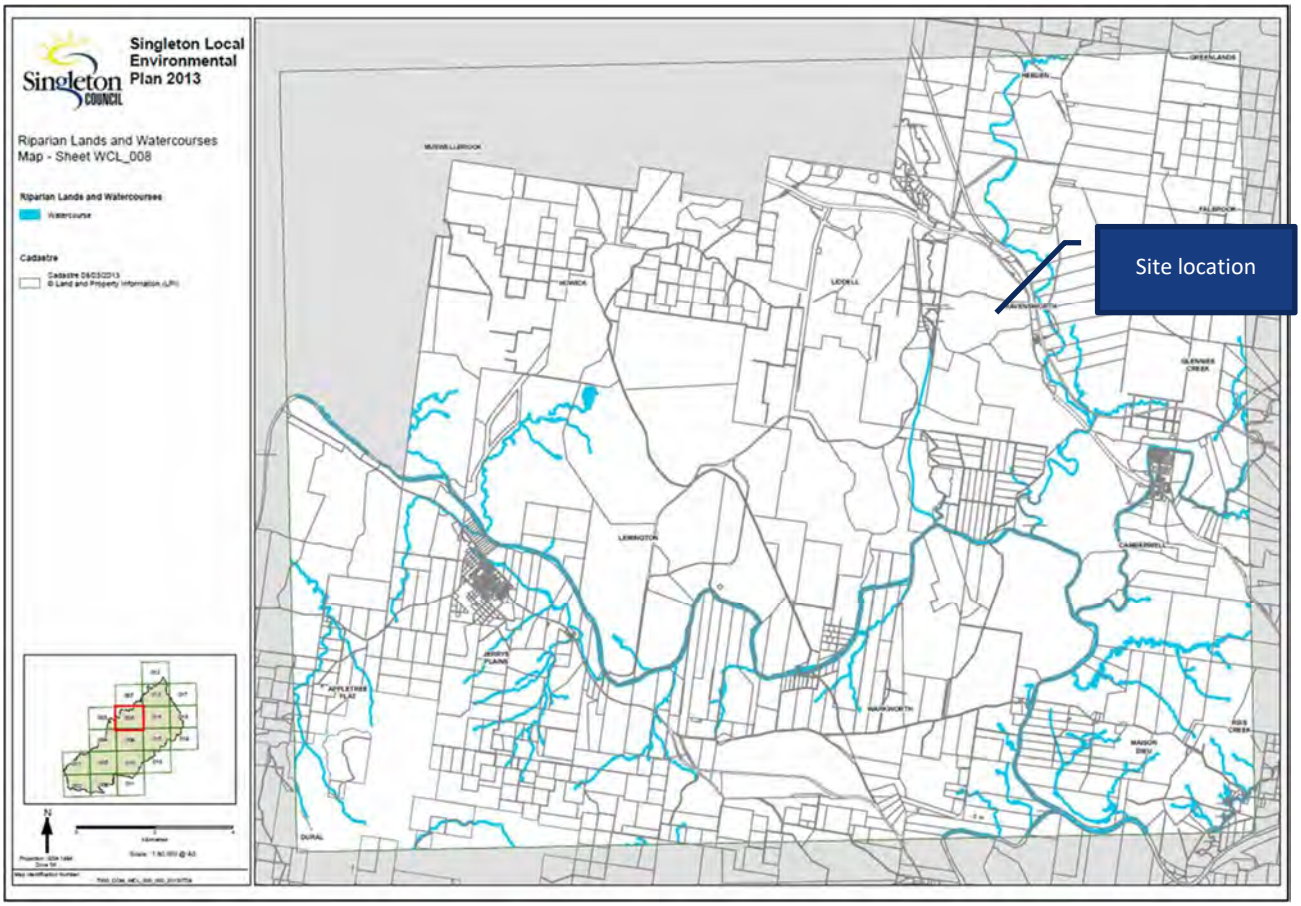
Requirement	Response
• The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: – Flood prone land – Flood planning area, the area below the flood planning level – Hydraulic categorisation (floodways and flood storage areas)	• Flood prone land is defined in the Floodplain Development Manual 2005 as "land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with "flood liable land". • The *Singleton Local Environment Plan 2013 (LEP)* defines flood prone land as land that is mapped on the 'flood planning area' maps in the LEP or land at or below the flood planning level. The flood planning level means the level of a 1 in 100year (1% AEP) flood event plus 0.5 metre freeboard. • The site is not within the flood planning area. • The site is above the flood planning level. • The site has no floodways or flood storage areas as it is not flood prone. The site has no flood hazard.
• The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10-year (10% AEP), 1 in 100-year (1% AEP) flood levels and the probable maximum flood, or an equivalent extreme event.	• As per the Singleton LGA Flood Plan a 1% AEP event is recorded as 14.43m (42.06 mAHD) at the Singleton gauge (Station ID 210001). A 10% AEP is recorded as 11.6m at the Singleton gauge (39.23 mAHD) • The site is not considered to be at risk of inundation resulting from either flood event, with the lowest natural surface level of the site being above 100 mAHD and as indicated above is not flood prone i.e. not subject to a PMF event.
• The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios: – Current flood behaviour for a range of design events as identified above. This includes the 1 in 200 and 1 in 500-year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	• The site is not flood prone and therefore there are no impacts to flood behaviour due to the development.
• Modelling in the EIS must consider and document: – The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. – Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other development on land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulics categories. – Relevant provisions of the NSW Floodplain Development Manual 2005.	• The site is not flood prone and therefore there are no impacts to flood behaviour due to the development.

- The EIS must assess the impacts on the proposed development on flood behaviour, including:
  - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
  - Consistency with Council Floodplain Risk Management Plans.
  - Compatibility with the flood hazard of the land.
  - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
  - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
  - Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.
  - Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council.
  - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters area to be discussed with the SES and Council.
  - Emergency management, evacuation and access, and the contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed and have the support of Council and the SES.
  - Any impacts the development may have on the social and economic costs to the community as consequence of flooding.
- The site is not flood prone and therefore there are no impacts to flood behaviour due to the development.
- The site is not within the Singleton Shire Council floodplain management plan.

4.3 Wetlands and riparian land

There are no wetland areas located within the site, as identified in the Singleton Local Environment Plan 2013 and shown in Figure 10). Riparian land is identified as 40 metres from the top of the bank of a watercourse. The site is not located in a riparian zone given its location being 600 metres from Bayswater Creek and 1,200 metres from Bowmans Creek.

Figure 10: Riparian lands and watercourses (Singleton Local Environmental Plan 2013)



4.4 Existing surface water supply

4.4.1 Source

Bettergrow currently access water for composting from the leachate dam and make-up water from the Void 4 mine water storage (approximately 500 megalitre capacity), part of AGL's integrated water management system. Water for dust suppression is sourced from Void 4 only. Fly ash from AGL's power stations is placed into remaining voids across the Ravensworth No. 2 and Ravensworth South mine sites as part of the approved rehabilitation of the site. This fly ash is pumped as a thick slurry from the Bayswater Power Station and is currently deposited into Void 5. As a result of this process, water from the fly ash seeps from Void 5 into Void 4 and is pumped from Void 4 back to the Bayswater Power Station for further re-use. Void 3, which has also been subject of filling from fly ash, also seeps water into Void 4.

Bettergrow access water from Void 4 for the composting process and for dust suppression via an existing AGL storage tank located on the eastern extent of the development footprint (refer Figure 2). This tank has an approximate capacity of 300,000 litres and is filled remotely from Void 4 by operators at the Bayswater Power Station. Water is also pumped directly from Void 4 into water trucks by Bettergrow for haulage road dust suppression and to supplement use in composting operations.

No water is sourced from outside the AGL Ravensworth mining operations, including water bodies, creeks or groundwater bores.

4.4.2 Quantity

Bettergrow estimate that the annual water consumption for the existing composting operation is 58 megalitres per year, with usage peaking at 80 kilolitres per weekday (57.1 kilolitres per day) for dust suppression and 230 kilolitres per weekday (164.3 kilolitres per day) for compost moisture conditioning.

Water use is minimised by:

- Optimising water application for proper curing of the compost, with too much or too little water impacting the quality of the finished product
- Water is required to be pumped from the source (leachate dam, AGL storage tank or Void 4) and trucked for use within the compost operation or for dust suppression. Hence there is a commercial incentive to minimise this cost of transport through efficient use of water
- Excess water application to compost will leach out and cause access issues for machinery movements between compost rows, adding further incentive to minimise water use.

4.4.2.1 Site water balance

The facility operates within a closed water cycle, whereby leachate water is captured and reused, makeup water is sourced from Void 4 and there are no direct discharges to the surrounding watercourses. The composting process is a net user of water, with water and leachate generated from operation of the facility managed on site by water infrastructure as outlined in Section 4.8.

An (average) monthly site water balance, using the key input parameters/assumptions as described in Table 5, has been prepared for the existing operations and is shown in Table 6.

Table 5: Water balance input parameters / assumptions – existing operations

Parameter	Value	Notes
Hardstand area – pad	87,800 m^2	
Hardstand area – basins	11,370 m^2	
Seepage rate from hardstand area	0.1 mm/day	Assumed value
Peak dust suppression requirements	57,143 L/day	Equivalent to actual use of 80,000 L per weekday
Road area	15,000 m^2	2,500 m x 6 m width
Peak compost moisture conditioning requirements	164,286 L/day	Equivalent to actual use of 230,000 L per weekday
Moisture content of finished compost	35%	
Compost production rate	6,333 tonne per month	76,000 tonne per year
Moisture loss from compost management	1% per tonne per day	Assumed value
Assumptions		
Average rainfall and daily maximum temperature data from BoM Station 061270 Bowmans Creek (Grenell)		
Average evaporation from BoM Station 061288 Lostock Dam		
Water imported for compost moisture conditioning, and water lost from compost management (turning), adjusted according to variation in average daily maximum temperature		
Dust suppression not included in water balance – water usage balanced through equivalence to difference between daily evaporation loss and rainfall input		

Table 6: Site water balance – existing operations

Water balance													
Month	Average daily max temp (°C)	Average daily rain (mm)	Rain volume (ML)	Water import for compost (ML)	**Total water in (ML)**	Mean daily evap'n (mm)	Seepage below pad/basins (ML)	Evap'n from pad/basins (ML)	Evap'n from compost mngmnt (ML)	Water export in compost (ML)	**Total water out (ML)**	***Balance (ML)***	Dust suppression (ML)
January	29.7	3.4	10.54	5.09	**15.63**	6.2	0.31	10.23	1.96	2.22	**14.72**	*0.91*	1.29
February	28.7	3.3	9.05	4.45	**13.50**	5.2	0.28	8.78	1.71	2.22	**12.98**	*0.51*	0.81
March	26.8	3.2	9.73	4.60	**14.33**	4.1	0.31	9.43	1.77	2.22	**13.72**	*0.61*	0.43
April	23.6	2.0	5.96	3.92	**9.87**	3.2	0.30	5.66	1.51	2.22	**9.68**	*0.19*	0.54
May	20.1	1.9	5.97	3.45	**9.41**	2.5	0.31	5.66	1.33	2.22	**9.51**	*-0.10*	0.26
June	17.0	2.3	6.78	2.82	**9.60**	2.2	0.30	6.49	1.09	2.22	**10.09**	*-0.48*	-0.04
July	16.6	1.5	4.59	2.85	**7.44**	2.5	0.31	4.29	1.10	2.22	**7.91**	*-0.47*	0.47
August	18.5	1.5	4.72	3.17	**7.89**	3.5	0.31	4.41	1.22	2.22	**8.16**	*-0.27*	0.91
September	21.8	1.8	5.50	3.62	**9.11**	4.6	0.30	5.20	1.39	2.22	**9.11**	*0.01*	1.24
October	24.7	2.1	6.57	4.24	**10.80**	5.4	0.31	6.26	1.63	2.22	**10.42**	*0.39*	1.52
November	26.7	2.9	8.57	4.43	**13.00**	5.9	0.30	8.27	1.71	2.22	**12.49**	*0.51*	1.36
December	29.0	2.8	8.62	4.97	**13.60**	6.7	0.31	8.32	1.92	2.22	**12.76**	*0.84*	1.81
Total			**86.60**	**47.59**	**134.19**		**3.62**	**82.98**	**18.35**	**26.60**	**131.55**	***2.65 (1.97%)***	**10.61**

4.4.3 Quality

Earlier reports prepared for AGL (Ravensworth South Final Void Plan, Aurecon 2012) indicated that the water within Void 4 is likely to be alkaline as a result of seepage through fly ash and overburden. Data also indicated that the conductivity of water contained within Void 4 is brackish with various anionic and cationic salts present.

Void 4 water quality is regularly tested by Bettergrow. Recent testing (February, August & November 2018; refer Appendix D) delivered the following results:

- Electrical conductivity: range 4,520-7,580 µS/cm (brackish to saline)
- Total suspended solids: <5 - 40 mg/L (negligible)
- pH: 8.35-8.36 (alkaline).

Water quality, whilst not potable, is considered by Bettergrow to be fit-for-purpose in use for moisture conditioning of compost.

4.4.4 Security and management

Aurecon (2012) states that Void 4 is effective at holding water due to a depression in the Bayswater Syncline Axis and when the water level is kept below the maximum RL of 46.5 metres AHD it is unlikely to seep beyond the boundary of the facility.

AGL manages water levels accordingly through two mechanisms; usage by Bettergrow in processing compost, and with excess water disposed via pumping through to Lake Liddell. The pump capacity is 120 L/s, and it is estimated that, in years of average rainfall, 500 megalitres per annum is disposed to Lake Liddell. There are no other demands on water from Void 4. Bettergrow's current water use of 58 megalitres per year is negligible given the storage volume of Void 4, being in excess of 500 megalitres, and the available volume of water otherwise disposed to Lake Liddell.

Bettergrow's security of supply from Void 4 is by arrangement with AGL and is not formalised by agreement or licence. Therefore, security of supply could be impacted by future changes to management of Void 4 water as part of AGLs integrated water management system; although changes of this nature would be subject to regulatory approval.

4.5 Adjacent surface water users

There are no other demands on water from Void 4, meaning that there are no impacts to other surface water users as a result of extractions. Excess water is disposed via pumping through to Lake Liddell for use in power generation.

The site does not extract water from, nor discharge water to, Bayswater or Bowmans Creeks, meaning that there are no impacts to surface water users on these streams.

4.6 Acid sulphate soils

The presence of acid sulphate soils on the property is unlikely as indicated by the Australian Soil Resource Information System (ASRIS). ASRIS maps the site as having a low probability of occurrence (Bn(p4)) of acid sulphate soils, as shown in Figure 11.

Figure 11: ASRIS Acid sulphate soils (source: ASRIS, CSIRO 2018)

4.7 Surface water salinity

Both Bayswater and Bowmans Creeks exhibit high levels of salinity as described in Section 4.1.3. The facility controls and captures all internal runoff and provides for beneficial reuse of excess water produced as part of mining and power generation activities. The facility does not discharge water off-site and as such, does not exacerbate existing salinity issues in either of these streams. It is noted that interception of any upstream runoff that may have otherwise discharged to waterways has already been accounted for through approvals and regulation of the existing mining activities.

4.8 Existing surface water management

The facility currently features the following surface water management infrastructure (refer Figure 12 and Figure 13):

- A 20.22 ha compacted earth processing pad engineered to a permeability of $1x10^{-9}$ m/s to control the penetration of leachate generated from the composting process (Stage 1 pad area, 8.78 ha, has been bunded with clean water diverted)
- Leachate and sediment control dam and spillway (currently sized and constructed for Stage 1 only)
- Clean water diversion and sediment bund – located on the eastern side of the Stage 1 pad
- Clean water diversion – located along the western side of the facility
- Diversion wall and channel directing clean stormwater runoff from the eastern side of the site into the spillway
- Channel connecting the clean stormwater spillway to the lower basin.

The existing leachate dam and the associated embankments have been constructed with spoil from mine overburden material. As per the *Ravensworth Composting Pad Leachate Detention Basin – Construction Report* (Aurecon, 2017) the design specifications include:

- Designed to capture storm water runoff from the facility in excess of the minimum EPL 7654 requirement (4% AEP, 24-hour event). The detention basin is enclosed on the southern and eastern sides by two embankments up to 1.5 metres in height. The basin has enough storage volume (15,400 m^3) to capture all runoff up to the 1% AEP, 24-hour storm event without any uncontrolled discharge off site. A small overflow spillway is provided at RL 107.1 mAHD on the eastern wall to assist in discharging runoff in excess of design
- The northern and western perimeters feature earth fill buttresses added to the existing batters, to separate and seal the pond storage area from loose overburden

- Runoff enters the basin from the north west, via a shotcrete lined channel, connecting from the composting pad to the leachate detention basin. The channel has enough capacity to discharge the peak flow during a 1% AEP, 24-hour storm event
- Soil overburden used for the detention basin embankment, is compacted to a minimum 98% maximum dry density (MDD) to achieve low permeability ($1x10^{-9}$).

Water captured in the leachate dam is available for reuse in composting and is prioritised over Void 4, given its proximity to the compost pad and to quickly drawdown water levels and reinstate storage capacity for the next storm event.

Any leachate water that does overflow via the spillway, resulting from a rainfall event less frequent than the 1% AEP, 24-hour event, is able to be captured in the lower basin, which has an approximate capacity of 50 megalitres (approximately three times the capacity of the leachate basin). In the exceedingly rare event that the lower basin fills, water can overflow into Void 4, which has in excess of 40 metres depth of available airspace above its normal operating level (i.e. thousands of megalitres). This means that enough emergency storage capacity is available to ensure that the risk of discharge from the site is negligible.

Site design drawings are provided in Appendix C. Photographs of the above earthworks and surface water infrastructure is provided in Appendix E.

Figure 12: Existing water management infrastructure plan

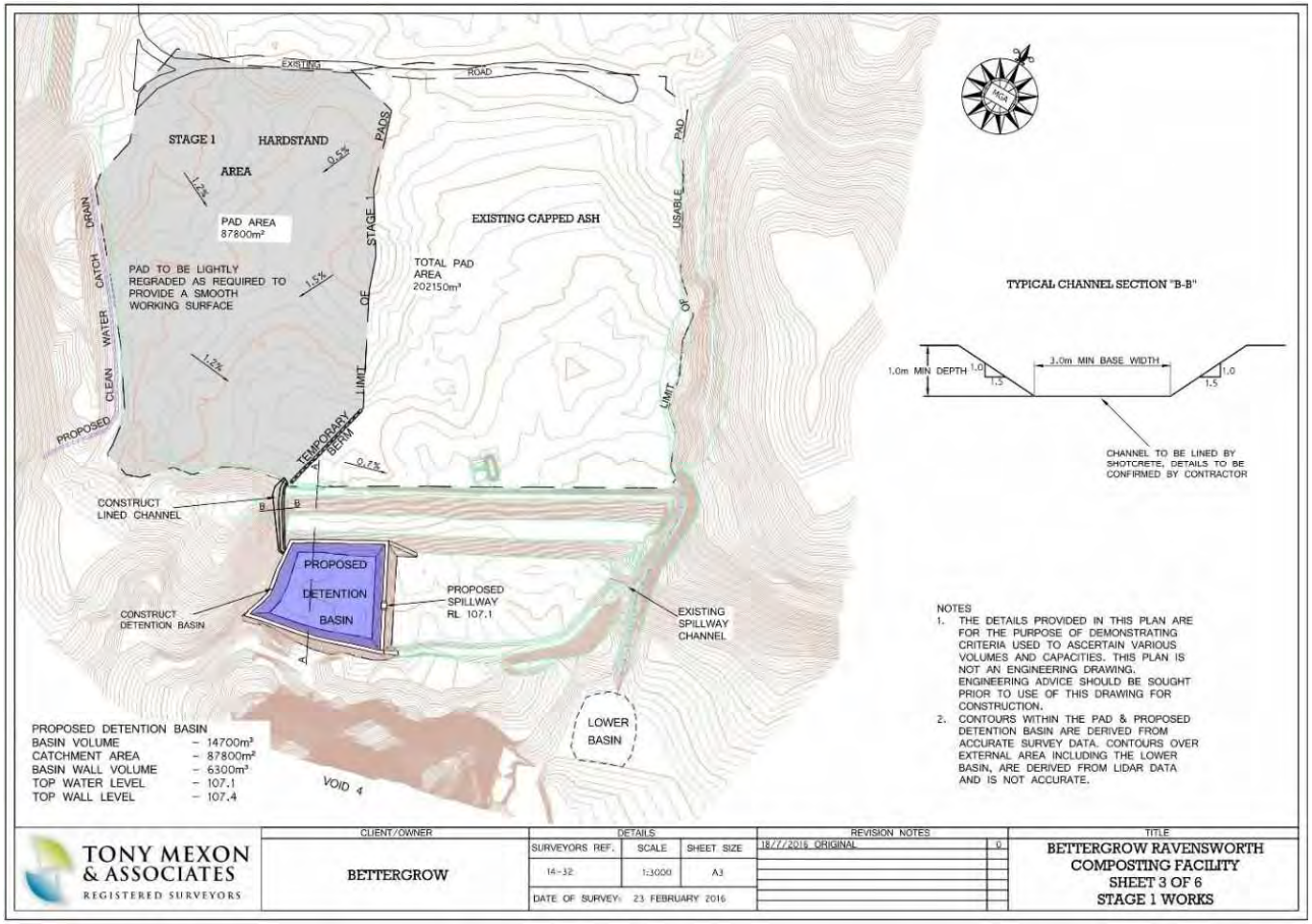
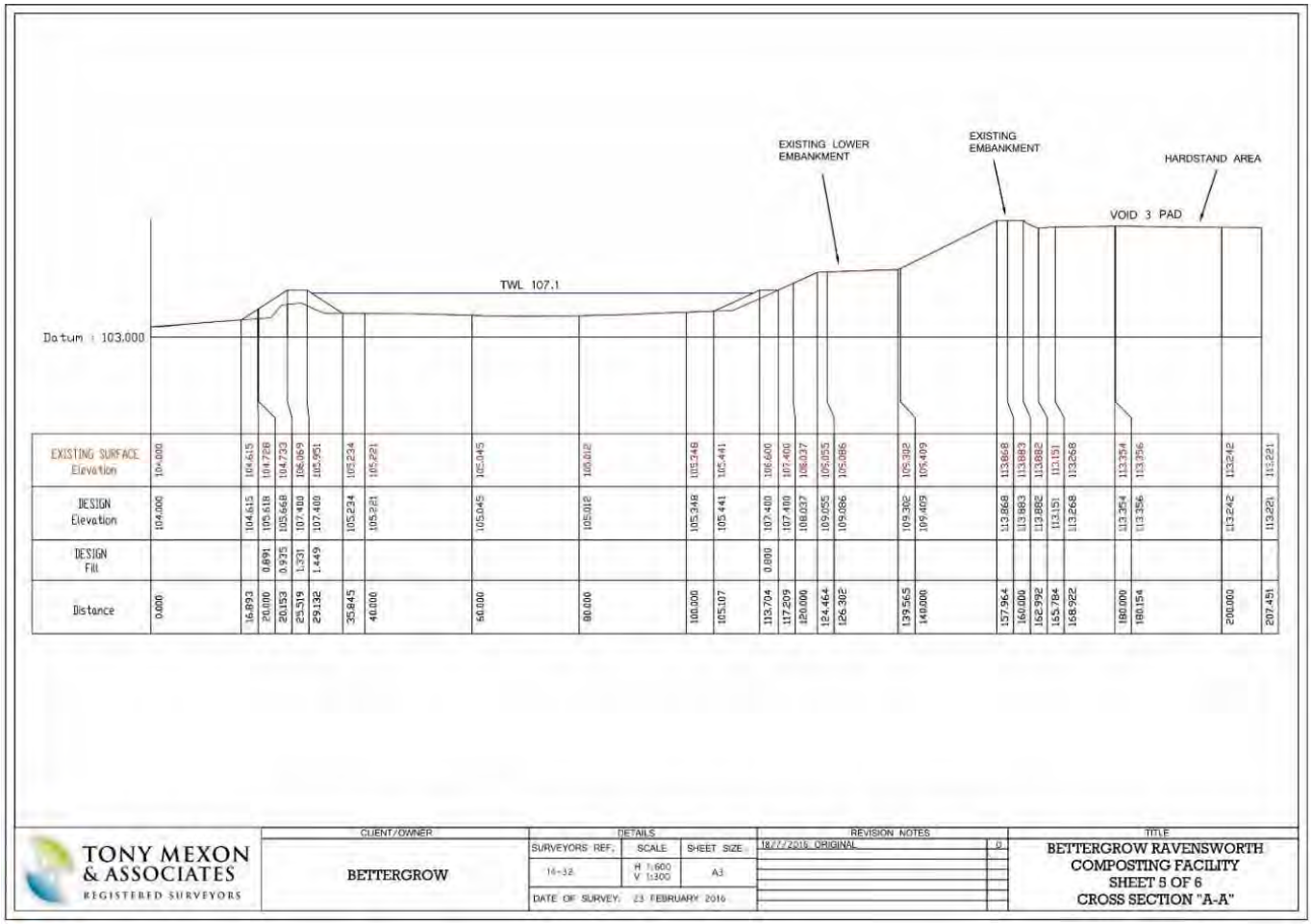


Figure 13: Existing water management infrastructure (cross section)



4.9 Existing on-site surface water monitoring

The current EPA licence (EPL 7654) identifies four monitoring points for the purposes the monitoring and/or the setting of limits for discharges of pollutants to water from the points as described in Table 7. Figure 2 shows the location of these points. EPL 7654 is included in Appendix A and Condition M2 describes the pollutant monitoring parameters required at each of the four monitoring points.

As described in Section 4.8 above, no surface water is discharged off-site, meaning that the contaminant load of leachate water is fully contained on-site and reused in the composting process.

Table 7: Location of monitoring / discharge points and areas

EPL 7654 Point No.	Type of monitoring point	Type of discharge point	Description	Pollutant concentration limit (Condition L2)
1	Leachate dam characterisation		Star picket in dam wall Dam depth marker gauge	N/A
2	Leachate dam emergency spillway	Leachate dam emergency spillway	Eastern embankment of leachate dam	Ammonia – 0.9 mg/L pH – in range 6.5-8.5 TSS – 50 mg/L
3	Process water tank		North-east corner of compost pad	N/A
4	Sediment basin	Sediment basin	Star picket at sediment basin outlet	pH – in range 6.5-8.5 TSS – 50 mg/L

Recent monitoring results are given in the latest EPL 7564 annual return (Appendix D). These results show:

- Point 2: No samples taken; no discharge from the leachate dam. Sampling from stored water in the leachate dam (Point 1) demonstrated pollutant concentrations were within Condition L2 limits for ammonia and pH. TSS exceeds limits (315 mg/L) however it is likely that this exceedance was due to the dry weather and limited leachate in storage.
- Point 4: Sampling demonstrated that pollutant concentrations were within the limits of Condition L2.

Therefore, it can be concluded that the quality of process and leachate water meets licence conditions. The risk of discharge to the environment is very low (refer Section 4.8) ensuring that potential for environmental harm is minimised.

4.10 Erosion and sediment controls

The surface water management infrastructure described in Section 4.8 above, in conjunction with implementation of the Surface and Groundwater Management Plan (The LZ Environmental Company, 2016) adequately identifies and mitigates risks of erosion and sedimentation. The Surface and Groundwater Management Plan is included as Appendix F, and provides information that:

- Details control measures and procedures that will minimise contamination of stormwater and groundwater
- Demonstrates that clean surface waters are not mixed with leachate (contaminated surface water) by way of appropriately positioned and constructed infrastructure that provides for the diversion of uncontaminated (or clean) stormwater
- Demonstrates that the volume of leachate contained on site will be greater than what is ordinarily considered to be representative of industry practice and how containment will be assured

- The mass movement of sediment or significant erosion will not occur
- Demonstrates that the quality of leachate contained will be maintained as far as possible such that offensive or noxious odours are not released
- Demonstrates that the quality of leachate contained within the detention basin will be of such a pH that any seepage from the detention basin will not mobilise heavy metals in the underlying fly ash
- Demonstrates that whilst highly unlikely, (due to rarity of occurrence), that the quality of leachate that may be released in an emergency event (defined as an abnormal rainfall event that causes a release offsite) will in no way cause material harm to receiving waters or will result in worsening water quality conditions downstream of the facility, (i.e. Void 4, including groundwater) due to onsite leachate management practices, onsite uses and the volume of secondary containment provided; and that including groundwater due to the amount of leachate containment provided
- Demonstrates only clean stormwater will leave the site from remaining areas not included within the operational area.

5. Proposed surface water management

5.1 Expansion of surface water management infrastructure

As indicated in Section 2.2, not all infrastructure authorised by DA140/2016 has been constructed. The remaining Stage 2 surface water infrastructure will be constructed as part of the Proposal and will include:

- Extension to the processing pad area (identified as Stage 2 in DA140/2016, shown in Figure 3), comprising the following works:
  - Preparation of an operations area by placing and compacting a sub-base of 300-400 mm of site won overburden with 100-150 mm compacted gravel as a wearing course. The overburden will be placed over the existing capping layer that has been constructed over Void No.3
- Expansion of the existing surface water drainage system, comprising the following works:
  - Extension of perimeter bunding for Stage 2 to divert clean water runoff away from the composting area to the surrounding voids
  - Bunding will be constructed using overburden and will be stabilised using compost produced onsite and a suitable grass seed mix
  - Expansion of the leachate dam as approved as part of the Stage 2 development application (DA140/2016).

The location of the above infrastructure and modifications are illustrated in Figure 4, and design plans are shown in Appendix C.

The expansion of the pad and the surface water management system will be undertaken to the same standard as employed for the existing infrastructure. In accordance with *Ravensworth Composting Pad Leachate Detention Basin – Construction Report* (Aurecon, 2017) the design specifications will similarly include:

- Designed to capture storm water runoff from the facility in excess of the minimum EPL 7654 requirement (4% AEP, 24-hour event). The detention basin will be enclosed on the southern, western and eastern sides by embankments up to 1.5 metres in height. The basin has enough storage volume (50,200 m^3) to capture all runoff up to the 1% AEP, 24-hour storm event without any uncontrolled discharge off site. An overflow spillway is provided at RL 107.1 mAHD on the eastern wall to assist in discharging runoff in excess of design

- The northern and western perimeters feature earth fill buttresses added to the existing batters, to separate and seal the pond storage area from loose overburden
- Runoff will enter the basin from the north east, via a shotcrete lined channel, connecting from the composting pad to the leachate detention basin. The channel will have enough capacity to discharge the peak flow during a 1% AEP, 24-hour storm event
- Soil overburden used for the detention basin embankment, is compacted to a minimum 98% maximum dry density (MDD) to achieve low permeability ($1x10^{-9}$).

Water captured in the leachate dam will be available for reuse and is prioritised over Void 4, given its proximity to the compost pad and to quickly drawdown water levels and reinstate storage capacity for the next storm event.

Any leachate water that does overflow via the spillway, resulting from a rainfall event less frequent than the 1% AEP, 24-hour event, is still able to be captured in the lower basin, which has an approximate capacity of 50 megalitres, effectively doubling the available storage capacity. In the exceedingly rare event that the lower basin fills, water can overflow into Void 4, which has in excess of 40 metres depth of available airspace above its normal operating level (i.e. thousands of megalitres). This means that enough storage capacity is available to ensure that discharges from site are never required.

5.2 Water supply

The expanded facility will continue to operate within a closed water cycle, whereby leachate water is captured and reused, makeup water is sourced from Void 4 and there are no direct discharges to the surrounding watercourses. The composting process is a net user of water, with water and leachate generated from operation of the facility to be managed on site by the proposed water infrastructure as outlined in Section 5.1.

A monthly site water balance, using the key input parameters/assumptions as described in Table 8, has been prepared for the proposed operations and is shown in Table 9.

The water balance shows that water import requirements increases from 47.6 megalitres to 125.2 megalitres (increase of 77.7 megalitres). This water is to be sourced from the leachate dam or Void 4. There is enough available water from Void 4 to meet this additional requirement. As noted in Section 4.4.4, approximately 500 megalitres of water is disposed from Void 4 to Lake Liddell annually.

Therefore, the expansion of the facility makes use of a greater volume of water for beneficial reuse, rather than disposal, reducing the risk of discharge from the facility itself and Void 4.

Table 8: Water balance input parameters / assumptions (proposed operations)

Parameter	Value	Notes
Hardstand area – pad	202,150 m^2	
Hardstand area – basins	20,720 m^2	
Seepage rate from hardstand area	0.1 mm/day	Assumed value
Peak dust suppression requirements	57,143 L/day	80,000 L per weekday (no increase in road area used)
Road area	15,000 m^2	2,500 m x 6 m width (no change)
Peak compost moisture conditioning requirements	432,331 L/day	605,000 L per weekday (proportional increase to compost production rate)
Moisture content of finished compost	35%	
Compost production rate	16,667 tonne per month	200,000 tonne per year
Moisture loss from compost management	1% per tonne per day	Assumed value
Assumptions		
Average rainfall and daily maximum temperature data from BoM Station 061270 Bowmans Creek (Grenell)		
Average evaporation from BoM Station 061288 Lostock Dam		
Water imported for compost moisture conditioning, and water lost from compost management (turning), adjusted according to variation in average daily maximum temperature		
Dust suppression not included in water balance – water usage balanced through equivalence to difference between daily evaporation loss and rainfall input		

5.3 Update to Surface and Groundwater Management Plan

The Surface and Groundwater Management Plan (The LZ Environmental Company, 2016; Appendix F) is to be updated to include the expansion proposal, and the mitigation measures outlined in Section 7, to ensure that risks of erosion, sedimentation and pollution of surface and groundwater continue to be adequately identified and mitigated.

Table 9: Site water balance – proposed operations

Water balance													
Month	Average daily max temp (°C)	Average daily rain (mm)	Rain volume (ML)	Water import for compost (ML)	**Total water in (ML)**	Mean daily evap'n (mm)	Seepage below pad/basins (ML)	Evap'n from pad/basins (ML)	Evap'n from compost mngmnt (ML)	Water export in compost (ML)	**Total water out (ML)**	***Balance (ML)***	Dust suppression (ML)
January	29.7	3.4	24.75	13.40	**38.15**	6.2	0.72	24.03	5.17	5.83	**35.75**	*2.40*	1.29
February	28.7	3.3	21.26	11.70	**32.96**	5.2	0.65	20.61	4.51	5.83	**31.60**	*1.35*	0.81
March	26.8	3.2	22.86	12.09	**34.95**	4.1	0.72	22.14	4.66	5.83	**33.35**	*1.60*	0.43
April	23.6	2.0	13.99	10.31	**24.30**	3.2	0.70	13.29	3.97	5.83	**23.80**	*0.50*	0.54
May	20.1	1.9	14.01	9.07	**23.08**	2.5	0.72	13.29	3.50	5.83	**23.34**	*-0.26*	0.26
June	17.0	2.3	15.93	7.42	**23.35**	2.2	0.70	15.23	2.86	5.83	**24.62**	*-1.27*	-0.04
July	16.6	1.5	10.79	7.49	**18.28**	2.5	0.72	10.07	2.89	5.83	**19.51**	*-1.23*	0.47
August	18.5	1.5	11.09	8.35	**19.43**	3.5	0.72	10.36	3.22	5.83	**20.14**	*-0.70*	0.91
September	21.8	1.8	12.91	9.52	**22.43**	4.6	0.70	12.21	3.67	5.83	**22.41**	*0.02*	1.24
October	24.7	2.1	15.42	11.15	**26.57**	5.4	0.72	14.70	4.30	5.83	**25.55**	*1.02*	1.52
November	26.7	2.9	20.11	11.66	**31.77**	5.9	0.70	19.41	4.49	5.83	**30.44**	*1.33*	1.36
December	29.0	2.8	20.25	13.09	**33.33**	6.7	0.72	19.53	5.04	5.83	**31.13**	*2.21*	1.81
Total			**203.36**	**125.24**	**328.60**		**8.50**	**194.86**	**48.28**	**70.00**	**321.64**	***6.96 (2.12%)***	**10.61**

6. Potential impacts

6.1 Construction and decommissioning

As outlined in Section 2.4 above, the development of the facility to receive 200,000 tonnes of green waste for composting requires the expansion of existing infrastructure such as the leachate dam, hardstand pad, diversion bunding and spillways, as well as the construction of additional built infrastructure.

Activities involved in construction (and ultimate decommissioning) of the proposal have the potential to impact on surface water quality with negative associated ecological and aesthetic effects and may include:

- Spillage of fuels, oils or chemicals from plant and equipment on site
  - Pollution impacts to waterway ecology and downstream water users
- Erosion of bare earth surfaces during earthworks and sediment transport off-site
  - Increased turbidity / suspended solids / nutrient load increasing risk of eutrophication
- Escape of leachate stored on site during expansion earthworks
- Uncontained construction waste
  - Gross pollutants in waterways.

6.2 Operation

The proposed expansion of the composting facility introduces a risk of additional volumes of leachate (and associated contaminant load) being generated and subsequently entering the surface water drainage environment. Leachate, if discharged to the environment, has the potential to cause impacts to water quality through reduced oxygen, high nutrient levels, increased organic matter and turbidity. Decreased water quality could impact waterways and aquatic environments by the following means:

- Dissolved oxygen is vital for the survival of fish, aquatic invertebrates and amphibians. Dissolved oxygen levels in waterways depend on the physical, chemical and biological activities in the water body. Oxygen is lost from water when temperature and salinity increase, and consumption and decay of organic matter occur. Oxygen is likely to be lost due to the increase in oxygen demanding wastes contained in leachate
- Phosphate/nitrogen levels in most Australian waterways are naturally low. High nutrient levels could lead to water bodies choked with weeds or algae, changes in aquatic flora and fauna composition and increased fluctuations in dissolved oxygen
- Turbidity is a measure of the ability of light to pass through the water and is a measure of the water's clarity. The greater quantity of suspended solids in the water (higher turbidity) affects the photosynthesis process of plants, due to reduced sunlight
- Leachates can be acidic in anaerobic conditions, liberating heavy metal compounds and nutrients into waterways with associated ecological and aesthetic effects
- Poor maintenance of the bed or banks of stormwater drains and/or the onsite stormwater, sediment and leachate detention basins could increase the risk of release of leachate (through embankment failure) and erosion/sedimentation.

Other surface water impacts that may result from the operation of the facility include:

- Reduced aesthetic values of receiving waters due to increased turbidity and odour effects from ongoing anaerobic decomposition of organic material

- Health impacts to livestock and persons extracting water from the receiving waters
- Reduced health (species richness and biodiversity) of the receiving ecosystems
- Reduced water quality due to erosion and sedimentation in waterways.

These potential impacts have been mitigated to date for Stage 1 and additional mitigation of potential impacts can be achieved for the proposed expanded site.

7. Mitigation measures

The potential impacts outlined in Section 6 can be mitigated through a range of measures as outlined in this Section. The facility will continue to be managed in accordance with the conditions of Development Approval DA140/2016 and all requirements of EPL 7654, including surface water monitoring requirements. The Surface and Groundwater Management Plan (Appendix F) and other existing environmental management plans are to be updated to include the expanded facility and proposed mitigation measures as outlined in this Section.

Table 10: Surface water mitigation measures

Potential impact	Mitigation measures
Pollution from sedimentation, oil/chemical spills and gross pollutants	• Surface and Groundwater Management Plan to be updated to include the expanded facility • Limit fuels and chemicals stored onsite to a minimum • All required chemicals and fuels must be located within a bunded enclosure located away from drainage lines and stormwater drains • Plant and equipment must be regularly inspected and serviced to limit risk of oil loss • Refuelling of vehicles or machinery is to occur within a containment or hardstand area designed to prevent the escape of spilled substances to the surrounding environment • Wash down areas must be appropriately constructed to capture and treat all wastewater, with collected solid material disposed off-site to a licensed facility • All staff to be appropriately trained in the spill response plan for the minimisation and management of unintended spills • A high standard of site housekeeping is to be maintained to limit risk of gross pollutants entering surface waters (i.e. construction waste, litter) • All reasonable and practicable measures must be taken to prevent pollution of any existing waterways as a result of silt or untreated leachate run-off, and oil or grease spills from any machinery. Wastewater for cleaning equipment must not be discharged or in-directly to any watercourses or stormwater systems • Exposed bare earth areas within the composting facility site must be minimised. Unused areas are to be revegetated

Contamination of clean storm water with organics processing increasing leachate volumes	• The facility must be designed to prevent surface water from mixing with the organics received and processed at the premises and the final products, process residuals and contaminated materials stored at the premises. This includes:
	  • Drains and spillways
	  • Bunding
	  • Sediment controls during construction
	• Clean stormwater must be diverted around waste and leachate catchments through the installation of clean water catch drains and diversion bunds

Increased soil infiltration of contaminated surface water and leachate	• Maintain surface gradient of the hardstand pad and orientation/geometry of windrows to minimise leachate generation and to ensure that leachate flows directly to the primary detention basin without mixing with compost organics

	• Maintain all water related infrastructure, during construction and operation of expanded infrastructure, and operation, designed to maximise runoff and reduce infiltration including:
	  • Low permeability base in the composting processing areas
	  • Lining of the leachate dams
	  • Bunding and arrangement of windrows
	  • Perimeter bunding and diversion drains

High contaminant load in leachate	• Procedures for testing, treatment and discharge of leachate to be established and implemented, including monitoring anaerobic conditions • Undertake aeration of the leachate dam (increase oxygen) if required (i.e. if hydrogen sulphide, dissolved oxygen or pH levels are outside limits)
Uncontrolled releases of contaminates through the bed and banks of the onsite basins or through poorly maintained hardstand pads, bunding and stormwater drains	• Monitor water levels of the detention basin to ensure that the water levels do not drop below the anticipated use of water for composting and evaporation. • Maintain integrity of hardstand pad by repairs to areas damaged by plant and machinery movements • Ensure drains and surface water gradients are free of excess vegetation and debris so that the flow of stormwater or leachate is not impeded, and the moisture / compaction levels achieved in embankment construction are maintained • Regular inspections of onsite infrastructure and structural integrity of drains, hardstand and leachate dam • Repair and maintain any cracks observed in the base and side walls of the dam using clay, preferably bentonite or bentonite clay mixture
Contamination due to poor waste management	• Waste to be accepted at the facility is to be in accordance with the EPA licence. Waste must be effectively vetted so prohibited wastes are not accepted at the facility • Waste is only to be received, stored or processed in areas where the leachate barrier has been installed • Monitoring of pollutants must be undertaken as per EPL 7654
Surface and groundwater contamination from leachate	• Leachate collection and storage facilities must be maintained to collect and impound all leachate in accordance with the design storm event • Leachate is not to be used for dust suppression on haul roads • Leachate is to be recycled through moisture conditioning of compost, to drawdown on basin volumes and ensure the design capacity of the basin is maintained for future storm events • Management of windrows and gradients to ensure no ponding or pooling occurs. Depressions must be filled promptly by using screened or sieved overburden • All water that has entered processing and storage areas and water that has been contaminated by leachate must be handled and treated in the same manner as leachate
Ineffective collection and storage of leachate	• Leachate must be collected and stored in a lined basin capable of capturing the 1% AEP, 24-hour runoff event. The hardstand pad and basin liner shall be constructed recompacted overburden/clay with an in-situ permeability (K) of less than $1x10^{-9}$ m/s in accordance with Aurecon (2017) • The leachate dam must be designed in accordance with AS 3798-2007 – Guidelines on Earthworks for Commercial and Residential Developments • Leachate basin is to be regularly desilted in order to maintain design storage capacity, without compromising basin liner integrity

8. Conclusion

The proposed expansion of operations at the facility to accept up to 200,000 tonnes per annum of compostable waste is to be undertaken with extension to the existing controlled surface water environment.

The risk of harm to the surface water environment is currently low and will continue to be low as it is adequately managed through the controls proposed surface water management infrastructure and extension of the existing management plans.

The implementation of the mitigation measures described, and the conditions of the existing development approval and environment protection licence will ensure that the proposal will not result in significant, adverse environmental impacts associated with surface water management.

9. References

Aurecon (2012). *Ravensworth South Final Void Plan.* Prepared for AGL Macquarie.

NSW EPA (2013). *Hunter Catchment Salinity Assessment – Final Report*.

Zambelli Environmental (2016). *Surface and Groundwater Management Plan- GreenSPOT Recycling Facility.* Prepared for Bio-Recycle Australia Pty Ltd.

Aurecon (2017). *Ravensworth Composting Pad Leachate Detention Basin – Construction Report.* Prepared for AGL Macquarie.

Glencore (2018). *Ravensworth Complex Annual Environmental Review*.

APPENDIX A

DA 140/2016
EPL 7654

Singleton COUNCIL

Address all
Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Our Ref: DA140/2016

25 November 2016

AGL Macquarie Pty Ltd
John Vyse CARE Bettergrow Pty Ltd ,
PO Box 945 ,
WINDSOR NSW 2756

NOTICE OF DETERMINATION OF DEVELOPMENT APPLICATION

Issued in accordance with Section 80 of the Environmental Planning and Assessment Act, 1979

Development Application No.	DA140/2016
Applicant name	AGL Macquarie Pty Ltd
Applicant address	John Vyse CARE Bettergrow Pty Ltd , PO Box 945 , WINDSOR NSW 2756
Land to be Developed Address	Lot: 10 DP: 1204457 ,74 Lemington Road,RAVENSWORTH NSW 2330
Proposed development	Establishment and operation of a composting facility to support the rehabilitation of Ravensworth No.2 mine and Ravensworth South mine."
Determination made on (date)	25/11/2016
Determination	Approved
Consent to lapse on (date)	25/11/2021

Your application was considered under the Environmental Planning and Assessment Act 1979 and is approved subject to the following conditions:

General Conditions

Singleton COUNCIL

Address all Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

1 .1 Approved Plans and Supporting Documents

The development shall be carried out substantially in accordance with the approved stamped and signed plans and/or documentation listed below except where modified by any following condition. Where the plans relate to alteration or additions only those works shown in colour or highlighted are approved.

Reference/Drawing No.	Title/Description	Prepared By	Date/s
Sheet 1 of 6	General Arrangement	Tony Mexon & Associates	23 February 2016
Sheet 3 of 6	Stage 1 Works	Tony Mexon & Associates	23 February 2016
Sheet 4 of 6	Stage 2 Works	Tony Mexon & Associates	23 February 2016
Sheet 5 of 6	Cross Section A-A	Tony Mexon & Associates	23 February 2016
Sheet 6 of 6	Cross Section C-C	Tony Mexon & Associates	23 February 2016
Surface and Groundwater Management Plan Version 7		Bio-Recycle Australia Pty Ltd	3/08/2016
Statement of Environmental Effects		AECOM	15/07/2016

Note 1: Modifications to the approved plans will require the lodgement and consideration by Council of a modification pursuant to Section 96 of the *Environmental Planning and Assessment Act, 1979*.

Note 2: The approved plans and supporting documentation may be subject to conditions imposed under section 80A(1)(g) of the Act modifying or amending the development (refer to conditions of consent which must be satisfied prior to the issue of any Construction Certificate).

1 .2 Damage on Council Assets

Any existing infrastructure damaged due to the proposed works including, but not limited to, (roads, services, drainage, pipes, guardrails, etc.) is to be repaired or replaced at the applicant's expense. The Applicant must notify Singleton Council Infrastructure or Development Engineering immediately when the structure is damaged.

1 .3 Road Act Approval

In case of any asset damage along Lemington Road (from the New England Highway to the entrance of the mining site) the applicant is to submit a Section 138 application in order to obtain a permit with conditions prior to starting works on Council Road Reserve, and at the end, a Certificate of Compliance from Singleton Council Infrastructure Department is to be obtained. All works are to be carried out in accordance with the Singleton Council Development Construction Specifications and details are to be submitted at the time of the application.

1 .4 Legal Drainage Point of Discharge

All stormwater from the working area must be directed to a lawful point of discharge such that it does not adversely affect surrounding or downstream properties.

Singleton COUNCIL

Address all
Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

1 .5 Leachate Dam Design

Singleton Council request a Compliance Certificate from a qualified practicing Geotechnical/Dams Engineer stating structural adequacy of the dam and that earthworks have been carried out in accordance with the AS 3798-2007 – Guidelines on Earthworks for Commercial and Residential Developments.

The Compliance Certificate along with any correspondence from the Environmental Protection Authority EPA must be submitted to Council prior to filling of the dam.

Condition during the ongoing use of the development

2.1 Waterways Contamination

All reasonable and practicable measures must be taken to prevent pollution of any existing waterways as a result of silt or untreated leachate run-off, and oil or grease spills from any machinery. Wastewater for cleaning equipment must not be discharged or in-directly to any watercourses or stormwater systems.

Integrated Development Terms of Approval

3.1 Integrated Development General Terms of Approval

The following approval bodies have given general terms of approval in relation to the development, as referred to in Section 93 of the *Environmental Planning and Assessment Act 1979:*

a) NSW Environment Protection Authority

The applicant is to comply with all general terms of approval provided by the NSW Environment Protection Authority Notice No: 1544342. All records and reports required under the General Terms of Approval must be made available to Council within 48 hours of any request by Council.

A copy of the General Terms of Approval is attached and forms part of the development consent.

Advices

4.1 Lapsing of Consent

In accordance with Section 95 of the *Environmental Planning and Assessment Act 1979* (as amended), this Development Consent lapses five (5) years after the date from which it operates unless building, engineering or construction work has substantially physically commenced. The building must be completed, in accordance with the approved plans and specifications, within five (5) years from the date when the building was substantially physically commenced.

Address all
Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

4.2 Process for Modification
The plans and/or conditions of this Consent are binding and may only be modified upon written request to Council under Section 96 of the *Environmental Planning and Assessment Act, 1979* (as amended). The request shall be accompanied by the appropriate fee and application form. You are not to commence any action, works, contractual negotiations, or the like, on the requested modification unless and until the written authorisation of Council is received by way of an amended consent.

4.3 Review of Determination
In accordance with the provisions of Section 82A of the *Environmental Planning and Assessment Act 1979* (as amended) the applicant can request Council to review this determination. The request must be made within a period of 6 months from the date shown on this determination. A fee, as prescribed under Council's current Management Plan - Fees and Charges, is payable for such a review.

4.4 88b Instrument
An 88B Instrument made pursuant to the *Conveyancing Act 1919* applies to the subject land and it is the owners/applicants responsibility to check the compliance of the works with the instrument.

Other Approvals	
Local Government Act 1993 approvals granted under s 78A (5)	N/A
General terms of other approvals integrated as part of the consent	• Mine Subsidence Compensation Act 1961 • Protection of the Environment Operations Act 1997
Right of Appeal	To the extent provided for by Section 97 of the Act, an applicant who is dissatisfied with the determination of this application may appeal to the Court within six (6) months of the date of this notice. Section 98 of the Act provides that an appeal to the Court may be made by an objector who is dissatisfied with the determination of an application for designated development. Such an appeal must be made within 28 days of the date on which notice is given and must be in accordance with the regulations and rules of the court. Sections 97 and 98 of the Act do not apply in respect of a development consent declared to be valid or validly granted under Section 25C of the Land and Environment Court Act 1979.
Signed	on behalf of the consent authority
Signature	

Singleton COUNCIL

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Correspondence to:
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PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Title	**Development Planner**
Name	Joshua Real
Date	25 November 2016

If you have any inquiries regarding the consent, please contact Joshua Real of Council's Planning & Regulated Services, on (02) 6578 7290.

Note 1	Section 95 of the Act provides that a development consent for the erection of a building does not lapse if the building, engineering or construction work relating to the building is substantially physically commenced on the land to which the consent applies before the date on which consent would otherwise lapse.

Address all
Correspondence to:
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PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Our Ref: DA140/2016.2

16/04/2018

Bettergrow
PO Box 945
WINDSOR NSW 2756

NOTICE OF DETERMINATION

S4.55 (2) APPLICATION

This approval has been modified pursuant to *Section 4.55 (2) of the Environmental Planning and Assessment Act, 1979*. Notice is hereby given that the application has been determined by granting of consent, subject to conditions (as modified).

Development Application No. DA140/2016.1

Modification Application No. DA140/2016.2

Development Application

Applicant name Bettergrow

Applicant address PO Box 945 WINDSOR NSW 2756

Land to be Developed:

Address 74 Lemington Road RAVENSWORTH
Lot: 10 DP: 1204457

Address all Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Description of development	**4.55(2) Modification to Increase materials from 50,000 tonnes per annum to 76,000 tonnes per annum**
Description of modification tonnes per annum	**4.55(2) Modification to Increase materials from 50,000**

Date of determination	**25/11/2016**
Date of determination - modification	19/04/2018
Consent to lapse on	**25/11/2021**

MODIFICATIONS APPROVED:

- **Condition 1.1 to reflect new Statement of Environmental Effects**
- **Condition 1.6 to be added to reflect general terms of approval**
- **Condition 1.7 to be added to reflect general terms of approval**
- **Condition 4.5 to be added to reflect general terms of approval**

General Conditions

Condition 1.1 is amended and shall read as follows:

1.1 Approved Plans and Supporting Documents

The development shall be carried out substantially in accordance with the approved stamped and signed plans and/or documentation listed below except where modified by any following condition. Where the plans relate to alteration or additions only those works shown in colour or highlighted are approved.

Reference/Drawing No.	Title/Description	Prepared By	Date/s
Sheet 1 of 6	General Arrangement	Tony Mexon & Associates	23 February 2016
Sheet 3 of 6	Stage 1 Works	Tony Mexon & Associates	23 February 2016
Sheet 4 of 6	Stage 2 Works	Tony Mexon & Associates	23 February 2016
Sheet 5 of 6	Cross Section A-A	Tony Mexon & Associates	23 February 2016
Sheet 6 of 6	Cross Section C-C	Tony Mexon & Associates	23 February 2016

Surface and Groundwater Management Plan Version 7		Bio-Recycle Australia Pty Ltd	3/08/2016
Statement of Environmental Effects		AECOM	15/07/2016
Statement of Environmental Effects	***Section 96 Application – Ravensworth Composting Facility***	***JACOBS***	***6 February 2018***

Note 1: Modifications to the approved plans will require the lodgement and consideration by Council of a modification pursuant to Section 4.55 of the Environmental Planning and Assessment Act, 1979.

Note 2: The approved plans and supporting documentation may be subject to conditions imposed under section 4.17(1)(g) of the Act modifying or amending the development (refer to conditions of consent which must be satisfied prior to the issue of any Construction Certificate).

1.2 Damage on Council Assets

Any existing infrastructure damaged due to the proposed works including, but not limited to, (roads, services, drainage, pipes, guardrails, etc.) is to be repaired or replaced at the applicant's expense. The Applicant must notify Singleton Council Infrastructure or Development Engineering immediately when the structure is damaged.

1.3 Road Act Approval

In case of any asset damage along Lemington Road (from the New England Highway to the entrance of the mining site) the applicant is to submit a Section 138 application in order to obtain a permit with conditions prior to starting works on Council Road Reserve, and at the end, a Certificate of Compliance from Singleton Council Infrastructure Department is to be obtained. All works are to be carried out in accordance with the Singleton Council Development Construction Specifications and details are to be submitted at the time of the application.

1.4 Legal Drainage Point of Discharge

All stormwater from the working area must be directed to a lawful point of discharge such that it does not adversely affect surrounding or downstream properties.

1.5 Leachate Dam Design

Singleton Council request a Compliance Certificate from a qualified practicing

Address all Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Geotechnical/Dams Engineer stating structural adequacy of the dam and that earthworks have been carried out in accordance with the AS 3798-2007 – Guidelines on Earthworks for Commercial and Residential Developments.

The Compliance Certificate along with any correspondence from the Environmental Protection Authority EPA must be submitted to Council prior to filling of the dam

Condition 1.6 is amended and shall read as follows:

1.6 Leachate Management Dam Capacity

Singleton Council request a Compliance Certificate from a qualified practicing Hydraulic Engineering Consultancy Company stating that the capacity of the existing dam is adequate to cope with the increment of leachate.

The Compliance Certificate along with any correspondence from the Environmental Protection Authority EPA must be submitted to Council prior to increasing the amount of composting material

Condition 1.7 is amended and shall read as follows:

1.7 Road Impact Assessment

Prior to the commencement of the on-site composting increment, the applicant/contractor is to prepare a Road Condition Report of Lemington Road (from the New England Highway to the entrance of the mining site), identifying all existing problems with this section of the roadway. On completion, a joint inspection between the applicant and Council Officers to identify any further damage is to be carried out. If any additional damage has occurred, all rectification works shall be at the applicant's expense, to the satisfaction of the Council Infrastructure Department. The report is to contain (but not limited to): location of existing deficiencies of the roadway and site photos, especially at areas where turning movements will occur.

Condition during the ongoing use of the development

2.1 Waterways Contamination

All reasonable and practicable measures must be taken to prevent pollution of any existing waterways as a result of silt or untreated leachate run-off, and oil or grease spills from any machinery. Wastewater for cleaning equipment must not be discharged or in-directly to any watercourses or stormwater systems.

Integrated Development Terms of Approval

3.1 Integrated Development General Terms of Approval

The following approval bodies have given general terms of approval in relation to the development, as referred to in Section 7.4 of the Environmental Planning and Assessment

Act 1979:

1. NSW Environment Protection Authority

The applicant is to comply with all general terms of approval provided by the NSW Environment Protection Authority Notice No: 1544342. All records and reports required under the General Terms of Approval must be made available to Council within 48 hours of any request by Council.

A copy of the General Terms of Approval is attached and forms part of the development consent.

Advices

4.1 Lapsing of Consent

In accordance with Section 4.53 of the Environmental Planning and Assessment Act 1979 (as amended), this Development Consent lapses five (5) years after the date from which it operates unless building, engineering or construction work has substantially physically commenced. The building must be completed, in accordance with the approved plans and specifications, within five (5) years from the date when the building was substantially physically commenced.

4.2 Process for Modification

The plans and/or conditions of this Consent are binding and may only be modified upon written request to Council under Section 4.55 of the Environmental Planning and Assessment Act, 1979 (as amended). The request shall be accompanied by the appropriate fee and application form. You are not to commence any action, works, contractual negotiations, or the like, on the requested modification unless and until the written authorisation of Council is received by way of an amended consent.

4.3 Review of Determination

In accordance with the provisions of Section 8.2 of the Environmental Planning and Assessment Act 1979 (as amended) the applicant can request Council to review this determination. The request must be made within a period of 6 months from the date shown on this determination. A fee, as prescribed under Council's current Management Plan - Fees and Charges, is payable for such a review.

4.4 88b Instrument

An 88B Instrument made pursuant to the Conveyancing Act 1919 applies to the subject land and it is the owners/applicants responsibility to check the compliance of the works with the instrument.

4.5 Other Permits and Approvals

Address all
Correspondence to:
The General Manager
PO Box 314
SINGLETON NSW 2330
Ph: (02) 6578 7290
Email: ssc@singleton.nsw.gov.au

Approval shall be sought from the New South Wales Environment Protection Authority for the amendment of Environment Protection License number 7654, to allow for the composting of up to 76,000 tonnes per annum. An amended Environment Protection License must be granted by the New South Wales Environment Protection Authority prior to the increase of composting above 50,000 tonnes per annum.

Other Approvals

Local Government Act 1993 approvals granted under s 4.12 (5)	N/A
General terms of other approvals integrated as part of the consent (list approvals)	• Mine Subsidence Compensation Act 1961 • Protection of the Environment Operations Act 1997

Right of Appeal

The applicant has the right to appeal this determination in accordance with the provisions of Section 8.9 of the *Environmental Planning and Assessment Act, 1979* within six (6) months of the date of this notice.

Right of Review

The applicant has the right to request a review of the determination of this Section 4.55 Application in accordance with the provisions of Section 8.2 of the *Environmental Planning and Assessment Act, 1979*.

Signed	on behalf of the consent authority
Signature	
Title	**Development Planner**
Name	**Mr R Gounder**
Date	**23/04/2018**

If you have any inquiries regarding the consent, please contact Mr R Gounder of Council's Planning & Regulated Services, on (02) 6578 7290.

Note 1

The approval of this Application does not amend the timeframe of the validity of Development Consent, which will lapse on the specified date. Sections 4.53(4) and 4.53(5) of the *Environmental Planning and Assessment Act, 1979* provides that a development consent for the erection of a building does not lapse if the building, engineering or construction work relating to the building is commenced on the land to which the consent applies before the date on which consent would otherwise lapse.

Environment Protection Licence

Licence - 7654

Licence Details	
Number:	7654
Anniversary Date:	22-June

Licensee

BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED

PO BOX 945

WINDSOR NSW 2756

Premises

"RAVENSWORTH"

74 LEMINGTON ROAD

RAVENSWORTH NSW 2330

Scheduled Activity

Composting

Fee Based Activity	Scale
Composting	> 50000 T annual capacity to receive organics

Region

Waste & Resource Recovery

59-61 Goulburn Street
SYDNEY NSW 2000

Phone: (02) 9995 5000

Fax: (02) 9995 5999

PO Box A290

SYDNEY SOUTH NSW 1232

Environment Protection Licence

Licence - 7654

Environment Protection Licence

Licence - 7654

Environment Protection Licence

Licence - 7654

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).

Environment Protection Licence

Licence - 7654

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:

BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED
PO BOX 945
WINDSOR NSW 2756

subject to the conditions which follow.

Environment Protection Licence

Licence - 7654

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
Composting	Composting	> 50000 T annual capacity to receive organics

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
"RAVENSWORTH"
74 LEMINGTON ROAD
RAVENSWORTH
NSW 2330
PART LOT 10 DP 1204457
PART LOT 10 DP 1204457 AS HIGHLIGHTED IN YELLOW ON TONY MEXON & ASSOCIATES REGISTERED SURVEYORS MAP FOR BETTERGROW PTY LTD TITLED "CONCEPT PLAN SHOWING PROPOSED LEASE OF PART OF LOT 3 DP1193186 BEING MACQUARIE GENERATION'S RAVENSWORTH VOID 3. SHEET 2" SURVEYORS REF 14-32, REVISION DATE 6/2/2017. NOTE: ACCESS ROADS ARE EXCLUDED.

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

Licence - 7654

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	Leachate dam characterisation		South of site
2	Leachate dam emergency spillway	Leachate dam emergency spillway	Northeast corner of leachate dam
3	Process water tank		Eastern edge of premises
4	Sediment Basin	Sediment Basin	Sediment Basin outlet - TBC

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 2

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	within range of	100 percentile concentration limit
Ammonia	milligrams per litre				0.9
pH	pH			6.5 - 8.5	
Total suspended solids	milligrams per litre				50

POINT 4

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	within range of	100 percentile concentration limit
pH	pH			6.5 - 8.5	
Total suspended solids	milligrams per litre				50

L3 Waste

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 or Specific exempted waste	Paper Crumble	Composting	
NA	General solid waste (non-putrescible)	Urban wood residues (as defined in 'The compost order 2016')	Composting	
NA	Liquid Waste	Wastewater from Bayswater mine void 4	Composting	
NA	General solid waste (non-putrescible)	Natural organic fibrous material (as defined in	Composting	

		Schedule 1 of the POEO Act)		
NA	Power Station Bottom Ash	Coal ash which meets the conditions of 'The coal ash order 2014' .	Composting	
NA	General solid waste (non-putrescible)	Biosolids (as defined in Schedule 1 of the POEO Act)	Composting	
NA	General solid waste (non-putrescible)	Garden Waste (as defined in Schedule 1 of the POEO Act)	Composting	NA

L3.2 The total amount of waste referred to in the table above, must not exceed 76,000 tonnes received from offsite per year

L4 Hours of operation

L4.1 Activities at the premises may only be carried out between 6am to 6pm Monday to Saturday.

L5 Potentially offensive odour

L5.1 No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

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.

O1.2 No alteration or modification in approved design or method of operation must be made without written approval from the EPA.

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

O3.2 Trucks entering and leaving the premises that are carrying loads must be covered at all times except during loading and unloading.

O3.3 Leachate is not to be used for dust suppression on haul roads.

O3.4 The licensee must ensure that no material, including sediment or oil, is tracked from the premises.

O4 Emergency response

O4.1 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

Note: The licensee must develop their PIRMP in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations Act 1997 and the Protection of the Environment Operations (General) Regulation 2009.

O5 Processes and management

O5.1 Clean stormwater must be diverted around waste and leachate catchments at the premises.

O5.2 There must be no burning or incineration of waste at the premises.

O6 Waste management

O6.1 Waste is only permitted to be received, stored and processed in areas at the premises where leachate barrier has been installed and the barrier is to EPA satisfaction.

Leachate Management

O6.2 Leachate collection and storage facilities must be maintained so as to collect and impound all leachate generated by a storm events of less than 1 in 25 year recurrence interval of one day duration.

O6.3 Leachate must not be permitted to mix with stormwater or any stormwater infrastructure at the premises.

O6.4 The licensee must not cause or permit any leachate to pool at the premises (except within designated leachate dams/sumps).

O6.5 Leachate may be irrigated over active compost windrows only, within the premises.

O6.6 No leachate is permitted to be discharged from the operating area of the premises

O6.7 The Licensee shall install a level marker in the leachate dam/s to indicate the volume of leachate in each dam.

O7 Other operating conditions

O7.1 The licensee must prepare and implement an Odour Management Plan (OMP) for the premises before any waste is accepted in Stage 1 at the premises. For all odour emissions at the premises the OMP must include but is not limited to:

1. Key performance indicators;
2. Monitoring method(s);
3. Location, frequency and duration of monitoring;
4. Record keeping;
5. Response mechanisms;
6. Compliance reporting; and
7. Complaints management and reporting.

O7.2 Spray from leachate irrigation, must not drift beyond active compost rows.

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.

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
Alkalinity (as calcium carbonate)	milligrams per litre	Quarterly	Grab sample
Ammonia	milligrams per litre	Quarterly	Grab sample
Calcium	milligrams per litre	Quarterly	Grab sample
Chloride	milligrams per litre	Quarterly	Grab sample
Electrical conductivity	microsiemens per centimetre	Quarterly	Grab sample
Fluoride	milligrams per litre	Quarterly	Grab sample
Iron	milligrams per litre	Quarterly	Grab sample
Magnesium	milligrams per litre	Quarterly	Grab sample
Manganese	milligrams per litre	Quarterly	Grab sample
Nitrogen (total)	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Phosphorus	milligrams per litre	Quarterly	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Quarterly	Grab sample
Potassium	milligrams per litre	Quarterly	Grab sample
Sodium	milligrams per litre	Quarterly	Grab sample
Sulfate	milligrams per litre	Quarterly	Grab sample
Total organic carbon	milligrams per litre	Quarterly	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Quarterly	Grab sample
Total Phenolics	milligrams per litre	Quarterly	Grab sample

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Total suspended solids	milligrams per litre	Quarterly	Grab sample

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Alkalinity (as calcium carbonate)	milligrams per litre	Daily during any discharge	Grab sample
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Calcium	milligrams per litre	Daily during any discharge	Grab sample
Chloride	milligrams per litre	Daily during any discharge	Grab sample
Electrical conductivity	microsiemens per centimetre	Daily during any discharge	Grab sample
Fluoride	milligrams per litre	Daily during any discharge	Grab sample
Iron	milligrams per litre	Daily during any discharge	Grab sample
Magnesium	milligrams per litre	Daily during any discharge	Grab sample
Manganese	milligrams per litre	Daily during any discharge	Grab sample
Nitrogen (total)	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Phosphorus	milligrams per litre	Daily during any discharge	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Potassium	milligrams per litre	Daily during any discharge	Grab sample
Sodium	milligrams per litre	Daily during any discharge	Grab sample
Sulfate	milligrams per litre	Daily during any discharge	Grab sample
Total organic carbon	milligrams per litre	Daily during any discharge	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Total Phenolics	milligrams per litre	Daily during any discharge	Grab sample
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Boron	milligrams per litre	Quarterly	Grab sample

Cadmium	milligrams per litre	Quarterly	Grab sample
Copper	milligrams per kilogram	Quarterly	Grab sample
Electrical conductivity	microsiemens per centimetre	Quarterly	Grab sample
Iron	milligrams per litre	Quarterly	Grab sample
Molybdenum	milligrams per litre	Quarterly	Grab sample
Nickel	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Silver	milligrams per litre	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

POINT 4

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Electrical conductivity	microsiemens per centimetre	Daily during any discharge	Grab sample
Nitrogen (total)	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Total organic carbon	milligrams per litre	Daily during any discharge	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Total suspended solids	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 Recording of pollution complaints

M4.1 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.

M4.2 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.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

M5.1 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.

M5.2 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.

M5.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M6 Other monitoring and recording conditions

M6.1 The licensee must record the following information for each load of waste(s) received at the premises:
(a) the registration number of the vehicle;
(b) the time and date of receipt of the waste;
(c) the source of the waste;
(d) the type(s) of waste; and
(e) the quantity of each type of waste (in tonnes).

6 Reporting Conditions

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 a copy of the form that must be completed and returned to the EPA.

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

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.

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.

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.

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

R2 Notification of environmental harm

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

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

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.

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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

R4.1 The licensee must maintain a daily log and record the following data of fires at the site:
a) Time and date when the fire was observed, started or reported.
b) Whether the fire was authorised by the licensee, and, if not, the circumstances which ignited the fire.
c) The time and date that the fire ceased and whether it burnt out or was extinguished.
d) The location of fire (eg. clean timber stockpile, putrescible garbage cell, etc).
e) Prevailing weather conditions.
f) Observations made in regard to smoke direction and dispersion.
g) The amount of waste that was combusted by the fire.
h) Action taken to extinguish the fire.

R4.2 The licensee or its employees or agents must notify the EPA in accordance with conditions R2.1 and R2.2 of all fires at the premises as soon as practical after becoming aware of the incident.

Annual Waste Summary Reporting

R4.3 The licensee must complete and submit to the EPA an Annual Waste Summary Report each financial year.

R4.4 The Annual Waste Summary Report must be submitted to the EPA via the Waste and Resource Reporting Portal (WARRP) within 60 days of the end of the financial year.

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.

8 Special Conditions

E1 Requirement to Provide a 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.

E1.2 The financial assurance must be favour of the Environment Protection Authority in the amount of one hundred thousand dollars ($100,000.) and provided to the EPA by 5pm on 31 August 2017. The financial assurance is required to secure or guarantee funding for works or programs required by or under this licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.3 The financial assurance must be in favour of the Environment Protection Authority in the amount of two hundred dollars ($200,000) and provided to the EPA by 5pm on 31 August 2018. The financial assurance is required to secure or guarantee funding for works or programmes required by or under this licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.4 The financial assurance must be in favour of the Environment Protection Authority in the amount of three hundred thousand dollars ($300,000) and provided to the EPA by 5pm on 31 August 2019. The financial assurance is required to secure or guarantee funding for works or programmes required by or under this

licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.5 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.

E1.6 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 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.

E1.8 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.

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.
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 must:
a) Make all efforts to contain all fire water on the premises;
b) Make all efforts to control air pollution from the premises;
c) Make all efforts to contain any discharge, spill or run-off from the premises;
d) Make all efforts to prevent flood water entering the 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 premises and its potential to migrate from the premises;
h) At the request of the EPA, monitor surface water leaving the premises; and
i) Ensure the premises is secure.

E2.3 After the licensee's premises cease to be used for the purposes 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 premises, including conducting an assessment of the site and if required remediation of any site contamination.

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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 described 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

Ms Cathryn Ferguson

Environment Protection Authority

(By Delegation)

Date of this edition: 25-September-2000

End Notes

1	Licence varied by notice 1011936, issued on 15-Oct-2001, which came into effect on 09-Nov-2001.
2	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
3	Licence varied by notice 1097525, issued on 20-Feb-2009, which came into effect on 20-Feb-2009.
4	Licence varied by a change to the DECCW region, issued on 01-Sep-2010, which came into effect on 01-Sep-2010.
5	Licence varied by notice 1517796 issued on 03-Oct-2014
6	Licence varied by notice 1543233 issued on 12-May-2017
7	Licence varied by notice 1565003 issued on 14-Jun-2018

Licence Variation

Licence - 7654

BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED
ABN 62 062 888 082
PO BOX 945
WINDSOR NSW 2756

Attention: Mr John Vyse

Notice Number	1565003
File Number	EF13/4682
Date	14-Jun-2018

NOTICE OF VARIATION OF LICENCE NO. 7654

BACKGROUND

A. Bio-Recycle Australia Proprietary Limited holds Environment Protection Licence No. 7654 ("the Licence") issued under the *Protection of the Environment Operations Act* 1997 ("the Act"). The Licence authorises you to carry on scheduled activities under the Act at 74 Lemington Road, Ravensworth NSW ("the Premises").

B. On 21 March 2018 the Environment Protection Authority (EPA) received your application to vary the Licence to increase annual capacity to receive organics from 50,000 tonnes to 76,000 tonnes

C. You provided correspondence on 24 April 2018 which included modified consent DA140/2016.2 granted by Singleton Council which granted consent for 76,000 tonnes of waste to be received at the Premises.

D. On 9 April 2018 the Environment Protection Authority (EPA) received your application to vary the Licence to include "paper crumble" into approved waste inputs allowed to be accepted onsite for composting

E. The EPA has reviewed the application; the section 96(2) Modification to DA140/2016.2; and Statement of Environment Effects prepared by Jacobs, 6 February 2018 and proposes to increase the annual capacity to receive organics to 76,000 tonnes and to include paper crumble into the allowable waste inputs onsite for composting.

F. The EPA prepared a draft licence variation to you for comment on 17 May 2018 and we received your comments on 29 May 2018.

G. Conditions relating to construction of the Leachate Containment Infrastructure under condition O7, have been removed as those works have been completed.

Licence Variation

VARIATION OF LICENCE NO. 7654

1. By this notice the EPA varies the Licence. 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 A1.1, updated to increase Fee based scale to >50,000 tonnes annual capacity to receive organics
   - Condition L3.1, updated to include Paper Crumble into the table of approved waste inputs allowed onsite for composting
   - Condition L3.2, updated to reflect total amount of waste received from offsite must not exceed 76,000 tonnes per year.
   - Condition O7.1 to condition O7.5 inclusive, relating to construction of Leachate Containment Infrastructure have been removed. Conditions formerly listed as O7.6 and O7.7 have been renumbered as O7.1 and O7.2.

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Steven James

Unit Head Waste Compliance - Hunter

Waste & Resource Recovery

(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 - 7654

Licence Details	
Number:	7654
Anniversary Date:	22-June

Licensee

BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED

PO BOX 945

WINDSOR NSW 2756

Premises

"RAVENSWORTH"

74 LEMINGTON ROAD

RAVENSWORTH NSW 2330

Scheduled Activity

Composting

Fee Based Activity	Scale
Composting	> 50000 T annual capacity to receive organics

Region

Waste & Resource Recovery

59-61 Goulburn Street
SYDNEY NSW 2000

Phone: (02) 9995 5000

Fax: (02) 9995 5999

PO Box A290

SYDNEY SOUTH NSW 1232

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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:

BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED
PO BOX 945
WINDSOR NSW 2756

subject to the conditions which follow.

Environment Protection Licence

Licence - 7654

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
Composting	Composting	> 50000 T annual capacity to receive organics

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
"RAVENSWORTH"
74 LEMINGTON ROAD
RAVENSWORTH
NSW 2330
PART LOT 10 DP 1204457
PART LOT 10 DP 1204457 AS HIGHLIGHTED IN YELLOW ON TONY MEXON & ASSOCIATES REGISTERED SURVEYORS MAP FOR BETTERGROW PTY LTD TITLED "CONCEPT PLAN SHOWING PROPOSED LEASE OF PART OF LOT 3 DP1193186 BEING MACQUARIE GENERATION'S RAVENSWORTH VOID 3. SHEET 2" SURVEYORS REF 14-32, REVISION DATE 6/2/2017. NOTE: ACCESS ROADS ARE EXCLUDED.

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.

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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	Leachate dam characterisation		South of site
2	Leachate dam emergency spillway	Leachate dam emergency spillway	Northeast corner of leachate dam
3	Process water tank		Eastern edge of premises
4	Sediment Basin	Sediment Basin	Sediment Basin outlet - TBC

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 2

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	within range of	100 percentile concentration limit
Ammonia	milligrams per litre				0.9
pH	pH			6.5 - 8.5	
Total suspended solids	milligrams per litre				50

POINT 4

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	within range of	100 percentile concentration limit
pH	pH			6.5 - 8.5	
Total suspended solids	milligrams per litre				50

L3 Waste

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 or Specific exempted waste	Paper Crumble	Composting	
NA	General solid waste (non-putrescible)	Urban wood residues (as defined in 'The compost order 2016')	Composting	
NA	Liquid Waste	Wastewater from Bayswater mine void 4	Composting	
NA	General solid waste (non-putrescible)	Natural organic fibrous material (as defined in	Composting	

		Schedule 1 of the POEO Act)		
NA	Power Station Bottom Ash	Coal ash which meets the conditions of 'The coal ash order 2014' .	Composting	
NA	General solid waste (non-putrescible)	Biosolids (as defined in Schedule 1 of the POEO Act)	Composting	
NA	General solid waste (non-putrescible)	Garden Waste (as defined in Schedule 1 of the POEO Act)	Composting	NA

L3.2 The total amount of waste referred to in the table above, must not exceed 76,000 tonnes received from offsite per year

L4 Hours of operation

L4.1 Activities at the premises may only be carried out between 6am to 6pm Monday to Saturday.

L5 Potentially offensive odour

L5.1 No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

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.

O1.2 No alteration or modification in approved design or method of operation must be made without written approval from the EPA.

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

O3.2 Trucks entering and leaving the premises that are carrying loads must be covered at all times except during loading and unloading.

O3.3 Leachate is not to be used for dust suppression on haul roads.

O3.4 The licensee must ensure that no material, including sediment or oil, is tracked from the premises.

O4 Emergency response

O4.1 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

Note: The licensee must develop their PIRMP in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations Act 1997 and the Protection of the Environment Operations (General) Regulation 2009.

O5 Processes and management

O5.1 Clean stormwater must be diverted around waste and leachate catchments at the premises.

O5.2 There must be no burning or incineration of waste at the premises.

O6 Waste management

O6.1 Waste is only permitted to be received, stored and processed in areas at the premises where leachate barrier has been installed and the barrier is to EPA satisfaction.

Leachate Management

O6.2 Leachate collection and storage facilities must be maintained so as to collect and impound all leachate generated by a storm events of less than 1 in 25 year recurrence interval of one day duration.

O6.3 Leachate must not be permitted to mix with stormwater or any stormwater infrastructure at the premises.

O6.4 The licensee must not cause or permit any leachate to pool at the premises (except within designated leachate dams/sumps).

O6.5 Leachate may be irrigated over active compost windrows only, within the premises.

O6.6 No leachate is permitted to be discharged from the operating area of the premises

O6.7 The Licensee shall install a level marker in the leachate dam/s to indicate the volume of leachate in each dam.

O7 Other operating conditions

O7.1 The licensee must prepare and implement an Odour Management Plan (OMP) for the premises before any waste is accepted in Stage 1 at the premises. For all odour emissions at the premises the OMP must include but is not limited to:

1. Key performance indicators;
2. Monitoring method(s);
3. Location, frequency and duration of monitoring;
4. Record keeping;
5. Response mechanisms;
6. Compliance reporting; and
7. Complaints management and reporting.

O7.2 Spray from leachate irrigation, must not drift beyond active compost rows.

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.

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
Alkalinity (as calcium carbonate)	milligrams per litre	Quarterly	Grab sample
Ammonia	milligrams per litre	Quarterly	Grab sample
Calcium	milligrams per litre	Quarterly	Grab sample
Chloride	milligrams per litre	Quarterly	Grab sample
Electrical conductivity	microsiemens per centimetre	Quarterly	Grab sample
Fluoride	milligrams per litre	Quarterly	Grab sample
Iron	milligrams per litre	Quarterly	Grab sample
Magnesium	milligrams per litre	Quarterly	Grab sample
Manganese	milligrams per litre	Quarterly	Grab sample
Nitrogen (total)	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Phosphorus	milligrams per litre	Quarterly	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Quarterly	Grab sample
Potassium	milligrams per litre	Quarterly	Grab sample
Sodium	milligrams per litre	Quarterly	Grab sample
Sulfate	milligrams per litre	Quarterly	Grab sample
Total organic carbon	milligrams per litre	Quarterly	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Quarterly	Grab sample
Total Phenolics	milligrams per litre	Quarterly	Grab sample

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Total suspended solids	milligrams per litre	Quarterly	Grab sample

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Alkalinity (as calcium carbonate)	milligrams per litre	Daily during any discharge	Grab sample
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Calcium	milligrams per litre	Daily during any discharge	Grab sample
Chloride	milligrams per litre	Daily during any discharge	Grab sample
Electrical conductivity	microsiemens per centimetre	Daily during any discharge	Grab sample
Fluoride	milligrams per litre	Daily during any discharge	Grab sample
Iron	milligrams per litre	Daily during any discharge	Grab sample
Magnesium	milligrams per litre	Daily during any discharge	Grab sample
Manganese	milligrams per litre	Daily during any discharge	Grab sample
Nitrogen (total)	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Phosphorus	milligrams per litre	Daily during any discharge	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Potassium	milligrams per litre	Daily during any discharge	Grab sample
Sodium	milligrams per litre	Daily during any discharge	Grab sample
Sulfate	milligrams per litre	Daily during any discharge	Grab sample
Total organic carbon	milligrams per litre	Daily during any discharge	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Total Phenolics	milligrams per litre	Daily during any discharge	Grab sample
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Boron	milligrams per litre	Quarterly	Grab sample

Cadmium	milligrams per litre	Quarterly	Grab sample
Copper	milligrams per kilogram	Quarterly	Grab sample
Electrical conductivity	microsiemens per centimetre	Quarterly	Grab sample
Iron	milligrams per litre	Quarterly	Grab sample
Molybdenum	milligrams per litre	Quarterly	Grab sample
Nickel	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Silver	milligrams per litre	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

POINT 4

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Electrical conductivity	microsiemens per centimetre	Daily during any discharge	Grab sample
Nitrogen (total)	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Total organic carbon	milligrams per litre	Daily during any discharge	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Daily during any discharge	Grab sample
Total suspended solids	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 Recording of pollution complaints

M4.1 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.

M4.2 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.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

M5.1 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.

M5.2 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.

M5.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M6 Other monitoring and recording conditions

M6.1 The licensee must record the following information for each load of waste(s) received at the premises:
(a) the registration number of the vehicle;
(b) the time and date of receipt of the waste;
(c) the source of the waste;
(d) the type(s) of waste; and
(e) the quantity of each type of waste (in tonnes).

6 Reporting Conditions

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 a copy of the form that must be completed and returned to the EPA.

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

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.

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.

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.

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

R2 Notification of environmental harm

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

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

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.

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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

R4.1 The licensee must maintain a daily log and record the following data of fires at the site:
a) Time and date when the fire was observed, started or reported.
b) Whether the fire was authorised by the licensee, and, if not, the circumstances which ignited the fire.
c) The time and date that the fire ceased and whether it burnt out or was extinguished.
d) The location of fire (eg. clean timber stockpile, putrescible garbage cell, etc).
e) Prevailing weather conditions.
f) Observations made in regard to smoke direction and dispersion.
g) The amount of waste that was combusted by the fire.
h) Action taken to extinguish the fire.

R4.2 The licensee or its employees or agents must notify the EPA in accordance with conditions R2.1 and R2.2 of all fires at the premises as soon as practical after becoming aware of the incident.

Annual Waste Summary Reporting

R4.3 The licensee must complete and submit to the EPA an Annual Waste Summary Report each financial year.

R4.4 The Annual Waste Summary Report must be submitted to the EPA via the Waste and Resource Reporting Portal (WARRP) within 60 days of the end of the financial year.

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.

8 Special Conditions

E1 Requirement to Provide a 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.

E1.2 The financial assurance must be favour of the Environment Protection Authority in the amount of one hundred thousand dollars ($100,000.) and provided to the EPA by 5pm on 31 August 2017. The financial assurance is required to secure or guarantee funding for works or programs required by or under this licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.3 The financial assurance must be in favour of the Environment Protection Authority in the amount of two hundred dollars ($200,000) and provided to the EPA by 5pm on 31 August 2018. The financial assurance is required to secure or guarantee funding for works or programmes required by or under this licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.4 The financial assurance must be in favour of the Environment Protection Authority in the amount of three hundred thousand dollars ($300,000) and provided to the EPA by 5pm on 31 August 2019. The financial assurance is required to secure or guarantee funding for works or programmes required by or under this

licence. The financial assurance must contain a term that provides that any monies claimed can be paid to the EPA or, at the written direction of the EPA, to any other person. The licensee must provide to the EPA, along with the original counterpart guarantees, confirmation in writing that the financial institution providing the guarantees is subject to supervision by APRA.

E1.5 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.

E1.6 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 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.

E1.8 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.

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.
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 must:
a) Make all efforts to contain all fire water on the premises;
b) Make all efforts to control air pollution from the premises;
c) Make all efforts to contain any discharge, spill or run-off from the premises;
d) Make all efforts to prevent flood water entering the 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 premises and its potential to migrate from the premises;
h) At the request of the EPA, monitor surface water leaving the premises; and
i) Ensure the premises is secure.

E2.3 After the licensee's premises cease to be used for the purposes 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 premises, including conducting an assessment of the site and if required remediation of any site contamination.

Environment Protection Licence

Licence - 7654

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

Environment Protection Licence

Licence - 7654

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 described 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*.

Environment Protection Licence

Licence - 7654

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

Ms Cathryn Ferguson

Environment Protection Authority

(By Delegation)

Date of this edition: 25-September-2000

End Notes

1 Licence varied by notice 1011936, issued on 15-Oct-2001, which came into effect on 09-Nov-2001.

2 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>

3 Licence varied by notice 1097525, issued on 20-Feb-2009, which came into effect on 20-Feb-2009.

4 Licence varied by a change to the DECCW region, issued on 01-Sep-2010, which came into effect on 01-Sep-2010.

5 Licence varied by notice 1517796 issued on 03-Oct-2014

6 Licence varied by notice 1543233 issued on 12-May-2017

APPENDIX B

SEARs

Contact: Bianca Thornton
Phone: (02) 8217 2040
Email: bianca.thornton@planning.nsw.gov.au

Mr John Vyse
Bettergrow Pty Ltd
PO Box 945
WINDSOR NSW 2756

Dear Mr Vyse,

State Significant Development – Planning Secretary's Environmental Assessment Requirements
GreenSPOT Hunter Valley Nutrient Recycling Facility, Ravensworth (SSD 9418)

Please find attached the Planning Secretary's Environmental Assessment Requirements (SEARs) for the proposed composting facility for Bettergrow Pty Ltd at 74 Lemington Road, Ravensworth (Lot 10 DP 1204457) in the Singleton local government area (LGA).

The SEARs have been prepared in consultation with the relevant government agencies (see **Attachment 2**), and are based on the information you have provided to date. Please note that the Department has not yet received comments from Rural Fire Service, and these will be provided to you once they have been received.

Please also note that the Department may alter the SEARs at any time. You must consult further with the Department if you do not lodge a development application and Environmental Impact Statement (EIS) for the development within two years of the date of issue of these SEARs.

The Department notes that the site currently operates under a separate consent. The Department prefers operations like the GreenSPOT Hunter Valley Nutrient Recycling Facility to operate under a single, modern planning approval. Consequently, the Department encourages you to develop the project with this preference in mind, and to consider surrendering all existing planning approvals for the facility if the development is approved.

I wish to emphasise the importance of effective and genuine community consultation and the need for the proposal to proactively respond to the community's concerns. Accordingly, you must undertake a comprehensive, detailed and genuine community consultation and engagement process during the preparation of the EIS. This process must ensure that the community is informed of the development and engaged with issues of concern to them. Sufficient information must be provided to the community to enable a good understanding of the development and any potential impacts.

Your development may require separate approval under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise the Department accordingly, as the Commonwealth assessment process may be integrated into the NSW assessment process, and supplementary SEARs may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you intend lodge the EIS and any associated documentation for the development. This will enable the Department to determine the:

- applicable fee (under Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and
- consultation and public exhibition arrangements, including copies and format requirements of the EIS.

If you have any enquiries about these SEARs, please contact Bianca Thornton on the above details.

Yours sincerely

C. Ritchie 11/7/18

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 9418
Development	Expansion of an existing resource recovery facility to process up to 200,000 tonnes per annum of organic material.
Location	74 Lemington Road, Ravensworth (Lot 10 DP 1204457) in the Singleton local government area (LGA)
Applicant	Bettergrow Pty Ltd
Date of Issue	11 July 2018
General Requirements	The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. In addition, the EIS must include a: • detailed description of the development, including: – existing activities carried out on the site and how the site operates lawfully under the *Environmental Planning and Assessment Act 1979* (EP&A Act) including any reliance on existing use rights and/or planning approvals and how these will be consolidated – accurate history of the site, including development consents – need for the proposed development – justification for the proposed development – likely staging of the development - including demolition, construction, and operational stage/s – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works – contributions required to offset the proposal • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • consideration of issues discussed in **Attachment 2** (public authority responses to key issues) • risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (as defined in clause 3 of the *Environmental Planning and Assessment Regulation 2000*) of the proposal, including details of all assumptions and components from which the

	CIV calculation is derived • a close estimate of the jobs that will be created by the development during the construction and operational phases of the development • certification that the information provided is accurate at the date of preparation.
Key Issues	The EIS must address the following specific matters: • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form/s of the consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding occupiers and landowners that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of the consultation. • **Suitability of the Site** – including: – details of all development consents and approved plans for the existing facility, including for all structures, plant and equipment – results of an independent audit of the operation of the existing facility against the conditions of all development consents and all Environment Protection Licences in force in respect of the existing facility to ascertain the baseline of the site – a detailed justification that the site can accommodate the proposed increase in processing capacity, having regard to the scope of the operations of the existing facility and its environmental impacts and relevant mitigation measures. • **Waste Management** – including: – a description of the waste streams that would be accepted at the site including maximum daily, weekly and annual throughputs and the maximum size for stockpiles and any liquid waste storage – a description of waste processing operations (including flow diagrams for each waste stream) including a description of the technology to be installed, resource outputs, and the quality control measures that would be implemented including proposed procedures to ensure general solid waste is not contaminated by restricted, hazardous and/or liquid waste – details of how waste would be stored (including the maximum daily waste storage capacity of the site) and handled on site, and transported to and from the site including details of how the receipt of non-conforming waste, particularly asbestos, would be dealt with – details of the waste tracking system for incoming and outgoing waste – details of the final dispatch locations of waste – details of the waste management strategy for construction and ongoing operational waste generated – the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021*. • **Air Quality and Odour** – including: – a quantitative assessment of the potential air quality, dust and odour impacts of the development in accordance with relevant Environment Protection Authority guidelines. This is to include the identification of existing and potential future sensitive receivers and consideration of approved and/or proposed developments in the vicinity – the details of buildings and air handling systems and strong justification (including quantitative evidence) for any material handling, processing or stockpiling external to a building – a greenhouse gas assessment – details of proposed mitigation, management and monitoring measures.

- **Soil and Water** – including:
  - a description of erosion and sediment controls
  - consideration of salinity and acid sulphate soil impacts
  - an assessment of potential impacts to soil and water resources, topography, hydrology, groundwater, drainage lines, watercourses and riparian lands on or nearby to the site, including mapping and description of existing background conditions and cumulative impacts
  - a detailed site water balance, including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise the use of water at the site
  - characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from waste into the wastewater, proposed mitigation measures to manage any impacts to receiving waters, and monitoring activities and methodologies)
  - details of stormwater/wastewater/leachate management systems including the capacity of onsite detention systems and measures to treat, reuse or dispose of water.
- **Traffic and Transport** – including:
  - details of all traffic types and volumes likely to be generated during construction and operation, including a description of haul routes. Traffic flows are to be shown diagrammatically to a level of detail sufficient for easy interpretation
  - plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network
  - an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model
  - detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian Standards and Council's DCP
  - swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site
  - plans of any proposed road upgrades, infrastructure works or new roads required for the development
  - an assessment of potential impacts on local road pavement lifespan
- **Noise and Vibration** – including:
  - a quantitative assessment of potential demolition, construction, operational and transport noise and vibration impacts in accordance with relevant Environment Protection Authority guidelines
  - details and justification of the proposed noise mitigation and monitoring measures
  - specified times of operation for all phases of the development and for all noise producing activities.
- **Fire and Incident Management** – including:
  - identification of the aggregate quantities of combustible waste products to be stockpiled at any one time
  - technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures
  - detailed information relating to the proposed structures addressing relevant levels of compliance with Volume One of the National Construction Code (NCC)
  - details of how Clauses E.10 and E2.3 of the NCC would be addressed.
- **Hazards** – including:
  - a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous

	materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011). • **Biodiversity** – including: – a detailed assessment of biodiversity impacts of the proposal in accordance with the *Biodiversity Assessment Method* (BAM).
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular, you must consult with: • Singleton Council • Department of Primary Industries • Environment Protection Authority • NSW Rural Fire Service • Mine Subsidence Board • Office of Environment and Heritage • Roads and Maritime Services • the surrounding land owners and occupiers that may be affected by the proposal. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge an EIS for the development within 2 years of the issue date of these SEAR's, you must consult with the Planning Secretary in relation to the requirements for lodgement.
References	The assessment of the key issues listed above must consider relevant guidelines, policies and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.

ATTACHMENT 1
Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.bookshop.nsw.gov.au
http://www.publications.gov.au

Policies, Guidelines & Plans

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
   - the location of the land, boundary measurements, area (sq. m) and north point
   - the existing levels of the land in relation to buildings and roads
   - location and height of existing structures on the site
   - location and height of adjacent buildings and private open space
   - all levels to be to Australian Height Datum (AHD).

2. A locality/context plan drawn at an appropriate scale should be submitted indicating:
   - watercourses including nearby rivers and creeks, and dams
   - significant local features such as heritage items
   - the location and uses of nearby buildings, shopping and employment areas, hospitals and schools
   - traffic and road patterns, pedestrian routes and public transport nodes.

3. An indication of the location of the site with respect to the relevant Land Zoning Map within the *Wyong Local Environment Plan 2013*.

4. Drawings at an appropriate scale illustrating:
   - detailed plans, sections and elevations of the existing building, which clearly show all proposed internal and external alterations and additions.

Documents to be submitted

Documents to submit include:
- 1 electronic copy of all the documents and plans for review prior to exhibition
- other copies as determined by the Department once the development application is lodged.

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.bookshop.nsw.gov.au
http://www.publications.gov.au

Policies, Guidelines & Plans

Aspect	Policy /Methodology
Waste	
	Waste Avoidance and Resource Recovery Strategy 2014-2021 (EPA 2014)
	Waste Classification Guidelines (DECC)
	Environmental Guidelines: Assessment Classification and Management of Non-Liquid and Liquid Waste (EPA)
	Environmental guidelines: Composting and Related Organics Processing Facilities (DEC)
	Environmental guidelines: Use and Disposal of Biosolids Products (EPA)
	Composts, soil conditioners and mulches (Standards Australia, AS 4454)
Air Quality and Odour	
Air Quality	Protection of the Environment Operations (Clean Air) Regulation 2010
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2016)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC 2007)
	The National Greenhouse and Energy Reporting (Measurement) Technical Guidelines (NGER Technical Guidelines)
	Guidelines for Energy Savings Action Plans (DEUS 2005)
Odour	Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006)
	Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC)
Soil and Water	
Soil	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)
	State Environmental Planning Policy No. 55 – Remediation of Land
	Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land (DOP)
	Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites (OEH 2011)
Surface Water	National Water Quality Management Strategy: Water quality management - an outline of the policies (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Policies and principles - a reference document (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Implementation guidelines (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (DEC)
	NSW State Rivers and Estuaries Policy (1993)
	State Water Management Outcomes Plan
	NSW Government Water Quality and River Flow Environmental Objectives (DECC)
	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC)
	Managing Urban Stormwater: Soils & Construction (Landcom)

	Managing Urban Stormwater: Treatment Techniques (DECC)
	Managing Urban Stormwater: Source Control (DECC)
	Technical Guidelines: Bunding & Spill Management (DECC)
Groundwater	National Water Quality Management Strategy: Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	NSW State Groundwater Policy Framework Document 1997 (DLWC)
	NSW State Groundwater Quality Protection Policy 1998 (DLWC)
	NSW State Groundwater Quantity Management Policy 2002 (DLWC)
	The NSW State Groundwater Dependent Ecosystem Policy (DLWC)
	Guidelines for the Assessment and Management of Groundwater Contamination (DECC)
	NSW Aquifer Interference Policy (NOW 2012)
	MDBC Guidelines on Groundwater Flow Modelling 2000
	Australian Groundwater Modelling Guidelines 2012
Wastewater	Environmental Guidelines: Use of Effluent by Irrigation (DECC)
	National Water Quality Management Strategy - Guidelines For Water Recycling: Managing Health And Environmental Risks (Phase1) 2006 (EPHC, NRMMC & AHMC)
	National Water Quality Management Strategy – Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Augmentation of Drinking Water Supplies 2008 (EPHC, NRMMC & AHMC)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC)
	Recycled Water Guidance Document: Recycled Water Management Systems (DPI, 2015)
Traffic and Transport	
	Guide to Traffic Generating Development (RTA)
	Guide to Traffic Management Part 12: Traffic Impacts of Developments (Austroads 2016)
	NSW Long Term Transport Master Plan (TfNSW 2012)
	Road Design Guide (RTA)
Noise and Vibration	
Noise	Noise Policy for Industry (EPA 2017)
	NSW Road Noise Policy (EPA 2011)
	Environmental Criteria for Road Traffic Noise (EPA 1999)
	Interim Construction Noise Guideline (DECC 2009)
Vibration	Assessing Vibration: A Technical Guideline (DEC 2006)
Fire and Incident Management	
	Planning for Bushfire Protection (NSW Rural Fire Service 2006)
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP)
	AS/NZS 4360:2004 Risk Management
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning (DUAP)
	Contaminated Sites – Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report (EPA 2003)
Flora and Fauna	
	NSW Biodiversity Offsets Policy for Major Projects (2014) and the Framework for Biodiversity Assessment
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 4282)
	State Environmental Planning Policy No 64 - Advertising and Signage

ATTACHMENT 2

Public Authority Responses to Request for Key Issues

Transport
Roads & Maritime
Services

CR2018/002558
SF2016/194283
KAP

21 June 2018

Department of Planning & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Attention: Bianca Thornton, Planning Officer

SEARS REQUEST – HUNTER VALLEY NUTRIENT RECYCLING FACILITY EXPANSION, 74 LEMINGTON ROAD, RAVENSWORTH (LOT: 10 DP: 1204457), SSD 9418

Reference is made to Department of Planning and Environment's email received 18 June 2018, requesting Roads and Maritime Services' (Roads and Maritime) requirements under Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

Transport for NSW and Roads and Maritime's primary interests are in the road network, traffic and broader transport issues. In particular, the efficiency and safety of the classified road network, the security of property assets and the integration of land use and transport.

Roads and Maritime have reviewed the Preliminary Environmental Assessment ('PEA'), prepared by Jacobs, dated 14 June 2018. It is understood the proposed development seeks to increase the volume of processed composted material from 74,000 tonnes per annum to 200,000 tonnes per annum, providing additional organic material for the rehabilitation of exhausted Ravensworth mine pits and for sale and supply to local mining and farming operations.

The PEA anticipates that, "*On the basis that all deliveries and compost transfers will require in-bound and out-bound movements the total traffic movements generated from the overall composting facility could be a maximum of 112 movements per day (56 in-bound and 56 out-bound). The actual traffic movements will be less than this due to the use of as many inbound trucks as possible to also take out finished product for delivery to sites.*"

<u>Roads and Maritime response & requirements</u>

Roads and Maritime recommends that the Environmental Impact Statement ('EIS') should refer to the following guidelines with regard to the traffic and transport impacts of the proposed development:

- Road and Related Facilities within the Department of Planning EIS Guidelines, and,
- Section 2 Traffic Impact Studies of Roads and Maritime's *Guide to Traffic Generating Developments 2002*.

Furthermore, a traffic and transport study shall be prepared in accordance with the Roads and Maritime's *Guide to Traffic Generating Developments 2002* and is to include (but not be limited to) the following:

- Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject properties.
- Current traffic counts for all of the traffic routes and intersections.
- The anticipated additional vehicular traffic generated from both the construction and operational stages of the project.
- The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.
- Consideration of the traffic impacts on existing and proposed intersections, in particular, any intersection with the New England Highway, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during both the construction and operational stages. The traffic impact shall also include the cumulative traffic impact of other proposed developments in the area.
- Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development. In this regard, preliminary concept drawings shall be submitted with the EIS for any identified road infrastructure upgrades. However, it should be noted that any identified road infrastructure upgrades will need to be to the satisfaction of Roads and Maritime and Council.
    - Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:
        - Current traffic counts and 10 year traffic growth projections
        - With and without development scenarios
        - 95th percentile back of queue lengths
        - Delays and level of service on all legs for the relevant intersections
        - Electronic data for Roads and Maritime review.
- Any other impacts on the regional and state road network including consideration of pedestrian, cyclist and public transport facilities and provision for service vehicles.

On determination of this matter, please forward a copy of the SEARs to Roads and Maritime for record and / or action purposes. Should you require further information please contact Hunter Land Use on 4924 0688 or by emailing development.hunter@rms.nsw.gov.au.

Yours sincerely

Peter Marler
Manager Land Use Assessment
Hunter Region

DOC18/400935-1
SSD 9418

Ms Bianca Thornton
Planning Officer, Industry Assessments
Department of Planning and Environment
bianca.thornton@planning.nsw.gov.au

Dear Bianca

Input into Secretary's Environmental Assessment Requirements – Hunter Valley Nutrient Recycling Facility Expansion – SSD 9418

I refer to your letter dated 18 June 2018 seeking input into the Secretary's Environmental Assessment Requirements (SEARs) for the expansion of the Hunter Valley Nutrient Recycling, located at 74 Lemington Road (Lot 10 DP 1204457) in Ravensworth. The proposed development is within the Singleton local government area.

The Office of Environment and Heritage (OEH) understands that Bettergrow Pty Ltd (the applicant) are seeking to expand an existing nutrient recycling facility to increase the processing capacity from 74,000 tonnes per annum (tpa) to 200,000 tpa of waste. OEH understands that the proposal is a State Significant Development (SSD 9418) project under the *Environmental Planning and Assessment Act 1979*.

OEH has reviewed the Preliminary Environmental Assessment documents as prepared by Jacobs Group (Australia) Pty Limited (dated 14 June 2018) and has prepared Standard SEARs which are presented in **Attachment A**. There are no project-specific SEARs provided for this project (**Attachment B**). Details of guidance documents are provided in **Attachment C**.

With respect to Aboriginal cultural heritage, OEH notes that any Aboriginal cultural heritage assessment undertaken prior to 2010 is unlikely to meet current OEH Aboriginal cultural heritage guidelines for the assessment of Aboriginal cultural heritage in NSW. The OEH 2011 *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* should be referenced in this instance.

If you have any further questions in relation to this matter, please contact Steve Lewer, Regional Biodiversity Conservation Officer, on 02 4927 3158.

Locked Bag 1002 Dangar NSW 2309
Level 4/26 Honeysuckle Drive Newcastle NSW 2300
rog.hcc@environment.nsw.gov.au
ABN 30 841 387 271
www.environment.nsw.gov.au

Yours sincerely

STEVEN COX

Senior Team Leader - Planning
Hunter Central Coast Branch
Regional Operations Division

02 July 2018

Enclosure: Attachments A, B, C

Attachment A – Standard Environmental Assessment Requirements

Biodiversity

1. Biodiversity impacts related to the proposed development (SSD 9418) are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method.
2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
3. The BDAR must include details of the measures proposed to address the offset obligation as follows;
   - The total number and classes of biodiversity credits required to be retired for the development/project;
   - The number and classes of like-for-like biodiversity credits proposed to be retired;
   - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;
   - Any proposal to fund a biodiversity conservation action;
   - Any proposal to conduct ecological rehabilitation (if a mining project);
   - Any proposal to make a payment to the Biodiversity Conservation Fund.

   If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.
4. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.

Aboriginal cultural heritage

5. The Environmental Impact Assessment (EIS) must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in the Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and consultation with OEH regional branch officers.
6. Consultation with Aboriginal people must be undertaken and documented in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.
7. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.

Historic heritage

8. The EIS must provide a heritage assessment including but not limited to an assessment of impacts to State and local heritage including conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, trees should be assessed. Where impacts to State or locally significant heritage items are identified, the assessment shall:

   a. outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the NSW Heritage Manual (1996),

   b. be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria),

   c. include a statement of heritage impact for all heritage items (including significance assessment),

   d. consider impacts including, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment (as relevant), and

   e. where potential archaeological impacts have been identified develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime as relevant) and include the results of these test excavations.

Water and soils

9. The EIS must map the following features relevant to water and soils including:
   a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).
   b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
   c. Wetlands as described in s4.2 of the Biodiversity Assessment Method.
   d. Groundwater.
   e. Groundwater dependent ecosystems.
   f. Proposed intake and discharge locations.

10. The EIS must describe background conditions for any water resource likely to be affected by the development, including:
   a. Existing surface and groundwater.
   b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
   c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
   d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.

11. The EIS must assess the impacts of the development on water quality, including:
    a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
    b. Identification of proposed monitoring of water quality.

12. The EIS must assess the impact of the development on hydrology, including:
    a. Water balance including quantity, quality and source.
    b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
    c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
    d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.
    f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
    g. Identification of proposed monitoring of hydrological attributes.

Flooding and coastal erosion

13. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    a. Flood prone land.
    b. Flood planning area, the area below the flood planning level.
    c. Hydraulic categorisation (floodways and flood storage areas).

14. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.

15. The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:
    a. Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

16. Modelling in the EIS must consider and document:

    a. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood.
    b. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories.
    c. Relevant provisions of the NSW Floodplain Development Manual 2005.

17. The EIS must assess the impacts on the proposed development on flood behaviour, including:

    a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    b. Consistency with Council floodplain risk management plans.
    c. Compatibility with the flood hazard of the land.
    d. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    e. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    f. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
    g. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council.
    h. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council.
    i. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES.
    j. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

Attachment B – Project specific environmental assessment requirements

Biodiversity - nil
Aboriginal cultural heritage - nil
Historic heritage - nil
Water and soils - nil
Flooding and coastal erosion - nil

Attachment C – Guidance material

Title	Web address
Relevant legislation	
Biodiversity Conservation Act 2016	https://www.legislation.nsw.gov.au/#/view/act/2016/63/full
Coastal Management Act 2016	https://www.legislation.nsw.gov.au/#/view/act/2016/20/full
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
Marine Parks Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Wilderness Act 1987	http://www.legislation.nsw.gov.au/viewtop/inforce/act+196+1987+FIRST+0+N
Biodiversity	
Biodiversity Assessment Method (OEH, 2017)	http://www.environment.nsw.gov.au/resources/bcact/biodiversity-assessment-method-170206.pdf
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	http://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf
NSW Guide to Surveying Threatened Plant	http://www.environment.nsw.gov.au/resources/threatenedspecies/160129-threatened-plants-survey-guide.pdf
Fisheries NSW policies and guidelines	http://www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals/fish-habitat-conservation
List of national parks	http://www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx
Revocation, recategorisation and road adjustment policy (OEH, 2012)	http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm
Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010)	http://www.environment.nsw.gov.au/protectedareas/developmntadjoiningdecc.htm
Heritage	
The Burra Charter (The Australia ICOMOS charter for places of cultural significance)	http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf
Statements of Heritage Impact 2002 (HO & DUAP)	http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/hmstatementsofhi.pdf
NSW Heritage Manual (DUAP) (scroll through alphabetical list to 'N')	http://www.environment.nsw.gov.au/Heritage/publications/

Title	Web address
Aboriginal cultural heritage	
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/10783FinalArchCoP.pdf
Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)	http://www.environment.nsw.gov.au/resources/cultureheritage/20110263ACHguide.pdf
Aboriginal Site Recording Form	http://www.environment.nsw.gov.au/resources/parks/SiteCardMainV1_1.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/resources/cultureheritage/120558asirf.pdf
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Care Agreement Application form	http://www.environment.nsw.gov.au/resources/cultureheritage/20110914TransferObject.pdf
Acid sulphate soils	
Acid Sulfate Soils Planning Maps via Data.NSW	http://data.nsw.gov.au/data/
Acid Sulfate Soils Manual (Stone et al. 1998)	http://www.environment.nsw.gov.au/resources/epa/Acid-Sulfate-Manual-1998.pdf
Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004)	http://www.environment.nsw.gov.au/resources/soils/acid-sulfate-soils-laboratory-methods-guidelines.pdf This replaces Chapter 4 of the Acid Sulfate Soils Manual above.
Flooding and coastal erosion	
Reforms to coastal erosion management	http://www.environment.nsw.gov.au/coasts/coastalerosionmgmt.htm
Floodplain development manual	http://www.environment.nsw.gov.au/floodplains/manual.htm
Guidelines for Preparing Coastal Zone Management Plans	Guidelines for Preparing Coastal Zone Management Plans http://www.environment.nsw.gov.au/resources/coasts/130224CZMPGuide.pdf
NSW Climate Impact Profile	http://climatechange.environment.nsw.gov.au/
Climate Change Impacts and Risk Management	Climate Change Impacts and Risk Management: A Guide for Business and Government, AGIC Guidelines for Climate Change Adaptation
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	www.environment.gov.au/water/publications/quality/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf

Title	Web address
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

Department of Industry

OUT18/9330

Bianca Thornton
Planning Officer
Industry Assessments
NSW Department of Planning and Environment

bianca.thornton@planning.nsw.gov.au

Dear Ms. Thornton

Hunter Valley Nutrient Recycling Facility Expansion – SSD 9418
Comment on the Secretary's Environmental Assessment Requirements (SEARs)

I refer to your email of 18 June 2018 to the Department of Industry (DoI) in respect to the above matter. Comment has been sought from relevant branches of Lands & Water and Department of Primary Industries (DPI), and the following requirements for the proposal are provided:

DoI - Water

- The identification of an adequate and secure water supply for the life of the project. This includes confirmation that water can be sourced from an appropriately authorised and reliable supply. This is also to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Proposed surface and groundwater monitoring activities and methodologies.

Consideration of relevant legislation, policies and guidelines, including: the NSW Aquifer Interference Policy (2012); the *Guidelines for Controlled Activities on Waterfront Land* (Natural Resources Access Regulator 2018); and the relevant Water Sharing Plans (available at http://www.water.nsw.gov.au/).

Any further referrals to Department of Industry can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

Yours sincerely

Alison Collaros
A/Manager, Assessment Advice
2 June 2018

Planning & Environment
Resources & Geoscience

2 July 2018

Bianca Thornton
Planning Officer
Industry Assessments

Your Reference: V18/3344#1
Our Reference: DOC18/442826

Emailed: Bianca.Thornton@planning.nsw.gov.au

Dear Bianca,

Re: Request for Secretary's Environmental Assessment Requirements – Hunter Valley Nutrient Recycling Facility Expansion – SSD 9418

I refer to your email of 19-Jun-2018 requesting advice on issues concerning the preparation of Secretary's Environmental Assessment Requirements for the above project. Thank you for the opportunity to provide advice on the Hunter Valley Nutrient Recycling Facility Expansion. This is a response from the NSW Department of Planning & Environment – Division of Resources & Geoscience, Geological Survey of New South Wales (GSNSW). The Department of Primary Industries (incorporating advice from Agriculture and Fisheries) and the Forestry Corporation of NSW may respond separately.

Mineral Resources Requirements

Identification and assessment of impacts on other land users is required as a critical component of the Environmental Assessment (EA) process. Specifically, the EA must consider the potential for the proposed project to impact upon any State or regionally significant mineral resources, including metallic minerals, industrial and extractive minerals, petroleum, gas and coal resources. A significant characteristic of the process of mineral resource evaluation and development is that the final definition of economically mineable Reserves from within the larger area of a known resource cannot be predicted. This makes it imperative that known resources are protected from resource sterilisation which may arise from approval of incompatible zoning or development proposals in locations which are coincident with, or in close proximity to, known resources.

To assist the assessment of the potential for resource sterilisation, the GSNSW requires the proponent to consider and report on the potential impacts of the project upon any State or regionally significant resources or areas of State or regionally significant resource potential as part of the EA, including:

- **Any operating mines, extractive industries or known resources of metalliferous, industrial or extractive minerals, petroleum, gas or coal.**

NSW Department of Planning and Environment
DIVISION of RESOURCES & GEOSCIENCE
PO Box 344 Hunter Region Mail Centre NSW 2310
E: landuse.minerals@geoscience.nsw.gov.au
Tel: 02 4063 6500
ABN 38 755 709 681

- **Exploration activities near the proposed development.**

- **Access for future exploration in the area.**

Specific Issues

GSNSW notes that this is an existing operation which is working both sequentially to, and in conjunction with, coal mining activities within the Hunter Coalfield. GSNSW does not consider the current activities, or the proposed expansion, to be a significant sterilization risk to remaining coal resources within the proposal area.

Current GSNSW records show a significant number of current Coal mining and exploration authorities within the proposal area, with a complex ownership structure. Evidence of permission to operate within the bounds of these authorities will need to be provided in the Environmental Assessment for each of the impacted authorities / title holders.

GSNSW are available for consultation in relation to the location of areas of State or regionally significant resources or resource potential. Any requests for consultation should be directed to the Division of Resources & Geoscience - Land Use team at landuse.minerals@geoscience.nsw.gov.au.

Geoscience Information Services

The GSNSW has a range of online data related to mineral exploration, land use and general geoscience topics:
http://www.resources.nsw.gov.au/geological/online-services

The location of current exploration and mining titles in NSW, explanations of mining and production titles and the roles of community and government in the decision-making process for mining/resource projects may be accessed by the general public using the following online utilities:

http://commonground.nsw.gov.au

https://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/geoscience-information/services/online-services/minview

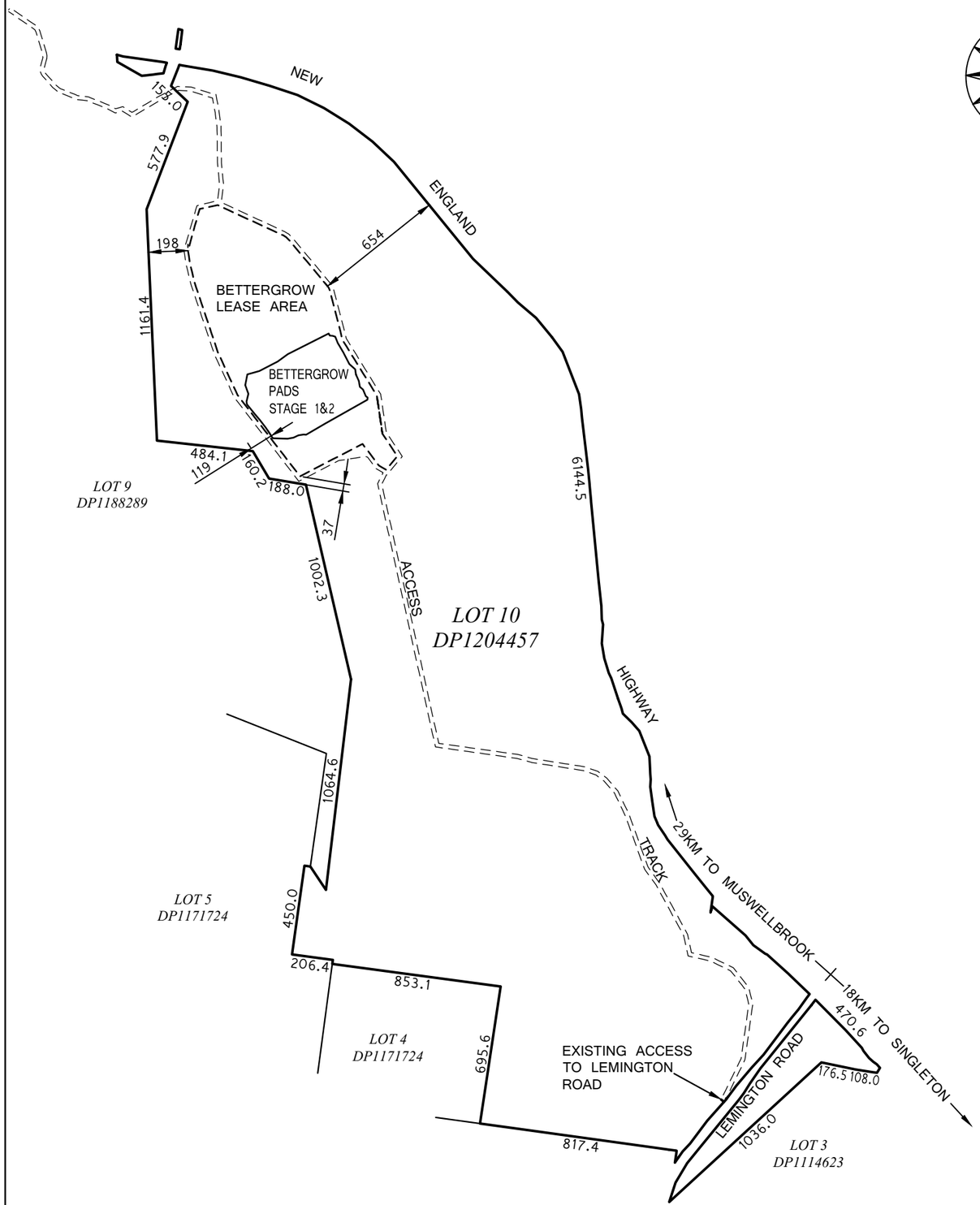
Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the Division of Resources & Geoscience - Land Use team at landuse.minerals@geoscience.nsw.gov.au.

Yours sincerely

Paul Dale
Director – Land Use & Titles Advice
DIVISION OF RESOURCES & GEOSCIENCE

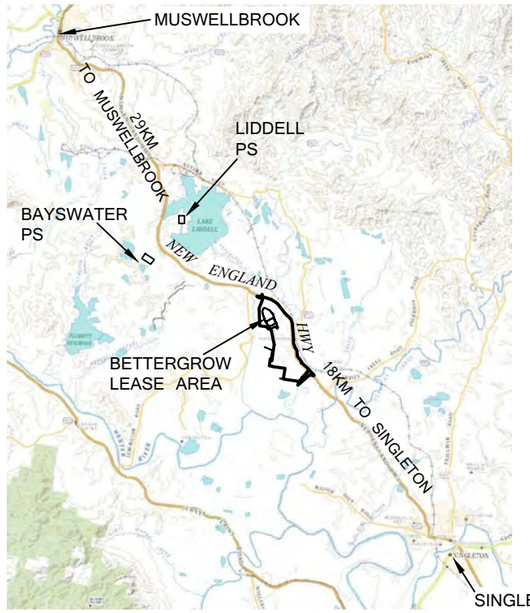
APPENDIX C

Existing / proposed surface water infrastructure design drawings



LOCATION MAP

SCALE 1:400000



TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS			REVISION NOTES		TITLE
BETTERGROW	SURVEYORS REF.	SCALE	SHEET SIZE	18/7/2016 ORIGINAL	0	BETTERGROW RAVENSWORTH COMPOSTING FACILITY SHEET 1 OF 6 GENERAL ARRANGEMENT
	14-32	1:25000	A3			
	DATE OF SURVEY: 23 FEBRUARY 2016					

EXISTING ROAD

PAD

USABLE

OF

LIMIT

1.2%

0.5%

1.3%

1.6%

3.0%

DISSUSED & CAPPED

TOTAL PAD AREA 202150m³

1.5%

3.3%

ASH DAM (VOID 3

0.5%

2.6%

1.2%

1.5%

EXISTING ASH DAM EMBANKMENT

0.7%

0.7%

EXISTING SPILLWAY

LOWER ASH DAM

(DISSUSED AND CAPPED)

EXISTING SPILLWAY CHANNEL

EXISTING EMBANKMENT

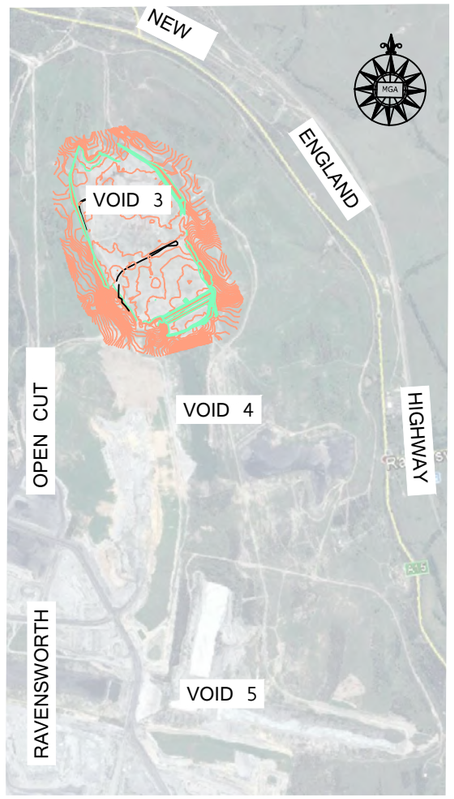
LOWER BASIN

VOID 4

MGA

LOCATION MAP

SCALE 1:40000



NOTES

CONTOURS WITHIN THE PAD & PROPOSED DETENTION BASIN ARE DERIVED FROM ACCURATE SURVEY DATA. CONTOURS OVER EXTERNAL AREA INCLUDING THE LOWER BASIN, ARE DERIVED FROM LIDAR DATA AND ARE NOT ACCURATE.

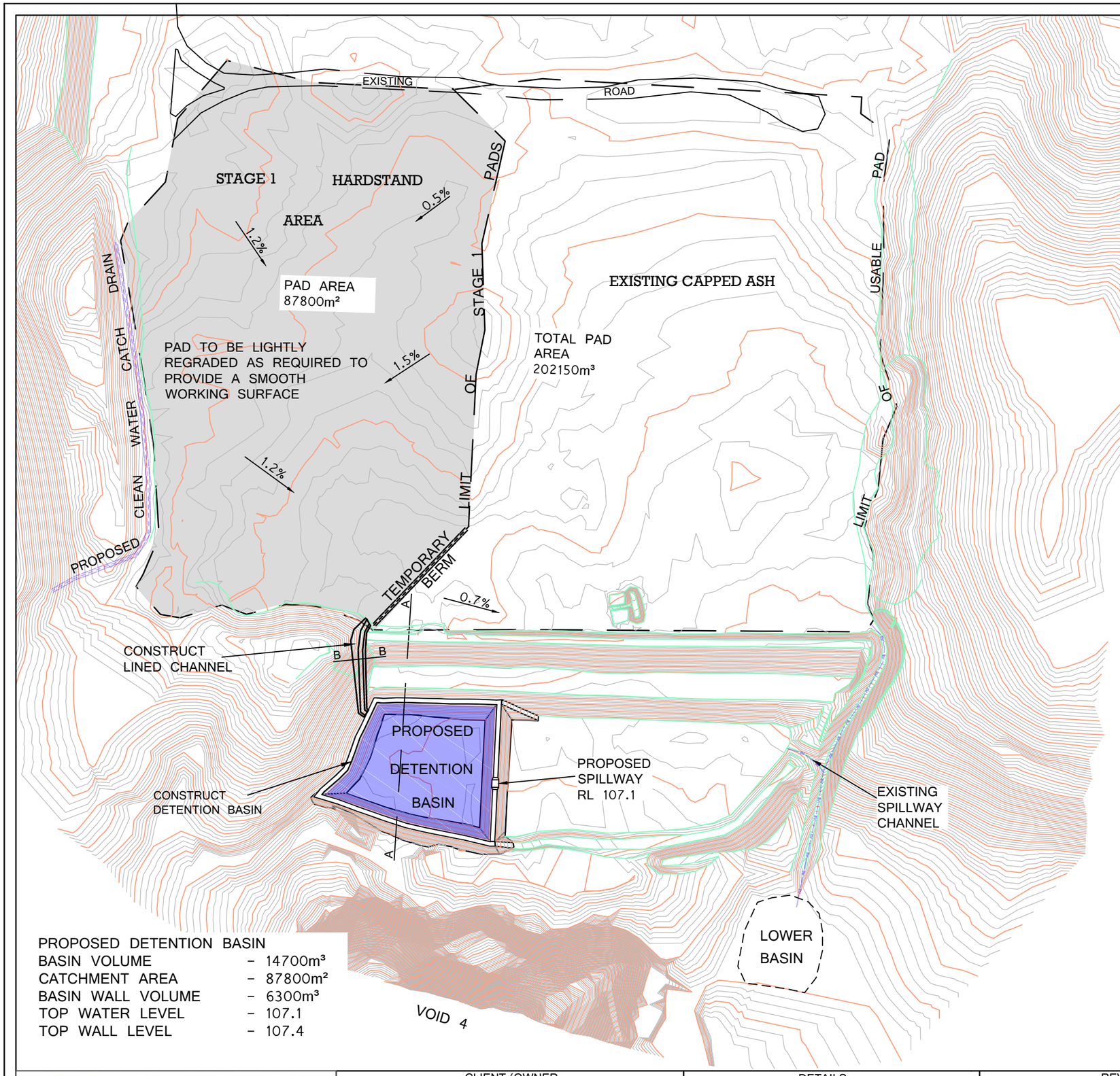
TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS		
	SURVEYORS REF.	SCALE	SHEET SIZE
BETTERGROW	14-32	1:3000	A3
	DATE OF SURVEY: 23 FEBRUARY 2016		

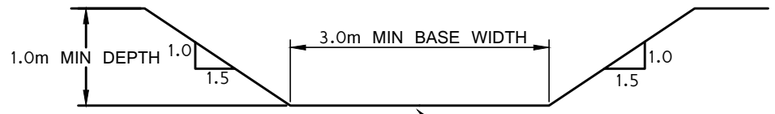
REVISION NOTES	
18/7/2016 ORIGINAL	0

TITLE

BETTERGROW RAVENSWORTH COMPOSTING FACILITY
SHEET 2 OF 6
EXISTING ARRANGEMENT



TYPICAL CHANNEL SECTION "B-B"



CHANNEL TO BE LINED BY SHOTCRETE, DETAILS TO BE CONFIRMED BY CONTRACTOR

PROPOSED DETENTION BASIN

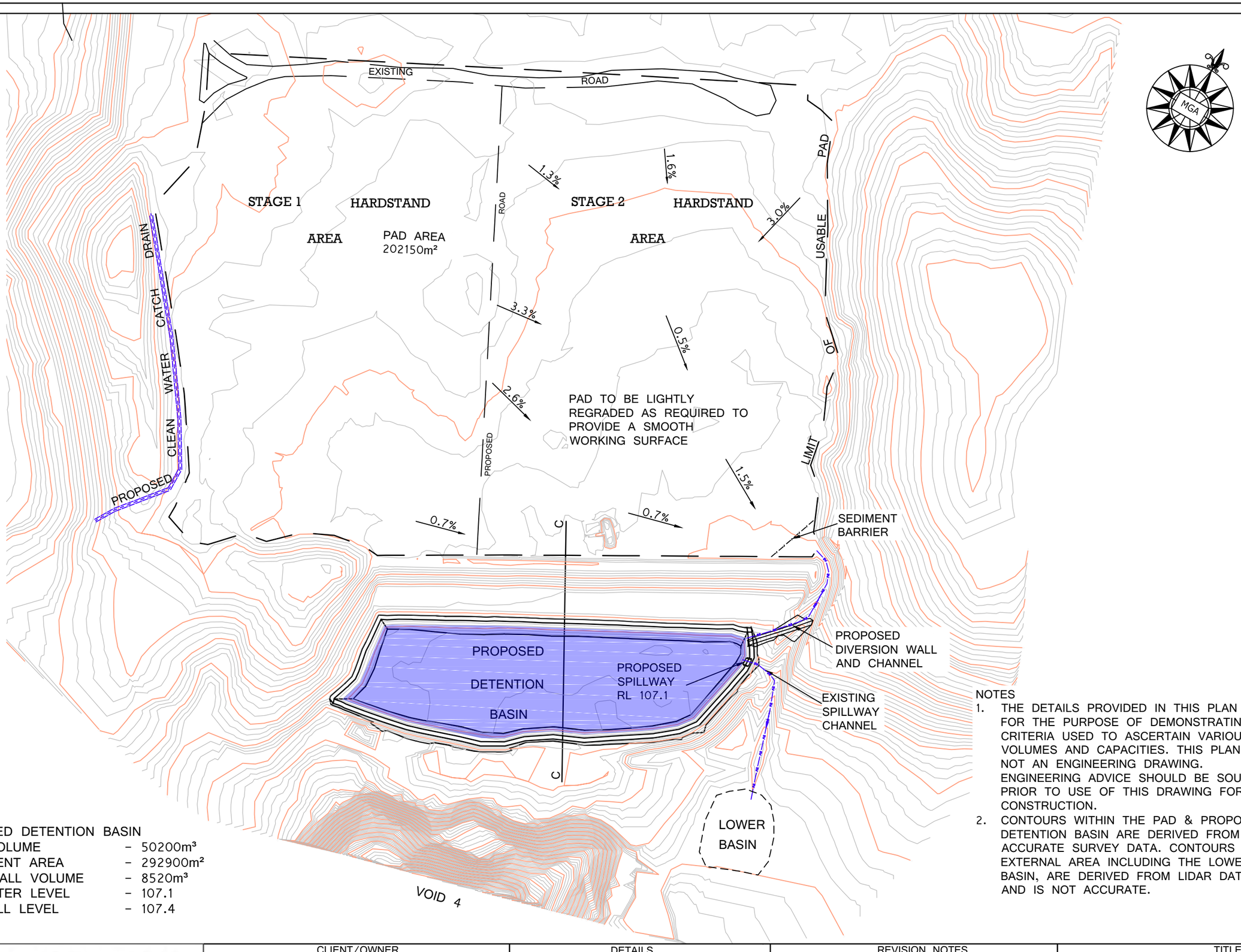
BASIN VOLUME	-	14700m³
CATCHMENT AREA	-	87800m²
BASIN WALL VOLUME	-	6300m³
TOP WATER LEVEL	-	107.1
TOP WALL LEVEL	-	107.4

NOTES

1. THE DETAILS PROVIDED IN THIS PLAN ARE FOR THE PURPOSE OF DEMONSTRATING CRITERIA USED TO ASCERTAIN VARIOUS VOLUMES AND CAPACITIES. THIS PLAN IS NOT AN ENGINEERING DRAWING. ENGINEERING ADVICE SHOULD BE SOUGHT PRIOR TO USE OF THIS DRAWING FOR CONSTRUCTION.
2. CONTOURS WITHIN THE PAD & PROPOSED DETENTION BASIN ARE DERIVED FROM ACCURATE SURVEY DATA. CONTOURS OVER EXTERNAL AREA INCLUDING THE LOWER BASIN, ARE DERIVED FROM LIDAR DATA AND IS NOT ACCURATE.

TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS			REVISION NOTES		TITLE
BETTERGROW	SURVEYORS REF.	SCALE	SHEET SIZE	18/7/2016 ORIGINAL	0	BETTERGROW RAVENSWORTH COMPOSTING FACILITY SHEET 3 OF 6 STAGE 1 WORKS
	14-32	1:3000	A3			
	DATE OF SURVEY: 23 FEBRUARY 2016					



PROPOSED DETENTION BASIN

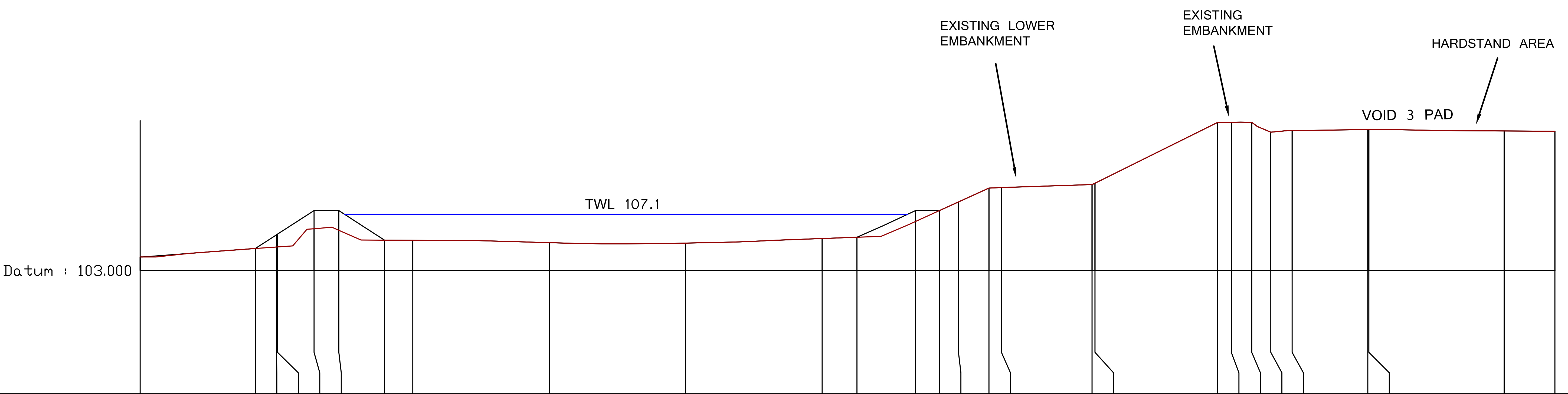
BASIN VOLUME	-	50200m³
CATCHMENT AREA	-	292900m²
BASIN WALL VOLUME	-	8520m³
TOP WATER LEVEL	-	107.1
TOP WALL LEVEL	-	107.4

NOTES

1. THE DETAILS PROVIDED IN THIS PLAN ARE FOR THE PURPOSE OF DEMONSTRATING CRITERIA USED TO ASCERTAIN VARIOUS VOLUMES AND CAPACITIES. THIS PLAN IS NOT AN ENGINEERING DRAWING. ENGINEERING ADVICE SHOULD BE SOUGHT PRIOR TO USE OF THIS DRAWING FOR CONSTRUCTION.
2. CONTOURS WITHIN THE PAD & PROPOSED DETENTION BASIN ARE DERIVED FROM ACCURATE SURVEY DATA. CONTOURS OVER EXTERNAL AREA INCLUDING THE LOWER BASIN, ARE DERIVED FROM LIDAR DATA AND IS NOT ACCURATE.

TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS			REVISION NOTES		TITLE
BETTERGROW	SURVEYORS REF.	SCALE	SHEET SIZE	18/7/2016 ORIGINAL	0	BETTERGROW RAVENSWORTH COMPOSTING FACILITY SHEET 4 OF 6 STAGE 2 WORKS
	14-32	1:3000	A3			
	DATE OF SURVEY: 23 FEBRUARY 2016					

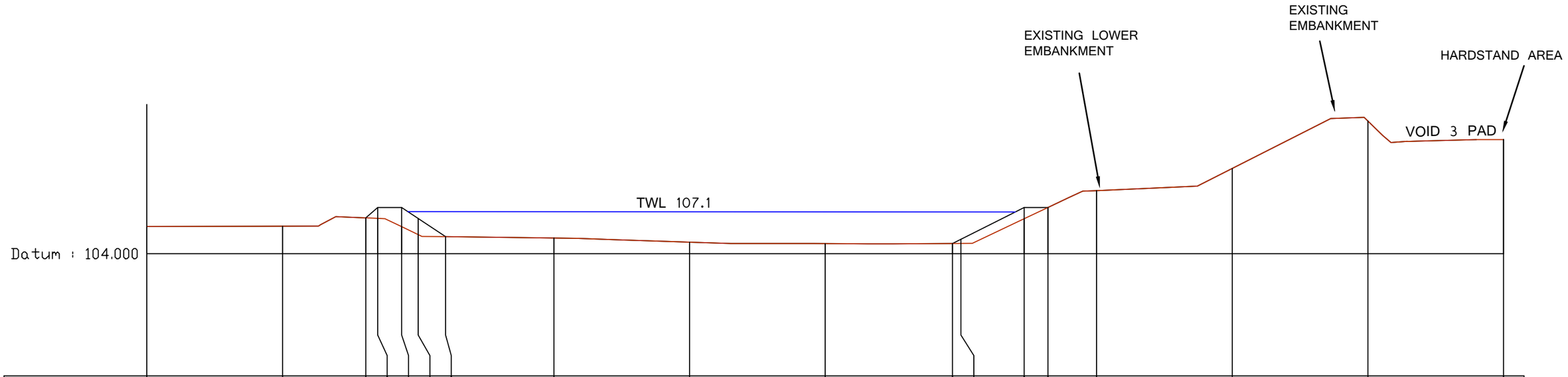


EXISTING SURFACE Elevation	104.000	104.615	104.728	104.733	106.069	105.951	105.234	105.221	105.045	105.012	105.348	105.441	106.600	107.400
DESIGN Elevation	104.000	104.615	105.618	105.668	107.400	107.400	105.234	105.221	105.045	105.012	105.348	105.441	107.400	107.400
DESIGN Fill			0.891	0.935	1.331	1.449							0.800	
Distance	0.000	16.893	20.000	20.153	25.519	29.132	35.845	40.000	60.000	80.000	100.000	105.107	113.704	117.209

EXISTING SURFACE Elevation	108.037	109.055	109.086	109.302	109.409	113.868	113.883	113.882	113.151	113.268	113.354	113.356	113.242	113.221
DESIGN Elevation	108.037	109.055	109.086	109.302	109.409	113.868	113.883	113.882	113.151	113.268	113.354	113.356	113.242	113.221
DESIGN Fill														
Distance	120.000	124.464	126.302	139.565	140.000	157.964	160.000	162.992	165.784	168.922	180.000	180.154	200.000	207.451

TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS			REVISION NOTES		TITLE
BETTERGROW	SURVEYORS REF.: 14-32	SCALE: H 1:600 V 1:300	SHEET SIZE: A3	18/7/2016 ORIGINAL	0	BETTERGROW RAVENSWORTH COMPOSTING FACILITY SHEET 5 OF 6 CROSS SECTION "A-A"
	DATE OF SURVEY: 23 FEBRUARY 2016					



EXISTING SURFACE Elevation	106.003	106.024	106.635	106.599	105.988	105.406	105.252	105.151	104.850	104.737	104.753	104.757	106.573	107.400	108.640	110.277	113.770	112.416
DESIGN Elevation			106.635	107.400	107.400	106.588	105.252				104.753	105.063	107.400	107.400				
DESIGN Fill				0.801	1.412	1.182					0.000	0.306	0.827					
Distance	0.000	20.000	32.271	34.039	37.554	40.000	44.025	60.000	80.000	100.000	118.764	120.000	129.340	132.840	140.000	160.000	180.000	200.000

TONY MEXON & ASSOCIATES
REGISTERED SURVEYORS

CLIENT/OWNER	DETAILS			REVISION NOTES		TITLE
BETTERGROW	SURVEYORS REF.	SCALE	SHEET SIZE	18/7/2016 ORIGINAL	0	BETTERGROW RAVENSWORTH COMPOSTING FACILITY SHEET 6 OF 6 CROSS SECTION "C-C"
	14-32	H 1:600 V 1:300	A3			
	DATE OF SURVEY: 23 FEBRUARY 2016					

APPENDIX D

EPL 7654 annual return
Void 4 water quality testing results

ANNUAL RETURN

LICENCE NO	**7654**
LICENCE HOLDER	BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED
REPORTING PERIOD	22-Jun-2017 to 21-Jun-2018

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

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

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

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 21-Aug-2018

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

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

- **the issue of a Penalty Notice for $1500 (individuals) or $3000 (corporations);**

OR

- **prosecution.**

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

Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF $250,000 FOR A CORPORATION OR $120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997*.

Use the checklist below to ensure that you have completed your Annual Return correctly.
(✓ the boxes)

CHECKLIST		
☑	Section A:	All licence details are correct
☑	Section B1:	You have entered the correct number in the complaints table
☑	Section B2 – B3:	If there are tables, you have provided the required details
☑	Section C:	You have answered question 1, and 2 if applicable
☑	Section D:	If applicable, you have completed all load calculation worksheets
☑	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
☑	Section F:	You have answered question 1, 2 and 3 if applicable
☑	Section G:	You have answered question 1 and question 2, 3 and 4 or question 5 through to 11 if applicable
☑	Section H:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
☑	Make a copy of the completed Annual Return and keep it with your licence records	

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

Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232

A Statement of Compliance - Licence Details

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

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

Licence variation and transfer application forms are available on the EPA website at: http://www.epa.nsw.gov.au/licensing, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number	7654
Licence Holder	BIO-RECYCLE AUSTRALIA PROPRIETARY LIMITED
Trading Name *(if applicable)*	
ABN	62 062 888 082

A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	"RAVENSWORTH"
Premises	74 LEMINGTON ROAD RAVENSWORTH NSW 2330

A3 Activities to which Licence Applies

Composting

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

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

Fee-based activity	Activity scale	Unit of measure
Composting	> 50,000.00	T annual capacity to receive organics

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period. **If no complaints were received enter nil in the attached box, otherwise complete the table below.**	NIL

Pollution Complaint Category	Number of Complaints
Air	
Water	
Noise	
Waste	
Other	

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.
Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

→ Dam empty on 1st Sample dated
3 date sample taken Bottom Corner of Dam (Not much water)

Monitoring Point 1 Only once sample could be taken

Leachate dam characterisation, South of site

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample 1	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	3	1		183	

Ammonia	milligrams per litre	3	1		.17	
Calcium	milligrams per litre	3	1		190	
Chloride	milligrams per litre	3	1		640	
Electrical conductivity	microsiemens per centimetre	3	1		2191	
Fluoride	milligrams per litre	3	1		.14	
Iron	milligrams per litre	3	1		1.5	
Magnesium	milligrams per litre	3	1		120	
Manganese	milligrams per litre	3	1		.33	
Nitrogen (total)	milligrams per litre	3	1		19	
pH	pH	3	1		7.11	
Phosphorus	milligrams per litre	3	1		.86	
Polycyclic aromatic hydrocarbons	milligrams per litre	3	1		<1	
Potassium	milligrams per litre	3	1		160	
Sodium	milligrams per litre	3	1		390	
Sulfate	milligrams per litre	3	1		1000	
Total organic carbon	milligrams per litre	3	1		140	

Total petroleum hydrocarbons	milligrams per litre	3	1		< 50	
Total Phenolics	milligrams per litre	3	1		.01	
Total suspended solids	milligrams per litre	3	1		315	

Discharge & Monitoring Point 2 No Discharge No Samples could be Taken

Leachate dam emergency spillway, Northeast corner of leachate dam

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value *
Alkalinity (as calcium carbonate)	milligrams per litre					
Ammonia	milligrams per litre					
Calcium	milligrams per litre					
Chloride	milligrams per litre		* See Notes			
Electrical conductivity	microsiemens per centimetre					
Fluoride	milligrams per litre					
Iron	milligrams per litre					
Magnesium	milligrams per litre					
Manganese	milligrams per litre					
Nitrogen (total) *	milligrams per litre					

pH	pH					*
Phosphorus	milligrams per litre					
Polycyclic aromatic hydrocarbons	milligrams per litre					
Potassium	milligrams per litre					
Sodium	milligrams per litre		* Note			
Sulfate	milligrams per litre	See				
Total organic carbon	milligrams per litre					
Total petroleum hydrocarbons	milligrams per litre					
Total Phenolics *	milligrams per litre					
Total suspended solids	milligrams per litre					

Monitoring Point 3

Process water tank, Eastern edge of premises

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Boron	milligrams per litre	3	3	3	3.3	3.8
Cadmium	milligrams per litre	3	3	.0006	.46	.6
Copper	milligrams per kilogram	3	3	1	1	1

Electrical conductivity	microsiemens per centimetre	3	3	3660	5083	7070
Iron	milligrams per litre	3	3	.042	10-34	19
Molybdenum	milligrams per litre	3	3	.410	.400	.440
Nickel	milligrams per litre	3	3	.008	.0083	.009
pH	pH	3	3	8.36	8.51	8.64
Silver	milligrams per litre	3	3	<.001	<.001	<.001
Total suspended solids	milligrams per litre	3	3	5	14	21

Discharge & Monitoring Point 4 ⊗ NO WATER in SEDIMENT BASIN

Sediment Basin, Sediment Basin outlet - TBC

NO SAMPLE COULD BE TAKEN

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample ⊗	Highest sample value
Ammonia	milligrams per litre					
Electrical conductivity	microsiemens per centimetre					
Nitrogen (total)	milligrams per litre	See Note				
pH	pH					
Total organic carbon ⊗	milligrams per litre					
Total petroleum hydrocarbons	milligrams per litre					

Total suspended solids	milligrams per litre	See note				

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, **no tables** will appear below.

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

N/A

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☑ the boxes)

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

(✓ a box)

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

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

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

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

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

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

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

e) What were the registrati on numbers of any vehicles or the chassis number of any mobile plant involved in the non -compliance?

f) What was the cause of the non -compliance?

g) What action has been, or will be, taken to mitigate any adverse effects of the non -compliance?

h) What action has been, or will be, taken to prevent a recurrence of the non -compliance?

3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section G of this Annual Return

C2 Details of Non-Compliance with Licence NIL

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

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

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

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

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box) ☐ Yes ☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Is the PIRMP available at the premises?

(✓ a box) ☐ Yes ☐ No

3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box) ☐ Yes ☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address: www.bettergrow.com.au Contact Page

4 Has the PIRMP been tested in the last 12 months?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on: 09/10/2017

+ 14/4/2018

5 Has the PIRMP been updated?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on: 03/05/2018

6 How many times has the PIRMP been activated in this reporting period? 2

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on: __/__/____ as above 9/10/2017 + 14/4/2018

The EPA's guidelines for preparation of pollution incident response management plans are available at

http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm

F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box) ☑ Yes ☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box) ☑ Yes ☐ No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box) ☐ Yes ☑ No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address

The EPA's written requirements for publishing pollution monitoring data are available at http://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

G Statement of Compliance - Environmental Management Systems and Practices

1 Do you have an environmental management system (EMS) certified to ISO 14001 or any other demonstrated equivalent system[1]? (see note below on demonstrated equivalent)

(✓ a box) ☐ Yes ☑ No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

2 When was the last check of the EMS[2] completed (see note below on check of EMS)? __/__/____

3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box) ☐ Yes ☐ No

4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box) ☐ Yes ☐ No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to http://www.epa.nsw.gov.au/licensing/EMCP.htm for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box) ☑ Yes ☐ No

6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box) ☑ Yes ☐ No

7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box) ☑ Yes ☐ No

8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box) ☑ Yes ☐ No

9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box) ☑ Yes ☐ No

10 Have you established and implemented an environmental improvement or management plan?

(✓ a box) ☑ Yes ☐ No

11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this

(✓ a box) ☑ Yes ☐ No

[1] Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:
http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf

[2] Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

Revised Return Declaration Form

This declaration may only be signed by a person(s) with legal authority to sign it.

The various ways in which the Annual Return/declaration may be signed, and the people who may sign the annual Return/declaration, are set out in the categories below.

Please tick (✓) the box next to the category that describes how this declaration is being signed. If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700

If the licence holder is	the Annual Return must be signed and certified:
an individual	☐ by the individual licence holder, or ☐ by a person approved in writing by the EPA to sign on the licence holder's behalf
a company	☐ by affixing the common seal in accordance with the Corporations Act 2001, or ☐ by 2 directors, or ☐ by a director and a company secretary, or ☒ if a proprietary company that has a sole director who is also the sole company secretary – by that director, or ☐ by a person delegated to sign on the company's behalf in accordance with the Corporations Act 2001 **and** approved in writing by the EPA to sign on the company's behalf.
a public authority (other than a council)	☐ by the Chief Executive Officer of the public authority, or ☐ by a person delegated to sign on the public authority's behalf in accordance with its legislation **and** approved in writing by the EPA to sign on the public authority's behalf.
a local council	☐ by the General Manager in accordance with s.377 of the Local Government Act 1993, or ☐ by affixing the seal of the council in a manner authorised under that Act

PLEASE TICK THE APPROPRIATE BOX AND SIGN ACCORDINGLY

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of $250,000 for a corporation or $120,000 for an individual..

I/We

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

SIGNATURE: _____

NAME:

(printed) NEIL SCHEMBRI

POSITION: SOLE DIRECTOR SECRETARY

DATE: 21/ 08/ 18

SIGNATURE: _____

NAME:

(printed) _____

POSITION: _____

DATE: ____/____/____

SEAL (if signing under seal)

Reporting Period 22 / 06 / 17 to 21 / 06 / 18

Licence Number 7654

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

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

Better Grow
PO Box 945
WINDSOR NSW 2756

Attention Mr John Vyse

Project:	RCA ref 12802-703/0		
Date:	1/03/2018		
Client reference:	Better Grow February 2018		
Received date:	15/02/2018	**Number of samples:**	1
Client order number:	N/A	**Testing commenced:**	15/03/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS/ NON NATA
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA
pH	ENV-LAB006*	pH unit	RCA Laboratories- Environmental	NATA
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA
Trace Metals (Total) in Water by ICPMS	AN022/AN318	mg/L	SGS	NATA

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

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

Tests Subcontracted Lab No's WN175608-001 (NATA Accreditation No.825).
The results stated in this report relate only to the sample(s) as submitted by the Client.

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	021812825002
Date sampled	-	14/02/2018
Sampled By	-	Client
Conductivity	µS/cm	4520
pH	pH unit	8.36
Total Suspended Solids	mg/L	<5
Total Boron	µg/L	3800
Total Cadmium	µg/L	0.7
Total Copper	µg/L	1
Total Silver	µg/L	<1
Total Iron	µg/L	12
Total Molybdenum	µg/L	440
Total Nickel	µg/L	8

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA. Analysis on samples is on an as received basis.

Appendix 1

Internal Laboratory Analysis Report and Chain of Custody Documentation

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

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

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-PC040	pH unit	RCA Laboratories- Environmental	NATA	±0.54
Conductivity	ENV-PC040	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories - Environmental	NATA	±6.41

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

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	021812825002
Date sampled	-	14/02/2018
Sampled By	-	Client
Conductivity	µS/cm	4520
pH	pH unit	8.36
Total Suspended Solids	mg/L	<5

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

Shaded area analysis not required

Water

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

Analysis on samples is on an as received basis

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
15/02/2018	pH	ENV-PC040	pH	7.00	6.95 - 7.05	7.00
15/02/2018	Total Suspended Solids	ENV-LAB009	mg/L	75	67.5 – 82.5	68
15/02/2018	Conductivity	ENV-PC040	µS/cm	1413	1385 - 1441	1411

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
021812825001	15/02/2018	pH	ENV-PC040	pH	-	8.36	8.46
021812825001	15/02/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	<5	<5
021812825001	15/02/2018	Conductivity	ENV-PC040	µS/cm	1	4520	4320

Please contact the undersigned if you have any queries.

Yours sincerely

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

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

RCA Internal Quality Review

General

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

Holding Times.

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

Receipt Acknowledgment.

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

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

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

QC - ACCEPTANCE CRITERIA

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

Results <10 times the LOR: No Limit

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

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

QC DATA GENERAL COMMENTS

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

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

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

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

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

mg/L: milligrams per Litre

TERMS

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

LOR Limit of Reporting.

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

QCS Quality Control Sample - reported as value recovery

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

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

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

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

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

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

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

< indicates less than

> Indicates greater than

ND Not Detected

RCA LABORATORIES
• ENVIRONMENTAL • CONSTRUCTION MATERIALS TESTING

Ph: (02) 4902 9200 Fax: 02 4902 9299
92 Hill Street, Carrington NSW 2294
www.rca.com.au Email: labenviro@rca.com.au

ENV-F

Client Name: Better Grow
Client Site: Ravensworth

Contact Name:
Phone Number:

Email Report To: chris@bettergrow.com.ai
Project Manager:

Turnaround Required: ☐ Urgent ☐ Standard (5 Day)

Date Required: standard

Expected Reporting Date:
(Laboratory Use Only)

ANALYSIS REQUIRED

Page of

RCA Job Number: 12825

SAMPLE INFORMATION

RCA Laboratories Environmental Sample Number	Client ID / Description	Date	Matrix	Total Samples	pH EC	TSS	TOC	Alkalinity	Ammonia	Chloride & Sulphate	Calcium Fluoride Iron Magnesium Manganese Sodium Potassium	Total phenolics and Nitrogen	Phosphorus	PAH&TPH	Phosphorus	Boron Cadmium Copper Silver Iron Molybdenum Nickle	Notes:
021712825001	water tank	14/02/18	w		x	x										x	

RELINQUISHED BY		RECEIVED BY		Laboratory use only (circle appropriate)
Name:Corrier	Date:15/2/18	Name:K Hawes	Date: 15/2/18	**Received in good condition:** Yes
Of:	Time: 11.25	Of:Rca-le	Time:11.30	**Chilled:** Yes

ENV-F

Appendix 2

External Laboratory Reports and Chain of Custody Documentation

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Laura Schofield
Client	RCA AUSTRALIA
Address	PO BOX 175 NSW 2294
Telephone	61 2 49029200
Facsimile	61 2 49029299
Email	lauras@rca.com.au
Project	**12825**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE175608 R0**
Date Received	16 Feb 2018
Date Reported	21 Feb 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Kamrul Ahsan
Senior Chemist

Parameter	Units	LOR	Sample Number SE175608.001 Sample Matrix Water Sample Date 14 Feb 2018 Sample Name 021812825001 Point 3 water tank
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 21/2/2018			
Total Boron	µg/L	5	**3800**
Total Cadmium	**µg/L**	**0.1**	**0.7**
Total Copper	**µg/L**	**1**	**1**
Total Iron	**µg/L**	**5**	**12**
Total Molybdenum	**µg/L**	**1**	**440**
Total Nickel	**µg/L**	**1**	**8**
Total Silver	**µg/L**	**1**	**<1**

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals (Total) in Water by ICPMS **Method: ME-(AU)-[ENV]AN022/AN318**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MS %Recovery
Total Boron	LB141932	µg/L	5	<5	107%	
Total Cadmium	LB141932	µg/L	0.1	<0.1	110%	
Total Copper	LB141932	µg/L	1	<1	112%	
Total Iron	LB141932	µg/L	5	<5	NA	NA
Total Molybdenum	LB141932	µg/L	1	<1	98%	
Total Nickel	LB141932	µg/L	1	<1	107%	
Total Silver	LB141932	µg/L	1	<1	100%	

METHOD SUMMARY

SE175608 R0

METHOD	METHODOLOGY SUMMARY
AN022	The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E.
AN022/AN318	Following acid digestion of un filtered sample, determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE175608 R0

CLIENT DETAILS

Contact	Laura Schofield
Client	RCA AUSTRALIA
Address	PO BOX 175 NSW 2294
Telephone	61 2 49029200
Facsimile	61 2 49029299
Email	lauras@rca.com.au
Project	**12825**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE175608 R0**
Date Received	16 Feb 2018
Date Reported	21 Feb 2018

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	1 Water
Date documentation received	16/2/2018	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.4°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE175608 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
021812825001 Point 3	SE175608.001	LB141932	14 Feb 2018	16 Feb 2018	13 Aug 2018	21 Feb 2018	13 Aug 2018	21 Feb 2018

SURROGATES

SE175608 R0

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]AN022/AN318

Sample Number	Parameter	Units	LOR	Result
LB141932.001	Total Boron	µg/L	5	<5
	Total Cadmium	µg/L	0.1	<0.1
	Total Copper	µg/L	1	<1
	Total Molybdenum	µg/L	1	<1
	Total Nickel	µg/L	1	<1
	Total Silver	µg/L	1	<1

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No duplicates were required for this job.

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB141932.002	Total Boron	µg/L	5	21	20	80 - 120	107
	Total Cadmium	µg/L	0.1	22	20	80 - 120	110
	Total Copper	µg/L	1	22	20	80 - 120	112
	Total Molybdenum	µg/L	1	20	20	80 - 120	98
	Total Nickel	µg/L	1	21	20	80 - 120	107
	Total Silver	µg/L	1	20	20	80 - 120	100

MATRIX SPIKES

SE175608 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE175543.001	LB141932.004	Total Iron	µg/L	5	420	430	-	-

MATRIX SPIKE DUPLICATES

SE175608 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

RCA LABORATORIES
• ENVIRONMENTAL •
CONSTRUCTION MATERIALS TESTING

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92 Hill Street, Carrington NSW 2294
www.rca.com.au Email: labenviro@rca.com.au

ENV-F103-4

Client Name: RCA
Client Site: Ravensworth

Contact Name: Laura Schofield
Phone Number: 403699112

Email Report To: lauras@rca.com.au
Project Manager:

Turnaround Required: ☐ Urgent ☐ Standard (5 Day)

Date Required: standard

Expected Reporting Date: *(Laboratory Use Only)*

ANALYSIS REQUIRED

Page of

RCA Job Number: 12825

SAMPLE INFORMATION

RCA Laboratories Environmental Sample Number	Client ID / Description	Date	Matrix	Total Samples			~~FOC~~	~~Alkalinity~~	~~Ammonia~~	~~Chloride & Sulphate~~	~~Calcium Fluoride Iron Magnesium Manganese Sodium Potassium~~	~~Total phenolics and Nitrogen~~	~~Phosphorus~~	~~PAH&TPH~~	~~Phosphorus~~	Boron Cadmium Copper Silver Iron Molydenum Nickle	Notes:
021812825001	Point 3 water tank	14/02/18	w													x	

SGS EHS Alexandria Laboratory

SE175608 COC
Received: 16 – Feb – 2018

RELINQUISHED BY		RECEIVED BY		Laboratory use only (circle appropriate)	
Name:K Hawes	Date: 15/2/18	Name:	Date: 16/2/18	Received in good condition:	Yes No
Of:Rca-Le	Time:	Of: SGS	Time: 11:33	Chilled:	Yes No

ENV-F103-4

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

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

Better Grow
PO Box 945
WINDSOR NSW 2756

Attention Mr John Vyse

Project:	RCA ref 12825-705/0		
Date:	31/08/2018		
Client reference:	Better Grow August 2018		
Received date:	22/08/2018	**Number of samples:**	1
Client order number:	N/A	**Testing commenced:**	22/08/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS/ NON NATA
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA
pH	ENV-LAB006*	pH unit	RCA Laboratories- Environmental	NATA
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA
Trace Metals (Total) in Water by ICPMS	AN022/AN318	mg/L	SGS	NATA

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

Tests Subcontracted Lab No's SE182991 (NATA Accreditation No.2562).
The results stated in this report relate only to the sample(s) as submitted by the Client.

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	081812825001
Date sampled	-	22/08/2018
Sampled By	-	Client
Conductivity	µS/cm	6030
pH	pH unit	8.66
Total Suspended Solids	mg/L	25
Total Boron	µg/L	3000
Total Cadmium	µg/L	0.1
Total Copper	µg/L	<1
Total Silver	µg/L	150
Total Iron	µg/L	350
Total Molybdenum	µg/L	8
Total Nickel	µg/L	<1

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA. Analysis on samples is on an as received basis.

Appendix 1

Internal Laboratory Analysis Report and Chain of Custody Documentation

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

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-PC040	pH unit	RCA Laboratories- Environmental	NATA	±0.54
Conductivity	ENV-PC040	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories - Environmental	NATA	±6.41

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

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	081812825001
Date sampled	-	22/08/2018
Sampled By	-	Client
Conductivity	µS/cm	6030
pH	pH unit	8.66
Total Suspended Solids	mg/L	25

Water

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

Analysis on samples is on an as received basis

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
22/08/2018	pH	ENV-PC040	pH	7.00	6.95 - 7.05	7.05
22/08/2018	Total Suspended Solids	ENV-LAB009	mg/L	75	67.5 – 82.5	76
22/08/2018	Conductivity	ENV-PC040	µS/cm	1413	1385 - 1441	1391

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
081812825001	22/08/2018	pH	ENV-PC040	pH	-	8.66	8.67
081812825001	22/08/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	25	24
081812825001	22/08/2018	Conductivity	ENV-PC040	µS/cm	1	6030	6040

Please contact the undersigned if you have any queries.

Yours sincerely

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

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

RCA Internal Quality Review

General

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

Holding Times.

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

Receipt Acknowledgment.

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

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

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

QC - ACCEPTANCE CRITERIA

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

Results <10 times the LOR: No Limit

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

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

QC DATA GENERAL COMMENTS

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

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

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

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

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

mg/L: milligrams per Litre

TERMS

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

LOR Limit of Reporting.

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

QCS Quality Control Sample - reported as value recovery

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

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

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

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

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

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

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

< indicates less than

> Indicates greater than

ND Not Detected

Appendix 2

External Laboratory Reports and Chain of Custody Documentation

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Laura Schofield	Manager	Huong Crawford
Client	RCA AUSTRALIA	Laboratory	SGS Alexandria Environmental
Address	PO BOX 175 NSW 2294	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	61 2 49029200	Telephone	+61 2 8594 0400
Facsimile	61 2 49029299	Facsimile	+61 2 8594 0499
Email	lauras@rca.com.au	Email	au.environmental.sydney@sgs.com
Project	**12825**	SGS Reference	**SE182991 R0**
Order Number	**12825**	Date Received	23 Aug 2018
Samples	1	Date Reported	28 Aug 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Kamrul Ahsan
Senior Chemist

Parameter	Units	LOR	Sample Number SE182991.001 Sample Matrix Water Sample Date 21 Aug 2018 Sample Name 081812825001 Point 3 water tank
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 27/8/2018			
Total Boron	µg/L	5	**3000**
Total Cadmium	**µg/L**	**0.1**	**0.1**
Total Copper	**µg/L**	**1**	**<1**
Total Iron	**µg/L**	**5**	**150**
Total Molybdenum	**µg/L**	**1**	**350**
Total Nickel	**µg/L**	**1**	**8**
Total Silver	**µg/L**	**1**	**<1**

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals (Total) in Water by ICPMS **Method: ME-(AU)-[ENV]AN022/AN318**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Boron	LB155027	µg/L	5	<5	5%	98%	
Total Cadmium	LB155027	µg/L	0.1	<0.1	1%	94%	105%
Total Copper	LB155027	µg/L	1	<1	0%	97%	102%
Total Iron	LB155027	µg/L	5	<5	14%	NA	NA
Total Molybdenum	LB155027	µg/L	1	<1	3%	109%	
Total Nickel	LB155027	µg/L	1	<1	0%	103%	
Total Silver	LB155027	µg/L	1	<1	0%	96%	

METHOD SUMMARY

SE182991 R0

METHOD	METHODOLOGY SUMMARY
AN022	The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E.
AN022/AN318	Following acid digestion of un filtered sample, determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE182991 R0

CLIENT DETAILS

Contact	Laura Schofield
Client	RCA AUSTRALIA
Address	PO BOX 175 NSW 2294
Telephone	61 2 49029200
Facsimile	61 2 49029299
Email	lauras@rca.com.au
Project	**12825**
Order Number	**12825**
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE182991 R0**
Date Received	23 Aug 2018
Date Reported	28 Aug 2018

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE182991 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
081812825001 Point 3	SE182991.001	LB155027	21 Aug 2018	23 Aug 2018	17 Feb 2019	27 Aug 2018	17 Feb 2019	28 Aug 2018

SURROGATES

SE182991 R0

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS — Method: ME-(AU)-[ENV]AN022/AN318

Sample Number	Parameter	Units	LOR	Result
LB155027.001	Total Boron	µg/L	5	<5
	Total Cadmium	µg/L	0.1	<0.1
	Total Copper	µg/L	1	<1
	Total Molybdenum	µg/L	1	<1
	Total Nickel	µg/L	1	<1
	Total Silver	µg/L	1	<1

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE182991.001	LB155027.010	Total Boron	µg/L	5	3000	3100	15	5
		Total Cadmium	µg/L	0.1	0.1	0.1	95	1
		Total Copper	µg/L	1	<1	<1	200	0
		Total Iron	µg/L	5	150	180	18	14
		Total Molybdenum	µg/L	1	350	350	15	3
		Total Nickel	µg/L	1	8	8	27	0
		Total Silver	µg/L	1	<1	<1	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB155027.002	Total Boron	µg/L	5	20	20	80 - 120	98
	Total Cadmium	µg/L	0.1	19	20	80 - 120	94
	Total Copper	µg/L	1	19	20	80 - 120	97
	Total Molybdenum	µg/L	1	22	20	80 - 120	109
	Total Nickel	µg/L	1	21	20	80 - 120	103
	Total Silver	µg/L	1	19	20	80 - 120	96

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE182947.001	LB155027.004	Total Cadmium	µg/L	0.1	21	0.004	20	105
		Total Copper	µg/L	1	20	-0.45	20	102
		Total Iron	µg/L	5	150	117.067	-	-

MATRIX SPIKE DUPLICATES

SE182991 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

RCA LABORATORIES
• ENVIRONMENTAL • CONSTRUCTION MATERIALS TESTING

Ph: (02) 4902 9200 Fax: 02 4902 9299
92 Hill Street, Carrington NSW 2294
www.rca.com.au Email: labenviro@rca.com.au

ENV-F103-4

Client Name: RCA
Client Site: Ravensworth
Contact Name: Laura Schofield
Phone Number: 403699112
Email Report To: lauras@rca.com.au
Project Manager:

Turnaround Required: ☐ Urgent ☐ Standard (5 Day)
Date Required: standard
Expected Reporting Date: *(Laboratory Use Only)*

ANALYSIS REQUIRED

Page of

RCA Job Number: 12825

SAMPLE INFORMATION

RCA Laboratories Environmental Sample Number	Client ID / Description	Date	Matrix	Total Samples	TOC	Alkalinity	Ammonia	Chloride & Sulphate	Calcium Fluoride Iron Magnesium Manganese Sodium Potassium	Total phonolics and Nitrogen	Phosphorus	PAH&TPH	Phosphorus	Boron Cadmium Copper Silver Iron Molydenum Nickle	Notes:
081812825001	Point 3 water tank	21/08/18	w	1										x	

SGS EHS Alexandria Laboratory
SE182991 COC
Received: 23 – Aug – 2018

RELINQUISHED BY		RECEIVED BY		Laboratory use only (circle appropriate)	
Name:L Schofield	Date: 22/8/18	Name: Nessa	Date: 23/8/18	Received in good condition:	Yes No
Of:Rca-Le	Time:	Of:	Time: 11:30	Chilled:	Yes No

ENV-F103-4

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

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

Better Grow
PO Box 945
WINDSOR NSW 2756

Attention Mr John Vyse

Project:	RCA ref 12825-706/0		
Date:	3/12/2018		
Client reference:	Better Grow November 2018		
Received date:	22/11/2018	**Number of samples:**	1
Client order number:	N/A	**Testing commenced:**	22/11/2018

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS/ NON NATA
Conductivity	ENV-LAB010*	µS/cm	RCA Laboratories - Environmental	NATA
pH	ENV-LAB006*	pH unit	RCA Laboratories- Environmental	NATA
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA
Trace Metals (Total) in Water by ICPMS	AN022/AN318	mg/L	SGS	NATA

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

Tests Subcontracted Lab No's SE186586 (NATA Accreditation No.2562).
The results stated in this report relate only to the sample(s) as submitted by the Client.

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	111812825001
Date sampled	-	21/11/2018
Sampled By	-	Client
Conductivity	µS/cm	7580
pH	pH unit	8.35
Total Suspended Solids	mg/L	40
Total Boron	µg/L	3700
Total Cadmium	µg/L	0.7
Total Copper	µg/L	41
Total Silver	µg/L	<1
Total Iron	µg/L	170
Total Molybdenum	µg/L	370
Total Nickel	µg/L	8

Water

NATA Scope of Accreditation does not cover the sampling of surface and ground waters by the client or by RCA. Analysis on samples is on an as received basis.

Appendix 1

Internal Laboratory Analysis Report and Chain of Custody Documentation

Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental
92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

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

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
pH	ENV-PC040	pH unit	RCA Laboratories-Environmental	NATA	±0.54
Conductivity	ENV-PC040	µS/cm	RCA Laboratories - Environmental	NATA	±1.32
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories - Environmental	NATA	±6.41

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

2 RESULTS

ANALYSIS	UNITS	Point 3 Water Tank
Sample Number	-	111812825001
Date sampled	-	21/11/2018
Sampled By	-	Client
Conductivity	µS/cm	7580
pH	pH unit	8.35
Total Suspended Solids	mg/L	40

Water

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

Analysis on samples is on an as received basis

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
22/11/2018	pH	ENV-PC040	pH	7.00	6.95 - 7.05	6.99
22/11/2018	Total Suspended Solids	ENV-LAB009	mg/L	75	67.5 – 82.5	75
22/11/2018	Conductivity	ENV-PC040	µS/cm	1413	1385 - 1441	1391

Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
111812825001	22/11/2018	pH	ENV-PC040	pH	-	8.35	8.39
11181206001 BATCH	22/11/2018	Total Suspended Solids	ENV-LAB009	mg/L	5	27	26
111812825001	22/11/2018	Conductivity	ENV-PC040	µS/cm	1	7580	7610

Please contact the undersigned if you have any queries.

Yours sincerely

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

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

RCA Internal Quality Review

General

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

Holding Times.

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

Receipt Acknowledgment.

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

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

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

QC - ACCEPTANCE CRITERIA

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

Results <10 times the LOR: No Limit

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

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

QC DATA GENERAL COMMENTS

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

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

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

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

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

mg/L: milligrams per Litre

TERMS

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

LOR Limit of Reporting.

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

QCS Quality Control Sample - reported as value recovery

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

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

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

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

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

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

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

< indicates less than

> Indicates greater than

ND Not Detected

Appendix 2

External Laboratory Reports and Chain of Custody Documentation

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Laura Schofield
Client	RCA AUSTRALIA
Address	PO BOX 175 NSW 2294
Telephone	61 2 49029200
Facsimile	61 2 49029299
Email	lauras@rca.com.au
Project	**Ravensworth**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE186586 R0**
Date Received	23 Nov 2018
Date Reported	27 Nov 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Parameter	Units	LOR	Sample Number SE186586.001 Sample Matrix Water Sample Date 21 Aug 2018 Sample Name 111812825001 Point 3 water tank
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 26/11/2018			
Total Boron	µg/L	5	**3700**
Total Cadmium	**µg/L**	**0.1**	**0.7**
Total Copper	**µg/L**	**1**	**41**
Total Iron	**µg/L**	**5**	**170**
Total Molybdenum	**µg/L**	**1**	**370**
Total Nickel	**µg/L**	**1**	**8**
Total Silver	**µg/L**	**1**	**<1**

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals (Total) in Water by ICPMS **Method: ME-(AU)-[ENV]AN022/AN318**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Boron	LB161985	µg/L	5	<5	1%	119%
Total Cadmium	LB161985	µg/L	0.1	<0.1	0 - 4%	110%
Total Copper	LB161985	µg/L	1	<1	2 - 3%	116%
Total Iron	LB161985	µg/L	5	<5	2%	NA
Total Molybdenum	LB161985	µg/L	1	<1	0 - 21%	98%
Total Nickel	LB161985	µg/L	1	<1	2%	110%
Total Silver	LB161985	µg/L	1	<1	0%	112%

METHOD SUMMARY

SE186586 R0

METHOD	METHODOLOGY SUMMARY
AN022	The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E.
AN022/AN318	Following acid digestion of un filtered sample, determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE186586 R0

CLIENT DETAILS

Contact	Laura Schofield
Client	RCA AUSTRALIA
Address	PO BOX 175 NSW 2294
Telephone	61 2 49029200
Facsimile	61 2 49029299
Email	lauras@rca.com.au
Project	**Ravensworth**
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LABORATORY DETAILS

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Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE186586 R0**
Date Received	23 Nov 2018
Date Reported	27 Nov 2018

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	1 Water
Date documentation received	23/11/2018	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	1.1°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE186586 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
111812825001 Point 3	SE186586.001	LB161985	21 Aug 2018	23 Nov 2018	17 Feb 2019	26 Nov 2018	17 Feb 2019	26 Nov 2018

SURROGATES

SE186586 R0

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS — Method: ME-(AU)-[ENV]AN022/AN318

Sample Number	Parameter	Units	LOR	Result
LB161985.001	Total Boron	µg/L	5	<5
	Total Cadmium	µg/L	0.1	<0.1
	Total Copper	µg/L	1	<1
	Total Molybdenum	µg/L	1	<1
	Total Nickel	µg/L	1	<1
	Total Silver	µg/L	1	<1

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Total) in Water by ICPMS — Method: ME-(AU)-[ENV]AN022/AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE186512.001	LB161985.014	Total Cadmium	µg/L	0.1	0.02	0.022	200	0
		Total Copper	µg/L	1	12.053	12.432	23	3
		Total Iron	µg/L	5	1617.498	1643.423	15	2
		Total Molybdenum	µg/L	1	2.07	1.678	68	21
		Total Nickel	µg/L	1	42.362	43.257	17	2
SE186586.001	LB161985.020	Total Boron	µg/L	5	3700	3700	15	1
		Total Cadmium	µg/L	0.1	0.7	0.7	29	4
		Total Copper	µg/L	1	41	40	17	2
		Total Iron	µg/L	5	170	160	18	2
		Total Molybdenum	µg/L	1	370	370	15	0
		Total Nickel	µg/L	1	8	8	28	2
		Total Silver	µg/L	1	<1	<1	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Total) in Water by ICPMS — **Method: ME-(AU)-[ENV]AN022/AN318**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB161985.002	Total Boron	µg/L	5	24	20	80 - 120	119
	Total Cadmium	µg/L	0.1	22	20	80 - 120	110
	Total Copper	µg/L	1	23	20	80 - 120	116
	Total Molybdenum	µg/L	1	20	20	80 - 120	98
	Total Nickel	µg/L	1	22	20	80 - 120	110
	Total Silver	µg/L	1	22	20	80 - 120	112

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE186586 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

APPENDIX E

Site photographs

Existing compost pad (Stage 1)

Stage 2 compost area (undeveloped)

Clean water diversion spillway (background) through to lower basin (foreground)

Rock lined spillway chute from Stage 1 compost pad to leachate dam

Leachate dam and spillway (middle of left embankment)

Void 4 water storage

APPENDIX F

Surface and Groundwater Management Plan

Surface & Groundwater Management Plan

For the Greenspot Ravensworth Composting Facility

Located Via New England Highway,

Muswellbrook NSW 2333

Written on behalf of

Bio-Recycle Australia Pty Ltd

By

The LZ Environmental Company Pty Limited

The LZ Environmental Company Pty Limited
T/A Zambelli Environmental
luke@zambellienvironmental.com.au
Providing environmental stewardship for industry today

Document Control

Document name	Surface and Groundwater Management Plan For The Greenspot Ravensworth Composting Facility	**Version**	7

Person Responsible

	Name	Position
Author	Luke Zambelli	Director
Contributing Author(s)		
Reviewing Officers(s)	John Vyse	Business Manager
Authorised by	Neil Schembri	Director

Revision History

Version	Issue Date (dd/mm/yy)	Amendment Details	Author	Authorised By
1	14/03/16	First draft	Luke Zambelli	Neil Schembri
2	19/03/16	Second draft re new placement of dam	Luke Zambelli	Neil Schembri
3	26/5/16	Third Draft re further change to dam location	Luke Zambelli	Neil Schembri
4	16/6/16	Fourth Draft re increase in storage capacity of detention dam	Luke Zambelli	Neil Schembri
5	19/6/16	Fifth Draft Amendment of drawings	Luke Zambelli	Neil Schembri
6	21/07/16	Sixth Draft amendment of pad area and associated detention basin volume	Luke Zambelli	Neil Schembri
7	3/08/16	Seventh Draft incorporation of further comments	Luke Zambelli	Neil Schembri

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Figures

Tables

Appendices

Appendix 1: Leachate and Stormwater Workplace and Emergency Procedures
Appendix 2: Forms and Checklists
Appendix 3: Figures
Appendix 4: Density and Permeability Results

Glossary of Terms

EPA	Environment Protection Authority
EPL	Environmental Protection Licence
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Plan
IECA	International Erosion Control Association
SGWMP	Surface and Groundwater Management Plan

1 Introduction

This Surface and Groundwater Management Plan (SGWMP) has been prepared for Bio-Recycle Australia Pty Ltd in response to the Pollution Reduction Program required by the EPA via Licence Variation (Notice No. 1533678) to be implemented at its Ravensworth Composting Facility – Environment Protection Licence EPL7654, located at New England Highway, Muswellbrook.

It is to be noted that this SGWMP provides information applicable to the current area where pasteurised greenwaste is being stored for use in AGL Macquarie's rehabilitation program for the Ravensworth mine site (area 1) and also to the future composting site (area 2) that is being proposed to be constructed due to constraints that exist with the currently used area.

The following figure defines the areas that are referenced within this SGWMP.

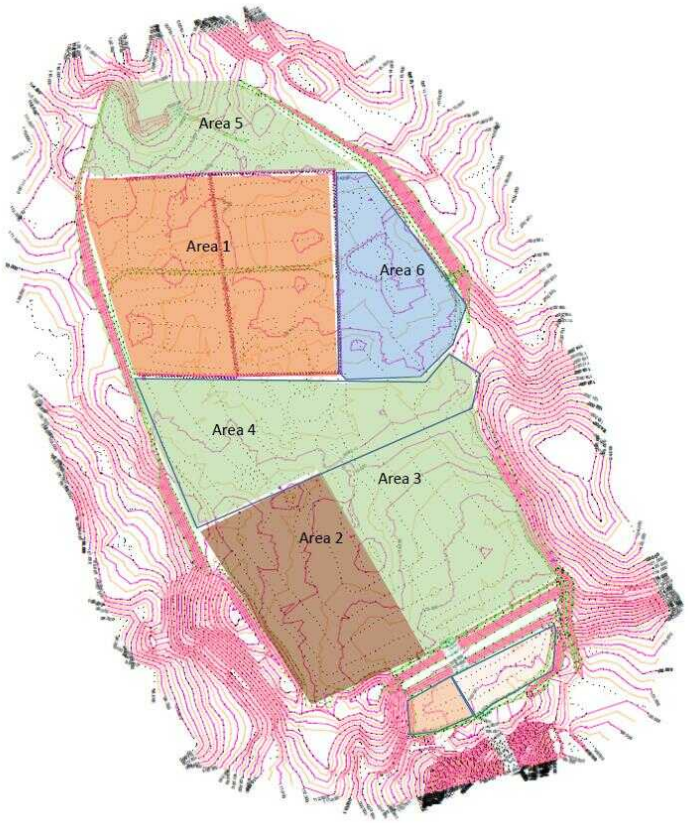


Figure 1: Areas identified within the SGWMP

It is to be noted that areas 3 and 4 are to be revegetated and area 1 will transition into a standard that is comparable to areas 3 and 4 once stored material is removed. Area 5 is to be revegetated. Whilst area 6 is denoted as the sedimentation basin for area 1 currently, it will remain into the future albeit that it will be revegetated.

This SGWMP will provide information that:

- details control measures and procedures that will minimise contamination of stormwater and groundwater;
- demonstrates that clean surface waters are not mixed with leachate (contaminated surface water) by way of appropriately positioned and constructed infrastructure that provides for the diversion of uncontaminated (or clean) stormwater;
- demonstrates that the volume of leachate contained on site will be greater than what is ordinarily considered to be representative of industry practice and how containment will be assured;
- the mass movement of sediment or significant erosion will not occur;
- demonstrates that the quality of leachate contained will be maintained as far as possible such that offensive or noxious odours are not released;
- demonstrates that the quality of leachate contained within the detention basin will be of such a pH that any seepage from the detention basin will not mobilise heavy metals in the underlying fly ash;
- demonstrates that whilst highly unlikely, (due to rarity of occurrence), that the quality of leachate that may be released in an emergency event (defined as an abnormal rainfall event that causes a release offsite) will in no way cause material harm to receiving waters or will result in worsening water quality conditions downstream of the facility, (i.e. Void 4, including groundwater) due to onsite leachate management practices, onsite uses and the volume of secondary containment provided; and that including groundwater due to the amount of leachate containment provided; and that
- demonstrates only clean stormwater will leave the site from remaining areas not included within the operational area.

  It is to be noted that whilst the primary leachate detention basin has a capacity for the containment of leachate that is equivalent in volume to that of a 1 in 100 year 24 hour rainfall event, Bio-Recycle will commit to ensuring that the detention basin will always have the available capacity to contain rainfall events up to and including a 1 in 25 year 24 hour rainfall event so as to comply with EPL condition O4.1.

It is to be also noted that rainfall events greater than a 1 in 25 year 24 hour rainfall event are unlikely to result in an emergency release occurring due to the volume of leachate that will be reused within the composting process on a daily basis (i.e. the volume utilised for moisture addition to windrows and dust suppression) and the volume used for dust suppression and irrigating revegetated areas (described further on).

It is to be noted that the International Erosion Control Association (IECA) guideline (November 2008, reprinted June 2012) has been acknowledged in developing this SGWMP, specifically in terms of Erosion and Sediment Control Planning, and the monitoring of implemented measures so as to continually improve on site conditions.

Similarly, the document authored by the NSW Government and titled "Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition, March 2004" has also been considered in the preparation of this document.

It is to be noted that considerations pertaining to the above mentioned publications are further detailed in *Section 7* below.

Similarly, this SGWMP has been prepared with consideration of the Environmental Guideline, titled, Composting & Related Organics Processing Facilities, prepared by the Department of Environment & Conservation 2004.

It is to be noted that during the drafting of this SGWMP a risk assessment was performed in relation to the various aspects of water management. The risk assessment has been incorporated into the WHS & Environment Site Specific Management Plan for the Ravensworth Facility.

It is to be noted that this document supports and expands on information provided within the onsite document, titled "Compost Management Plan, Including Management for CA-05 Biosecure Treatment of Phylloxera Host Plant material for Recycling, Version 3".

It is essential that the facility employees are aware that this SGWMP details important requirements for conducting surface water management, including the management of leachate which need to be adhered to. Specifically, the control strategies outlined within the various workplace and emergency procedures, provided within **Appendix 1** must be adhered to. Moreover, employees must become familiar with and implement the control measures provided within the respective procedures in their entirety.

Further to the above, **Appendix 2** contains a copy of all forms and checklists which must be utilised in conjunction with the aforementioned procedures.

Appendix 3 - Figures contains seven figures, the first of which outlines the four hardstand pad areas that will be constructed as the activity requires albeit that Pads 3 and 4 will be vegetated in the interim

so as to reduce the requirement to treat stormwater that is influenced by suspended solids, including colloidal clay material. The same figure includes the location of the primary leachate detention basin, the secondary basin and the lower basin in relation the northern end of void 4, the location where overflows from the lower basin will flow into. Figure 2 portrays a cross section cut through the respective containment dam (offering a total storage volume equivalent to a 1 in 100 year 24 hour rainfall event).

The third figure portrays the gradient of the area whilst the fourth figure indicates the stormwater flow paths. The fifth figure of **Appendix 3** portrays the erosion and sediment control plan for the facility and the sixth figure highlights the location the facility in relation to its surroundings, including the New England Highway. The seventh Figure of **Appendix 3** portrays the leased area for reference.

Section 3 below shows the organisational structure in place at the site to manage activities, including the management of stormwater.

1.1 Purpose

The purpose of this document is to provide detail surrounding the management of surface water such that releases of contaminated water to the receiving environment do not occur.

This document details how surface water management, including leachate management will occur at the site such that Bio-Recycle will operate in compliance with conditions of the EPL, namely condition L1.1, U1.1 and U1.2. Moreover, this document describes the actions that will be carried out to ensure that leachate is separated from external clean surface waters and as to how erosion and sediment transport and subsequent stormwater contamination will be minimised. The purpose of this document is to also stipulate the monitoring and management protocols that will be implemented to ensure that the receiving environment is protected in the event of an emergency release of leachate from the site.

Provided the directives contained within this SGWMP are followed, including the control measures contained within the respective workplace and emergency procedures, namely ones related to sediment and erosion control, stormwater and leachate management and emergency stormwater and leachate management (refer to **Appendix 1**) by facility employees, it is ensured that effective leachate management including erosion and sediment control will occur.

2 Environmental Commitments

This section outlines the various commitments made by Bio-Recycle for the effective management of stormwater generated externally and leachate generated within the composting activity area, inclusive of which is sediment and erosion control. Bio-Recycle is aware of the importance of managing all leachate generated within the area of the facility such that environmental harm is avoided. Similarly, Bio-Recycle will ensure that stormwater generated within remaining areas not associated with the composting activity, but are in fact located within Bio-Recycle's licenced area (see **Appendix 3 – Figure 7**) will not cause material harm. These areas will be vegetated so as to prevent the re-entrainment of soil particles. Namely the following areas listed will be revegetated, after commencement of the proposed compost area (area 2) with a mixture of grass seeds suitable to the yearly climate.

- Area 3 = 109,947 m^2;
- Area 4 = 110,112 m^2;
- Area 1 = 170,155 m^2; and
- Area 6 = 70,726 m^2.

Once area 2 activities commence, the preparation of 4 will begin at the release point in the south east corner. This will extend 40 metres back in towards Pad 4 so that a suitable growing medium is prepared in readiness for the spreading of grass seed. This grassed area will progressively move over Pads 4 and will eventually extend into the Pad 3 area. This will be done so as to reduce the ability of rain drops to re-entrain suspended soil particles within stormwater flow.

Bio-Recycle is committed to complying with all conditions contained within EPL 7654. In doing so, and wherever possible, Bio-Recycle will try to minimise the amount of contaminated stormwater generated by avoiding such contamination.

When considering the existing area, currently being utilised for the storage of pasteurised greenwaste, the following commitments are provided:

- Sections of windrows where possible have been removed from areas where ponding of stormwater may occur and also where the stormwater flow path has been covered or blocked with material;
- Any remaining ponding is managed by being mopped up with windrow material and added to windrows;
- Windrows are consolidated where appropriate; and
- The majority of the liquid retained in the leachate sumps is pumped out following rainfall, with liquid being incorporated into windrowed greenwaste material;

Within area 2, Bio-Recycle will re-use contained leachate primarily for the composting process, which is a nett user of water. In addition leachate will be used for dust suppression within the area of the composting facility, including haulage roads that are located within the composting facility. Bio-Recycle will not use leachate for dust suppression upon haulage roads that are external to the composting facility. Bio-Recycle will not use leachate for dust suppression upon haulage roads that are external to the composting facility. Bio-Recycle will treat water whenever required so as to reduce contaminant levels that are not conducive to composting or for use for any other purpose. Finally, Bio-Recycle may elect to irrigate leachate in times where the primary leachate detention basin requires emptying for the purpose of desilting or simply dewatering.

Bio-Recycle will utilise a spray gun irrigator so as to irrigate broadcasted grass seed over areas where compost is to be applied within areas 3 and 4 of Figure 1. At an operating pressure of 550 kPa, 16 L/s or 960 L/m can be delivered. This will provide for a rapid response time should in fact there be the need to reduce the height of contained leachate within the primary leachate detention basin. If for example a reduction was required, the pump and spray irrigator configuration could remove 1.382 Ml / 24 hours. When considering the combined area of area 3 and area 4 (220,059 m^2), at an irrigation rate of 5 L/ m^2 or 5mm of irrigation, approximately 1.1 Ml would be consumed. Irrigation will be performed when winds are low so that aerosols are not liberated far and wide and will only occur when the wind direction is such that air movement is away from onsite personnel. Appropriate buffer distance's exists such that no sensitive receptor will be affected.

With regard to the above hierarchy, it can be noted that Bio-Recycle will ensure that the generation of leachate is (in this order) avoided, reused, recycled or disposed of in accordance with best practice environmental management.

Bio-Recycle is committed to implementing an onsite surface water management plan that contains procedures which effectively manage leachate and stormwater generated within the area of the site, and which also prevents stormwater flows generated external to this area from entering the site.

Bio-Recycle is committed to ensuring that erosion protection and sediment control measures are implemented and maintained to minimise erosion and the release of sediment from the site.

Whilst the leachate detention basin has an overall capacity to contain a 1in 100 year 24 hour rainfall event, Bio-Recycle is committed to ensuring the containment capacity within the onsite detention basin is sufficient to contain the volume of stormwater runoff generated over the operational catchment area of the site during a 1 in 25 year AEP 24 hour rainfall event (~ 5.99 mm/hr) or less. Moreover, Stormwater generated in excess of the 25 year rainfall event may release to a secondary basin and then

to a lower basin so as to allow further deposition of sediment prior to leaving the licenced area and emptying into Void 4 for containment.

Bio-Recycle will ensure that storage capacity on site will be capable of containing a 1 in 25 year rainfall event at all times. In addition Bio-Recycle will further aim to contain stormwater generated in rainfall events up to and including a 1 in 100 year 24 hour rainfall event on site which far exceeds the minimum design requirements contained within the NSW EPA guideline, titled Composting and Related Organics Processing facilities, July 2004.

Bio-Recycle is also committed to ensuring that onsite employees are familiar with this SGWMP in its entirety, including understanding the various workplace and emergency procedures that have been created (refer to **Appendix 1**).

2.1 Site Water Characteristics

It is recognised that fly ash generated at the nearby Bayswater Power Station is pumped as a dense phase slurry back to the Ravensworth mine site and is utilised in the backfilling of open cut voids as part of the site's rehabilitation program. It is to be noted that Void 4 is integral to AGL Macquarie Pty Ltd's water management strategy associated with rehabilitation whereby Void 4 receives decant water from Void 5 (the current location for ash deposition). Water contained within Void 4 is transferred back (at 120 litres /second) to the Bayswater Power Station whereby it utilised again in the ash pumping cycle. It is also understood that any seepage from the deposited fly ash contained within Void 3 also releases to Void 4.

The quality of water contained within Void 4 is a result of seepage through fly ash and overburden, surface water runoff and decant water also from Void 5. Due to the placement of fly ash in direct contact with water, it is likely that pH's encountered will be alkaline. The report titled Ravensworth South Final Void Plan, prepared by Aurecon for AGL and dated 1 May 2012 indicated that the historical average pH within Void 4 was 8.54 pH units (1996 to Nov 2010). Data also indicates that conductivity of water contained within Void 4 is brackish with various anionic and cationic salts present. The Aurecon report stated that Void 4 is effective at holding water due to a depression in the Bayswater Syncline Axis. It is understood that the base of Void 4 is formed by the Archerfield Sandstone Unit and the water level in Void 4 is kept below the maximum RL of 46.5 m to avoid seepage in a south direction. It is understood that there is no evidence to suggest that any extensive seepage occurs from Void 4 and as such releases beyond the boundary of the facility are unlikely.

Due to the thickness of the fly ash that underlays the composting facility in Void 3, it is unlikely that seepage water from the lined detention basin will significantly influence the water quality

characteristics of Void 4. Due to the volume of water contained within Void 4 and the capacity provided within the detention basin associated with the composting activity plus the additional water detention areas in the stormwater flow path it is unlikely that water quality within Void 4 could be significantly changed in times when an emergency release did occur. If a release from the detention basin was to occur however, a release from the detention basin would flow firstly through a secondary basin and then to the lower basin before reaching Void 4. The volume of surface water that would be flowing into Void 4 from other areas of the mine site during such a rainfall event would negate any significant influence a release of contained leachate from the composting facility could have. It is for the above reasons why it is considered that the location of the composting facility is considered appropriate.

3 Organisational Structure

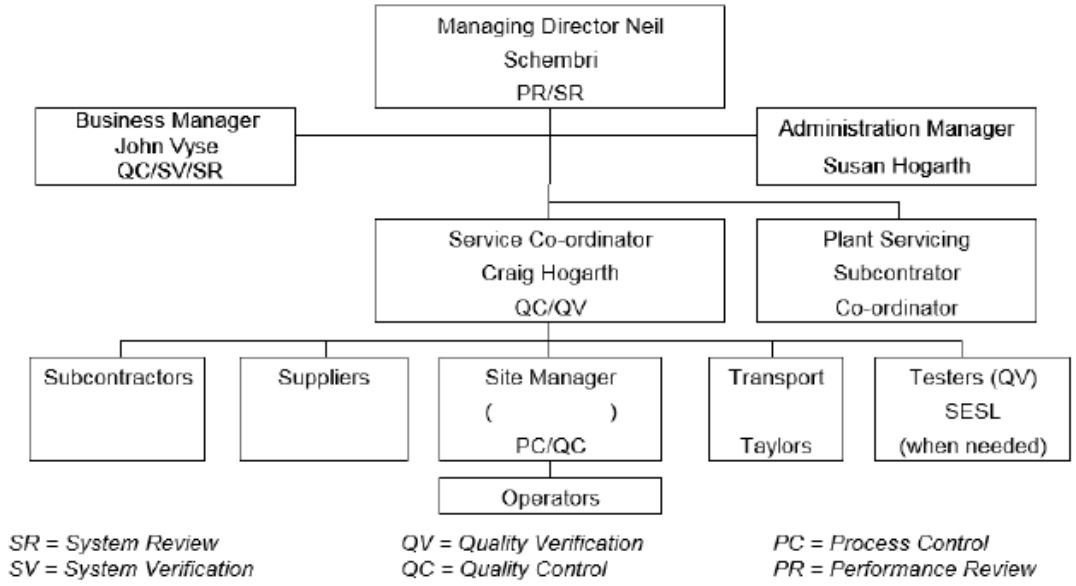


Figure 2: Organisation structure

3.1 General Contact Detail

	Managing Director	Site Manager	Organics Business Manager
Name:	Neil Schembri	Chris Payne	John Vyse
Mobile:	0419 636 088	0477 344 969	0403 996 518
Phone:	(02) 4587 7852		
Fax:	(02) 4577 2603		
Email:	neil@Bio-Recycle.com.au	chris@bettergrow.com.au	john@bettergrow.com.au

Table 1: General Contact Detail

3.2 Roles and Responsibilities

The principal QA/OHS/environmental responsibilities are outlined below. Responsibilities and authorities are defined in more detail in Bio-Recycle's System Procedures.

3.2.1 Managing Director

The Managing Director is responsible for setting Company quality, safety and environmental policies and objectives and for allocation of resources to each service area.

3.2.2 Contracts Manager

The Contracts Manager is the Company's corporate "quality management representative" (ISO9001 5.5.2), "environmental management representative" (ISO14001 4.4.1) and "WHS management representative" (AS4801 4.4.1.2) and has the authority to resolve any QA/WHS/Enviro management system matters.

3.2.3 Administration Manager

The Administration Manager is responsible for managing the Company's administrative / accounting functions, including:

- Debtors and Creditors, all accounts receivable and payable;
- payroll;
- administering legal obligations such as motor vehicle, public liability and workers compensation insurances, registrations and licenses;
- maintaining and updating various registers of staff, plant and equipment;
- workplace injury management;
- secretarial duties.

3.2.4 Service Co-ordinator

The Service Co-ordinator is responsible for managing the delivery of the various organics service and compliance with contract requirements including time, quality, safety, environmental and industrial matters.

The Service Co-ordinator is required to notify the Contracts Manager of any deficiencies or potential problems with Company procedures.

Table 2 is provided below to summarise the key management functions and responsibilities.

3.2.5 Site Manager

The Site Manger is responsible for the day to day management of the facility and to implement the requirements of the Organics Business Manager. The Site Manager is responsible for ensuring all onsite employees/operators are well versed in the respective workplace and emergency procedures that are associated with the facility. The Site Manager is responsible for advising the Organics Business Manager of incidents that are likely to cause material harm to the environment. The Site manager is responsible for ensuring that workplace health and safety is being provided to onsite employees and any visitors that attend the facility.

Function	Managing Director	Organics Business Manager	Service Coordinator	Site Manager
Authorise QA/WHS/environmental policies & objectives	*			
Management system document control		*		
Ascertain customer requirements for planning service delivery		*		
Evaluate suppliers and subcontractors	*			
Manage WHS Consultation		*		
WHS Hazard/Risk Identification & Establish Safety Controls		*	*	*
Prepare Environmental Impact Register & Establish Environmental Controls		*		*
Prepare Service Management Plans		*		
Personnel management and management of training	*	*		
Implement Training		*	*	*
Implement Service Management Plan			*	
Implement WHS Risk Controls				*
Implement Environmental Controls				*
Maintain vehicles and equipment in proper operating condition			Plant Servicing Co-ordinator	
Calibration of inspection & measuring equipment			Plant Servicing Co-ordinator	
Review effectiveness of service delivery		*	*	

Liaise with clients on service delivery issues		*	*	
Resolve service delivery nonconformities		*	*	
Investigate WHS incidents			*	*
Investigate environmental incidents			*	*
QA/WHS/environmental records		*	*	
Initiate corrective/preventive action including authority to temporarily restrict work		*	*	*
Follow through corrective preventive actions and monitor their effectiveness		*		
Internal Auditing		*	*	
Review effectiveness of QA/WHS/ environmental management system	*	*		
Management of industrial relations	*			

Table 2: Key management Functions and Responsibilities

All employees are required to immediately inform the Site Manager of any environmental risks, issues or incidents that have the potential to cause environmental harm. Any major incidents that may cause environmental harm must also be reported to the EPA by the Site Manager or the Organics Business Manager. If either is not available the employee is responsible for notifying the EPA when necessary (i.e. in the event of environmental harm or a release that is not in compliance of the relevant conditions of the EPL occurs).

4 Description of Activity

The following section provides detail on how stormwater generated within the area of the facility (designated as the catchment area, refer to *Section 11*) and stormwater generated externally to the facility will be managed.

Employees must understand that integral to the management of stormwater is the control of the volume of leachate generated within the designated catchment area and clean stormwater generated external to the designated catchment area and which is prevented from entering the composting area.

Further to the above, the quality characteristics of the leachate generated must not be such that it becomes significantly contaminated with compost or compost feedstocks as this will increase the potential to cause environmental nuisance (considered unlikely in an emergency release) from the release of anaerobic odour if the detention basin sours or creates worsening receiving water conditions due to elevated levels of contaminants being released.

Whilst *Section 8.1.1* provides further detail on how uncontaminated and leachate waters will be separated, it can be noted here however that stormwater generated externally to the operational hardstand areas will be actively directed away from entering the designated catchment area through the use of diversion drains and perimeter bunding as determined where being required (refer to **Appendix 3, Figure 5** for locations of perimeter bunding). Bund walls will be constructed from overburden located in close proximity and will be covered in compost amended overburden and grassed so as to stabilise. So as to comply with requirements of CA05 - biosecure transport and treatment of host plant material destined for recycling, a 10 m vegetation free buffer zone will exist between bunds and composting windrows. The perimeter bund will also ensure any internally generated stormwater is effectively directed as desired.

Employees must notify the Site Manager if it has been discovered that uncontaminated stormwater is entering the hardstand areas such that prompt repair can occur. Repairs can be performed promptly as there is a plentiful supply of overburden material that is suitable for construction of bunds or raising ground surface levels for example so as to exclude or retain water.

All leachate that is generated within the areas of the initial two hardstand pads (designated as the catchment area) must be directed via concrete spillway to the designated 1 in 100 year 24 hour ARI detention basin (refer to **Figure 5** of **Appendix 3**). A concrete sedimentation fore-bay will be located prior to the release point so as to minimise sediment loss into the detention basin. The sediment detention bay is considered to be key piece of infrastructure to restrict gross solids entering the detention basin and must regularly be desilted. Once full, the detention basin will spill into the secondary basin which at the current spillway height (RL104.85), will contain approximately another 1 ML. The secondary basin will release to the existing lower basin which will be in place primarily to settle any solids released prior to any waters entering Void 4.

Appendix 3 – Figure 1 highlights the two hardstand areas that makes up the entire catchment area for leachate. It is to be noted that Pads 1 and 2 located on the most western side of the catchment area is to be constructed first and Pads 3 and 4 will be constructed as and when required.

Surface gradients of hardstand pads and the strategic positioning of diversion bunds are such that respective pads (1, 2) drain to the primary detention basin without delay (refer to **Appendix 3**, **Figure 3**). Employees must be aware that the surface gradients of the hardstand pad needs to be maintained so

that leachate flows easily to the primary detention basin but not excessively, such that compost and sediments are not mobilised. There must be no ponding or pooling on the hardstand surface and if, encountered must be promptly attended to so as to establish desirable conditions.

The location of the detention basin will assist in the removal of contained water via pump for reapplication to composting windrows so as to ensure optimal moisture conditions exist throughout the composting cycle. The pump located at the detention basin will also be utilised from time to time to transfer and circulate contained leachate so as to aerate the dam in conjunction with the duty aerator that will be operational to maintain desirable dissolved oxygen levels within the detention basin.

It is to be understood that due to the average annual volume of rainfall (~658.4 mm) that is experienced at the site, and the need for a constant supply of water for the composting activity, Bio-Recycle will at all times be able to contain leachate runoff generated up to and including a 1 in 25 year 24 hour event with additional capacity for an overall maximum containment volume equivalent to a volume generated within a 1 in 100 year 24 hour event (i.e. 14.7 Ml). Stormwater generated in excess of this amount will flow to the second basin which will have a 1 ML capacity which will then release via spillway to the existing lower basin and then into void 4, thus preventing any releases to surrounding receiving surface waters located off site for a rainfall event in excess of a 1 in 100 year 24 hour event.

Appendix 3 – Figure 1 portrays how the secondary detention basin will release to the lower basin via a rock pitched spillway. The image further portrays topography that will see releases from the lower basin enter Void 4 for containment.

It is to be noted that windrows will be positioned parallel to the surface water flow on top of the hardstand pads to ensure that generated leachate does not accentuate the removal of compost at the base of the respective windrow and thus overload the detention basins with organic matter entering via flows. It is important to understand that excess organic matter entering detention basins will create reducing conditions as organic matter breaks down and due to this, reduced gases such as hydrogen sulphide (rotten egg gas) can be liberated. Due to the size and volume the primary leachate detention basin contains, allowing any anaerobic conditions to predominate will result in extra operational costs in its management, a scenario that is not supported by Bio-Recycle. To be absolutely clear in relation to this aspect of management, all windrows must be aligned with the gradient of the surface so as to minimise the re-entrainment of compost with flowing leachate. This action will minimise the amount of solids that enter the detention basin.

It is important to understand that other factors such as pH play a role in the amount of odour that is released such that if the pH is < 6.5 pH units, sulphide release can be accentuated. Therefore, an understanding that the pH of detention leachate should remain above a pH of 6.5 is essential.

Similarly, composting feedstock can introduce excess nutrients or oxygen demanding substances that can cause a deterioration in the quality of water contained and commensurate with that, an increase in the management that is required to maintain aerobic (oxygenated) conditions. As such it is essential that raw feedstocks do not enter detention basin. To minimise the level of contaminants entering the water column, wash out and wash-downs will occur initially on a bed of greenwaste to filter out solids and to absorb nutrients prior to its release to the detention basin. This initial wash-down area will be located at the southern end of Pad 2 so that wash waters can be easily directed to the pipe transferring leachate to the detention basin. The saturated greenwaste material will be added to compost recipes and will be replaced regularly. The greenwaste will be laid on top of crushed rock/concrete so that muddy conditions are not created. Within 12 months from the commencement of the activity within area 2, Bio-Recycle will construct a designated wash-out and wash–down area. A purpose built concrete hardstand will be constructed with a slight grade that will facilitate the movement of wash waters to a designated drive in sump, allowing for the easy removal of contained solids with a front end loader. Wash-down waters contained in the sump will be removed via pump.

Due to the size of containment provided by the primary detention basin and the leachate management practices mentioned previously, it is unlikely that dissolved oxygen levels within the water column of the detention basin will become significantly low. By not allowing excess compost/sediment to enter the detention basin the oxygen demand of the leachate will be significantly lower than it would if solids and organics were present.

If required, an aerator will be installed within the primary detention basin to ensure that contained leachate is aerated, particularly after rainfall events. If rapid oxygenation is required, hydrogen peroxide will be used.

Employees must be aware that as aerobic microbes degrade organic matter, oxygen present in the water column is consumed. As Oxygen levels diminish or disappear, anaerobic degradation occurs with the liberation of offensive odours such as sulphide or ammonia albeit that the scale of such a release is largely dependent upon pH however.

It is important to note that if the pH range limit is met (i.e. 6.5-8.5 pH units), then the likelihood of environmental nuisance occurring is remote to non-existent.

In ensuring that the onsite erosion and sediment transport (i.e. contamination of stormwater) is minimised, various erosion and sediment controls (ESCs) will be implemented. Sections *7-8* provides details of the various ESCs that will be implemented, including the various management controls and techniques that will be adopted onsite to minimise erosion and the subsequent contamination of stormwater.

It can be noted that the ESCs that have been adopted are focused towards minimising erosion and sediment transport at their source in accordance with the *IECA Guideline 2008, Book 1, section 2 - Principles of ESC, Principle 8.10, - 'Wherever reasonable and practicable, sediment should be trapped as close to its source as possible'*. Where this cannot happen, sediment ladened waters will be directed to designated sedimentation dam(s) for the retention of sediment.

Further to the above, guidance was provided from the document titled "Managing Urban Stormwater – Soils and Construction Volume 1, 4th edition, March 2004 (the blue book) for establishing the erosion hazard rating of the hardstand pad area and for also predicting the amount of soil loss that is expected to occur annually from the hardstand pad so as to assist in predicting when the detention basin may require desilting. *Section 7.1* below provides information surrounding soil loss from the operational hardstand area.

In ensuring the containment capacity provided by the detention basin is maintained so as to be able to at least contain a 1 in 25 year 24 hour event, the basin must be managed as outlined within *Section 9.5* Detention Basin Management. Briefly however, it can be noted that the regular de-silting of the basin will occur as and when directed by the Site Manager to maintain required volumes. As such regular observation for the accumulation of silt/sediment must occur.

In the event that a release of contained leachate occurs from the primary detention basin via the designated spillway into the secondary basin, additional monitoring of the water contained within this basin may be required to ensure that an understanding of the quality of water released has been established. Observations must note if released waters have been contained within the secondary basin, the lower basin or in fact released to Void 4.

Bio-recycle has established the following aspirational emergency release limit to ensure that offsite impacts are minimised should they in the unlikely event occur:

- a pH value that is within the range of 6.5-8.5.

Section 13 - Emergency Stormwater Release Management and Monitoring, provides specific detail on any additional monitoring that should be conducted prior to an anticipated emergency release and the necessary adjustments that can be made prior to a release occurring if the aspirational pH range limit is not achieved.

It is to be noted that the pH of contained water, is proposed to be monitored regularly for the understanding of the ability of water contained within the detention basin to release odour pertaining to ammonia and sulphides. As such, if pH of contained water requires adjustment it can be done so at the time of measurement as opposed to performing mass dosage events should the need arise prior to an anticipated emergency release.

For further reference, employees are directed to **Workplace Procedure 1 – Leachate Management** (refer to **Appendix 1**) for further direction.

The hardstand pad is considered to have a low permeability (refer to **Appendix 4** for detail regarding density and permeability results associated with onsite overburden) and as such meets the minimum design requirements for working surfaces as detailed within the NSW EPA Composting & Related Organics Processing Facilities, Environmental Guideline.

Where depressions or undulations are experienced, they are to be repaired with screened overburden; with emplaced overburden being slightly wetted and compacted so as to emulate the primary gradient of the surrounding surface.

The hardstand pad material is considered to be appropriate for the protection of receiving groundwater when considering the permeability and also the underlying strata, which is comprised of approximately 50 m (depth) of fly ash. **Appendix 4** indicates that the onsite overburden will achieve an appropriate impermeability (i.e. 1.45 x 10^{-9} m/s = 3.6 x 10^{-6} m/hr or 0.0036 mm/hr) such that the minimum design requirements detailed within the NSW EPA Composting & Related Organics Processing Facilities, Environmental Guideline for a leachate barrier system will be achieved. It is essential that when overburden is to be utilised for detention basin lining, it must be installed in accordance with the engineering design specification supplied by Aurecon.

It is worth mentioning here that the underlying fly-ash demonstrates a low permeability. The following table is reproduced from the report prepared by Aurecon for AGL Macquarie regarding the insitu permeability of fly-ash located within Void 3.

	BH1	BH2
Slug 1	1.3E-05 m/s	-
Slug 2	7.7E-06 m/s	8.4E-06 m/s
Slug 3	6.7E-06 m/s	6.6E-06 m/s
Average	8.9E-06 m/s	7.5E-06 m/s

Table 1 Permeability results from slug tests

Table 3: Permeability of underlying fly-Ash (source Aurecon

What is evident from the above table is that the permeability of the flysh-ash becomes lower with each successive slug test.

The detention basins will also be lined with overburden and drill muds that accord to the drill mud exemption and order, issued by the NSW EPA. Unsuitable material must not be utilised.

The addition of drill muds will assist in sealing the liner further. Whilst it is unlikely that significant volumes of contained stormwater will percolate through the 50 m of fly ash, it is to be noted that all percolate through the fly ash is contained within the onsite AGL Macquarie groundwater management system which is monitored. Due to the depth of fly ash (~ 50 m), confidence can be given that no contamination of groundwater is likely if hardstand pads and detention basins are maintained.

5 Items to Be Addressed

The information in the below sections directly addresses how Bio-Recycle will manage stormwater at the facility, including erosion and sediment control in compliance with conditions of the EPL.

6 International Erosion Control Association (IECA) Guidelines

In preparing this document, Bio-Recycle acknowledges the key principles of erosion and sediment control as listed within the IECA Best Practices Erosion and Sediment Control Guideline, November 2008, reprinted June 2012, of which certain aspects have been and will be considered where deemed necessary and desirable.

Further to the commitments made in section 2, Bio-recycle is committed to the following objective:

- ***To taking all reasonable and practicable measures to minimise short and long-term soil erosion and the adverse effects of sediment transport.***

The key principles portrayed within Section 2 of the IECA Guideline that have been considered as essential to the overall success of Bio-Recycle's erosion and sediment strategy at the site are to:

- appropriately integrate the facility into the existing site;
- integrate erosion and sediment control into the construction of the hardstand pads;
- develop an effective and flexible erosion and sediment control plan;
- control water movement on the site;
- maximise sediment retention on the site;
- maintain all erosion and sediment control ESC measures in proper working order at all times; and
- monitor the site and adjust ESC practices to maintain the required performance standard.

The Erosion and Sediment Control Pan (ESCP) has been created so that Bio-Recycle can integrate erosion and sediment control issues into on site stormwater planning and management on an ongoing basis so as to provide short and long term solutions to erosion and sediment control. The following

paragraphs provide detail in relation to how the above key principles have been and will be met by Bio-Recycle in carrying out composting and soil conditioner manufacturing with regards to effective erosion and sediment control.

Whilst the current plan delivers effective erosion and sediment control measures based on anticipated clay properties, weather and operational conditions, flexibility has also been provided such that Bio-Recycle can re-evaluate implemented measures to determine if improvements needs to be made (as and when required), a principle supported by IECA.

7 Erosion and Sediment Strategy

In accordance with IECA principles Bio-Recycle has adopted the following key strategies in order to meet site compliance obligations.

1) Clean water diversions will be maintained to minimise the risk of 'clean water' mixing with contaminated water and contributing to the overall site contaminated water inventory. Stormwater flows will be controlled to reduce velocities and minimise erosion.

2) Stormwater flows within the designated catchment will be controlled to reduce velocities and minimise erosion.

3) Maximise sediment retention on site by ensuring sediment laden waters are directed to respective sediment detention basins within the designated areas.

4) Maximise sediment retention outside the designated area by ensuring sediment laden waters are directed to sediment basins and in the long term establishing grass within swales or diversion drains.

5) Stabilise & Rehabilitate disturbed areas as soon as practical to control long term erosion and meet long term performance targets.

6) ESC controls will be maintained to ensure effective management of erosion and sediment and water quality objectives.

7) Monitor the site and adjust ESC practices and where necessary revise the ESCP to maintain performance standards and compliance outcomes.

Further to the above, consideration has been given to various aspects mentioned within the document, Managing Urban Stormwater – Soils and Construction, Volume 1 (the blue book).

7.1 Erosion Hazard & Soil Loss Estimation

The following section provides information pertaining to the erosion hazard status of the hardstand material. The overburden is considered to be a Group D type soil with a very high runoff potential as per Appendix F of the blue book.

The very high runoff potential is because observations and permeability results portray that water moves into and through these soils very slowly (i.e. less than 1 mm/ hr) when thoroughly wetted. The overburden is considered to be poorly structured which is comprised of fine textured clay in part. Observations highlight that the layer near the surface is nearly impervious and due to this shed runoff from most rainfall events. The overburden is considered to be dispersive.

To predict soil loss, the revised universal soil loss equation (shown below) was utilised (Appendix A of the blue book).

A= R .K. LS. P. C (tonnes / ha/yr).

The rainfall erosivity factor (the R factor) for the Singleton area is 1500 and the soil erodibility factor, K was determined to be 0.05 which is considered conservative because the initial value was increased by 20% because of potential dispersion.

The texture of the existing hardstand surface was considered to be a silt to clay, containing an organic carbon content of 2 % which is converted to an organic matter of 3.44 % with a soil structure on the surface being very fine and equivalent to rating 1 with a profile permeability rating of 6 which is very slow.

For the purpose of calculating the K value, the percentage of silt = 65% and the percentage of sand = 10 %.

The Slope length/gradient factor – LS of 0.19 (i.e. 1% slope over slope length of 80 m) was chosen as this will be approximately the length of the windrows. An erosion control practice factor (the P factor) of 1.3 was selected. A cover factor (the C factor) of 1 for bare soil and no grass cover was selected to be representative of future conditions.

When calculating A; A = 1500 x 0.05 x 0.19 x 1.3 x 1.0 = 18.53 tonnes of soil/ha /yr which equates to a volume of 23.2 cubic metres/ ha / year when you multiply tonnes by 1.25 tonnes/cubic metre. It is to be noted however that this estimation considers a cleared hardstand pad. Soil loss is predicted to be less due to the attenuation that windrows will provide. The above estimation does indicate that minimal height reduction of the hardstand pad will occur annually.

When considering that the primary leachate detention basin has a volume 14,700 m^3 and that the Pad 1 & 2 hardstand areas equals 8.78 ha, approximately 203 m^3 could potentially enter the detention basin which is representative of 1.4 % of the volume of the detention basin. It is therefore estimated that de-silting would occur every 5 years where the amount of silt/sediment removed would equate to 6.9 % of the detention basin's volume. If the sediment fore-bay is regularly maintained after rainfall events, the estimated loss of soil to the leachate detention basin will reduce and it is likely that the amount of silt/sediment removed from the basin every 5 years will be significantly less than the above estimated percentage.

8 Control Plan (ESCP)

This and proceeding sections are focused on detailing the proposed sediment control measures that have been and will be (if determined as necessary) implemented as part of effective stormwater and leachate management at the facility as part of short and long-term measures. For reference, **Appendix 3 – Figure 4** portrays the direction of leachate flow within and stormwater external to the designated operational area. **Appendix 3 – Figure 5** portrays the erosion and sediment control plan that must be followed at the facility and portrays key pieces of stormwater infrastructure. It is to be noted that erosion and sediment control devices that have been and will be implemented as part of an effective ESCP must be maintained and promptly repaired as and when required.

Bio-Recycle will work with AGL Macquarie to stabilise the ground surface of areas external to the composting platform. Measures could include grassing, installation of sediment socks or fibre logs on the ground surface so as to slow stormwater flow by reducing the fetch length of a surface.

Employees must be aware that from time to time extra ESC infrastructure construction maybe required to prepare for extended inclement weather conditions such that worsening conditions do not occur whilst managing the activity. This may mean that temporary bunds or sediment logs are installed for example to reduce the fetch lengths of flow paths.

The sediment fore-bay located prior to the headwall will release to the leachate dam which once full, will spill into the secondary dam with an additional ~ 1 Ml of containment and thence to the lower basin via rock pitched spillways. Any sediment that carries over into the lower basin will be allowed to settle.

The respective dams, flow paths and various ESCs are to be regularly monitored and maintained, and if required further ESCs will be implemented.

The above measures are expected to minimise soil erosion and maximise sediment retention onsite. **Workplace Procedure 4 – Erosion and Sediment Control Procedure** provides further examples of

management and outlines onsite duties to maintain all erosion and sediment control measures in proper working order at all times. All Site employees are to become familiar with this procedure and any daily observations of any maintenance issues are to be reported to the Site Manager for prompt action.

Daily monitoring of the Site infrastructure and feedback to management will be used to adjust any ESC practices to maintain the required performance standard. This is a particularly important aspect as there is always an exception to the rule, in that what works on a site successfully may not necessarily work on another. Nevertheless, under the ESC strategy Bio-Recycle is committed to ensuring that any failures will be recorded and rectified promptly so as to demonstrate continual improvement (refer to **Appendix 2 – Forms and Checklists**).

8.1 Erosion and Sediment Controls

The focus of ESCs as detailed in *Section 8.1.1 – 8.1.6* below are to minimise the occurrence and therefore risks associated with erosion and sediment transport at their source.

Bio-Recycle recognises that effective ESCs can provide many benefits to the site including:

- Increased on-site safety;
- Reduced down time after rain;
- Reduced clean-up costs after rain;
- Reduced damage to infrastructure; and
- Fewer contractor, transport or public complaints.

The ESCP that has been initiated by Bio-Recycle incorporates the implementation of the various ESCs previously mentioned above and described below at the site in order to achieve the bulleted benefits listed above.

For example, reducing hardstand fetch lengths will occur so that the velocity of flowing leachate is decreased. This can be achieved by slightly raising the hardstand pad at the end of each windrow where vehicles traverse so that flowing leachate can be slightly diverted. The change in grade has to only be slight. This action will negate the need to install a sedimentation basin prior to the headwall of the transfer pipe albeit as a precautionary measure a sediment fore-bay will be installed.

It is to be noted however, that whilst the primary detention basin has enough capacity for it to be also considered as sedimentation basin, there may come a time in the future based on observation of performance, that smaller sediment basins will be required to be installed above the detention dam so that sediment ladened leachate is prevented from entering the primary detention basin. This will likely

be the case when Pad 3 is brought on line with regards to compost production. But in the meantime, as stated previously Pads 3 and 4 will have compost applied and grass seed broadcasted with regular irrigation occurring so as to accentuate grass coverage that will ultimately minimise sediment movement from the current exposed surface.

When only considering Pads 1 and 2, the sediment fore-bay servicing the hardstand pads will be sufficient to slow the velocity and momentum of leachate exiting the hardstand pads so as to allow for the trapping of large solids.

Batter slopes that lead into the primary detention basin will be progressively covered with compost and topsoil so as to facilitate successful vegetation cover. In some areas, the use of sediment logs may be required to reduce the fetch length of slopes so as to minimise rill erosion. Mulch, too can be utilised to minimise the erosive force of rain drops. This can be easily determined when observations occurs for sediment and erosion control performance after rainfall events and erosion or sediment movement is observed. When this occurs, the Site Manager must be informed so that prompt attention can occur.

Where appropriate, rock check dams will be located within drainage channels to reduce the velocity of water and to also trap sediment. Drainage channels or broad water conveyance areas that are not located within the operational area will be initially targeted for grassing.

To ensure that externally generated stormwater does not enter the operational area, small perimeter bunds will be strategically positioned so as to prevent such entry.

In addressing the risk of erosion and sediment transport at their source however, whether it is external to the operational hardstand area or within its perimeter, protection of the detention basin can be achieved such that the requirement to desilt it can be reduced.

The above approaches to ESC (i.e. prevention at the source, installation of check dams and sediment logs, covering exposed surfaces with top soil and compost so as to achieve vigorous grass growth, covering exposed areas with pasteurised mulch to minimise rain drop penetration, including the provision to grass swale drains and drainage paths and ensuring grass is established on batter slopes and stormwater retention dam walls and bunds) creates a chain of ESC's that affords the receiving environment the greatest level of protection from erosion and the re-entrainment of sediment.

Integral to the successful performance of sedimentation and detention basins, is for the efficient management of suspended solids or colloidal suspensions. The importance of implementing a flocculating program so as to clarify contained leachate or sediment ladened stormwater is discussed further on within *Sections 8.1.5* and *9.5* respectively.

8.1.1 Bunding and drains for the Diversion of Stormwater from Undisturbed Areas

Perimeter bunding will be constructed as and when required so as to ensure that clean stormwater does not enter the hardstand pad. The current requirement is for the western side of the hardstand pad to have a bund installed. Similarly, diversion drains will be constructed to facilitate the movement of any accumulating stormwater. **Appendix 3 – Figure 5** highlights where bunding and diversion drains are to be located.

8.1.2 Cover of Exposed Areas with Vegetation

It is recognised that temporary cover of exposed areas assists in reducing the re-entrainment of sediment during times of rainfall. It is to be noted that the duration of soil exposure and the area of exposure at any given point should be minimised. As described previously, initially areas 3 and 4 will have compost spread with grass seed broadcasted so that grass can be established with irrigation. Area 1 will then be prepared in the same way so as to establish good grass coverage.

8.1.3 Management of Concentrated Flows

Bio-Recycle understands that concentrated flows can accentuate erosion and subsequent sediment re-entrainment. The following sections provide detail on how concentrated flows will be managed. In essence, concentrated flows wherever possible will be converted into sheet flow via the use of level spreaders or will be subject to energy dissipation.

8.1.3.1 Level Spreaders

When utilising level spreaders, sheet flow will be collected and concentrated and converted back into sheet flow. The determination to convert concentrated into sheet and vice versa will be determined by the Site Manager as and when required and will be primarily related to the fetch length where erosion starts to appear along batter slopes or graded surfaces. Emphasis will be given to installing channel grades at less than 1 % on the inside of bunding/drainage channels such that the level spreader can be created at 0% grade.

8.1.3.2 Energy Dissipaters

Bio-Recycle understands that concentrated flows can be further managed firstly by slowing the velocity or minimising the momentum of the subsequent flow. This will be achieved by installing energy

dissipaters such as check dams along the flow paths plus rip rap in combination with rock structures at the base of containment dam discharge locations/spillways.

Additional check dams may be installed if monitoring of onsite stormwater management determines that installation of such energy dissipaters is required to improve the level of protection provided to sedimentation and detention basins and the receiving environment. *Section 8.1.4* below details the monitoring that will be conducted with regard to the assessment of onsite stormwater management and the need for installation of additional ESC controls such as check dams.

8.1.4 Additional Erosion and Sediment Controls

The above detailed ESC measures have been provided with the view that compliance with EPL conditions will be achieved. However, if unknown sources of erosion or sediment load become apparent additional sediment and erosion control measures will be implemented as and when required. Prompt measures such as the installation of sediment fencing or rock armouring will occur as and when required. Sediment fencing at this time is not considered to be a main tool to erosion protection.

As part of the management of stormwater, **Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** (refer to **Appendix 2**) must be completed regularly, particularly after rainfall events, to assess the site performance with regard to erosion and sediment transport. The results obtained, as part of the completion of **Form 2**, will be used to determine where additional ESCs must be implemented.

Workplace Procedure 1 – Leachate Management (refer to **Appendix 1**) and *Section 9* below provide further detail on completing **Form 2 – Stormwater Performance** .

It can be noted that apart from the ESCs detailed above (i.e. diversion of external stormwater flows, rehabilitation of designated areas, installation of check dams, perimeter bunding etc), the maintenance of these controls, when and where appropriate (refer to *Section 9*), and the management and maintenance of the sedimentation dams (refer to *Section 9.6*), must be determined by the Site Manager.

8.1.5 Sediment Fore-Bay and Sedimentation Basin Management

Integral to successful leachate management and minimising the level of sediment movement or loss from the hardstand pad into the primary detention basin is the management of the sediment fore-bay initially, from Pads 1 and 2, and when Pad 3 is brought on line, the management of the sedimentation basin located within Pad 3.

Section 11.1 below details that the containment capacity provided within the primary detention basin exceeds the volume of leachate that will be produced over the disturbed area of the site during a 1 in 25 year 24 hour rainfall event and as such there is some capacity available for sediment storage. Whilst that is the case, s*ection 7.1* above provided an estimate of yearly soil loss from Pads 1 and 2 that shows desilting of the primary dam should occur every 5 years thus ensuring that less than 10 % of the volume for containment will be compromised. Whilst the chance of the primary detention basin being significantly filled with sediment so that the above required containment volume cannot be catered for is unlikely, observation must occur so as to determine if excessive amounts of sediment have in fact entered the detention basin. If observed to be the case, further small sediment basins must be installed, preferably close to the source if the source cannot be eliminated or manage via another technique. For it to continue to be able to retain desired volumes, sediment release from the hardstand must not be significant and as such the sediment fore-bay and eventually, when operational, the sedimentation basin within Pad 3 must be regularly desilted.

The Site Manager is responsible for ensuring that extended weather forecasts are considered such that the required capacity for the effective operation of the sediment fore-bay and sedimentation basin are achieved, prior to the possible rainfall event occurring. In observing the extended weather forecast, the Site Manager may determine that enough capacity exists within the fore-bay and or sedimentation basin for the containment of sediment that may possibly be delivered during the incoming rainfall event and as such an emptying or desilting of the basin prior to the rainfall event occurring will not be required.

It is expected that the frequency at which sediment and organic solids must be removed from the fore-bay and sedimentation basin will increase during the wet season. This will ensure their efficiency to remove solids and sediment from flowing leachate.

Bio-Recycle will manage stormwater in accordance with the conditions of the hierarchy highlighted in *Section 2* above. In ensuring this, including the ability to contain a 1 in 25 year 24 hour rainfall event when necessary, the water contained within any of the onsite basins will be reused as dust suppression water, compost make up or adjustment water and irrigation water within the licenced area of the site.

Stormwater monitoring of the primary detention basin must occur regularly for insitu parameters (pH, electrical conductivity, dissolved oxygen and redox potential) with a full analysis of target compounds and elements being conducted at half yearly intervals.

It can be noted here that prior to the reuse of contained leachate, treatment may be required and in particular pH adjustment.

In ensuring that the design capacity of all sedimentation basins is maintained, all sedimentation basins must be regularly de-silted to remove built up sediment. The Site Manager is responsible for determining when the removal of silt/sediment from the sedimentation basins and even the respective

stormwater detention basins must occur. However it can be noted that this will be largely dependent upon the volume of stormwater runoff generated as a result of rainfall over the area of the site. Regular measurement of sediment build up is required to ensure that the required volume of containment can be achieved.

Gypsum will be utilised to reduce suspended solids/colloidal material that is present within the water column of the primary leachate detention basin from time to time. Dosing will occur at 100 kg/ 100 m^2.

For further detail on the management of sedimentation basins as outlined above, readers are directed to **Workplace Procedure 2 – Leachate Detention Basin Management** (refer t**o Appendix 1**). Similarly, further information regarding maintenance is provided within *Section 9.6* below.

8.1.6 Grass Lined and or rock armoured drainage channels

Stormwater flow paths will be inspected and planted out where required to increase the roughness co-efficient to stem flow velocity, and filter sediment to control erosion as per the recommendations made within the IECA guideline. Performance of the flow paths and drainage channels will be monitored in accordance with **Workplace Procedure 4 – Erosion and Sediment Control Procedure** and if warranted Bio-Recycle will consider rock armouring drainage channels.

9 Maintenance of Erosion and Sediment Controls

Effective stormwater management cannot occur if ESCs, including the sedimentation dams and flow paths (i.e. surface gradients) are not properly maintained. Stormwater management must not be compromised due to ESC infrastructure not performing effectively.

The ESC controls detailed above, including flow paths must be maintained such that they are performing effectively. The sections below provide information on how these controls will be maintained such that offsite impact does not occur. It is to be noted that regular site observation must occur whereby **Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** will be utilised to gauge performance and to assist in determining if further ESC's are required (refer to **Appendix 2**). In general, the purpose of the site observation is to determine if:

- The adopted Erosion and Sediment Control Plan (ESCP) is still appropriate for the site;
- The ESCP is being appropriately implemented;
- The ESC measures are being appropriately maintained;

- The works are un-necessarily contributing to environmental harm or environmental nuisance; and
- An amended ESCP needs to be prepared and/or approved.

A Daily Running Sheet is provided in **Appendix 2** for the recording of any observations made during the above mentioned site observations to check leachate and externally generated stormwater management and ESC performance. The running sheet can also be used to document extraordinary events such as non-compliances or emergencies that occur on site.

All onsite employees are required to report to the Site Manager any observations made that may result in environmental harm for attention and necessary action. Some detailed examples of observations that could be made and recorded are provided below:

9.1 Stormwater flow paths (surface gradients)

Flow paths are important for movement and management of stormwater generated within the site. All flows paths must be visually inspected regularly (particularly after rainfall events) for evidence of blocking due to foreign objects being present or from the build-up of soil material resulting in inefficient drainage, misdirection and/or ponding and pooling of stormwater runoff. It is to be noted that some ponding or pooling of stormwater within temporary low points of flow paths created as a result of operations is likely to occur.

It is important for onsite personnel to understand that internal flow paths must be maintained, such that the desired movement of stormwater is not obstructed or prevented. It is also important for vegetation not to be allowed to proliferate along flow paths such that obstruction occurs.

It is considered that drainage channels are representative of appropriate gradients and widths to convey onsite water. However, observation will be performed to determine their efficiency in this regard.

Regular observation will determine flow path integrity and efficacy with the level of performance being recorded (refer to **Appendix 2, Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** for associated performance checklists).

Any undesirable surface gradients must be repaired or rectified promptly (when and where required). The observations made as part of completing **Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** must also be used to determine when and where installation of additional ESC controls for the management of concentrated flows and removal of sediment from stormwater runoff is required (refer to **Appendix 2**). For example if observations made as part of completion of **Form 2 –**

Stormwater Performance and **Form 5 – ESC Checklist** highlight that high velocity concentrated stormwater flows are occurring along the flow path then additional check dams will be installed (as determined by the Site Manager) to effectively reduce the velocity of and transport of sediment within stormwater flows along this path.

9.2 Spillways and Chutes

Spillways and chutes shall be created from various sized rock which will be classified as hard, durable albeit evenly graded with 50% by weight larger than (d50) rock size, determined to be 200 mm. Large rock should dominate, with sufficient small rock to fill voids between the larger rocks. The diameter of the largest rock size should be larger than 1.5 times the nominal rock size. Hand placing of rock may be necessary to achieve the proper distribution of rock sizes to produce a relatively smooth, uniform and stable surface.

9.3 Protection Structures and Energy Dissipaters

As referred to in *Section 8.1.3,* for concentrated stormwater flows which require it, protection structures and energy dissipaters will be considered. Significant energy loss can occur within a hydraulic jump and thus their existence is often encouraged at the base of chutes and spillways to dissipate energy (IECA; A.33; 2012).

9.4 Perimeter bunding

All perimeter bunding installed must be maintained as necessary to prevent the ingress of stormwater that is generated external to the area of the operational area. Attention will be given to ensuring that perimeter bunds do not become an entry point for stormwater. It is essential that all perimeter bunds do not develop cracks or gaps that compromise their integrity. Preventing external stormwater flows from entering the facility will reduce sediment transport and erosion onsite, ensuring maintenance of ESC devices is reduced as much as possible.

Care must be taken to ensure that all perimeter drainage has a consistent grade that suits the needs and topography of the site. Care must also be taken to ensure that this grade is maintained. In constructing perimeter bunds consideration must be given to allowing for compaction and settlement. Consideration must also be given to the application of topsoil and seeding perimeter bunding to aid in maintaining its integrity particularly through high rainfall events. However, care must be taken when installing

perimeter bunding such that a worsening condition upon neighbouring properties does not occur. Bio-Recycle, if required will consult with neighbours to ensure that impacts to operations or infrastructure do not occur.

Furthermore, the perimeter bunds must be monitored regularly (particularly after high rainfall events) for evidence of any of the above issues (refer to **Appendix 2, Form 2 – Stormwater Performance**).

When necessary, repair of perimeter bunding must occur as soon as possible following observation made regarding possible entry points within the bund(s) to ensure their integrity is reinstated promptly.

9.5 Detention Basin Maintenance

It is to be noted that due to the nature of the composting activity being performed, the types of wastes received and the method of stormwater management, it is expected that the water contained within the primary, secondary and lower (to a lesser extent) detention basins may be contaminated with nutrients, suspended solids, colloidal material, biological demanding substances, total organic carbon and various anions and cations, including trace elements. Therefore, the environment within the basin(s) is expected to be reduced and thus creating conditions suitable for odour generation.

In the event that the primary detention basin receives significant loading (unlikely if flows first pass through sediment fore-bay or later sedimentation basin on Pad 3) or is releasing unpleasant odour, the basin must be either aerated or treated with a bacterial inoculum or microbial stimulant, to ensure it is maintained in an oxidised, odourless state and that BOD and COD is reduced. The inoculum or stimulant must be mixed to the required dilution and sprayed across the surface of the pond to ensure an aerobic state predominates so that offensive odour is not generated, thus preventing environmental nuisance. If rapid oxygenation is required, then the use of hydrogen peroxide must occur. Before this occurs, the Site Manager must engage a suitably qualified person to provide direction on how the peroxide is to be applied.

Similarly, pH may need to be raised so as to ensure that sulphides remain in solution. The pH of all contained waters must remain above 6.5 pH units and not be allowed to increase above 8.5 pH units.

If the water column within the primary detention basin requires a reduction in suspended solids/colloidal clay suspensions, gypsum will be utilised to flocculate such suspensions. Gypsum will be partially dissolved in water and sprayed over the leachate water's surface. The dossing will be 50-100 kg/ 100 m^2.

9.6 Sedimentation Dams and check dams

After each rainfall event, respective sediment basins and check dams must be inspected, with the removal of accumulated sediment and solids occurring promptly if required.

All cracks or damage observed in the base and side walls of any sedimentation basin or check dams must be repaired promptly. All observations of cracks or damage must be reported to the Site Manager promptly and recorded on **Form 1 - Daily Running Sheet** (refer to **Appendix 2).**

Maintaining the functional integrity of the sedimentation basins and any check dams installed is imperative. Accumulated sediments must be removed from these basins regularly but at least when 30 % of the volume is occupied by sediment. This will be determined when dewatering occurs. This will ensure that the required containment capacity is maintained, the re-entrainment of sediment is reduced as much as possible and that dams are operating to their maximum potential.

10 Daily Weather Conditions

Appendix 2, Form 3 – Daily Weather Conditions must be used to record weather conditions experienced at the site. This is an extremely useful data set that can be used to schedule repair and maintenance of ESC areas after certain rainfall volumes are experienced.

Commensurate with this is the review of extended weather forecasts to assist in predicting unfavourable operational conditions that may arise. Review of such predictions can assist in demonstrating ones environmental duty and ensuring that sufficient containment capacity exists within onsite dams and basins when a 1 in 25 year 24 hour AEP rainfall is considered likely.

11 Leachate Quantity Management

11.1 Capacity for Leachate Containment and Catchment Area

The area of the hardstand pad is equivalent to ~ 8.78 ha. (refer to **Appendix 3, Figure 3**). Containment has been provided for the volume of stormwater that will be produced as a result of a 1 in 100 year 24 hour rainfall event (i.e. 168 mm) over the area of this catchment, which is equal to ~ 14.7 ML of stormwater being produced. Bio-Recycle is committed however to ensuring that available capacity is equivalent to the volume created during a 1 in 25 year 24 hour rainfall event.

It is to be noted that the volume of containment provided by the secondary detention basin of 1 Ml when combined with the primary detention basin exceeds the volume generated within a 1 in 100 year 24 hour event.

12 Leachate Quality Monitoring

As mentioned, monitoring and sampling of the primary detention basin must occur half yearly to determine the quality of water contained. Table 3 below provides the respective analytes that require analysis by a NATA accredited laboratory every 6 months.

Analyte
BOD
COD
Ammonia
Nitrate
Total Phosphorous
Total Nitrogen
Zinc
Copper
Mercury
Selenium
Lead
Nickel
Suspended Solids

Table 4: Analytes to be Determined at Half-Yearly Intervals

If no water is present within the detention basin in order to conduct half yearly stormwater monitoring, photographs of the basin must be taken as evidence to provide to the EPA if requested. In such instances, monitoring of the primary detention basin must occur at the next available opportunity so as to determine water quality.

13 Emergency Leachate Release Management and Monitoring

Monitoring prior to an anticipated emergency release should include the recording of pH, electrical conductivity (EC), dissolved oxygen (DO) and redox potential. Samples should also be obtained so as to allow further testing if considered necessary of analytes presented in Table 3 above.

In accordance with normal operating procedures correction of contained stormwater should occur, for pH, if it is not within the specified range of 6.5-8.5 pH units.

The corrective action associated with the adjustment of pH so as to achieve the aspirational release limit, is bulleted below:

pH adjustment

To increase or reduce the pH such that it is within the desired range (i.e. 6.5-8.5 pH units), caustic soda or lime (preferably), or sulphuric acid or sodium bisulphite must be added to the contained water.

- For further detail on the management and monitoring associated with an emergency release to the, readers are directed to **Emergency Procedure 1 – Emergency Stormwater Release** (refer to **Appendix 1**).

14 Conclusion

The information provided within this SGWMP demonstrates how Bio-Recycle will manage leachate at the site such that the receiving water environment is protected.

It is believed that if all control measures and workplace procedures are adhered to, achievement of the stated measures and design requirements expressed within the Composting & Related Organics Processing Facilities, Environmental Guideline prepared by the Department of Environment & Conservation, 2004 will be achieved.

Moreover, the information provided addresses all items the Pollution Reduction Program issued by the EPA via Licence Variation (Notice No. 1533678) to be implemented at its Ravensworth Composting Facility will be achieved.

Supporting the above, the Erosion and Sediment Control Strategy and subsequent plan proposed within this SGWMP demonstrates Bio-Recycle's commitment to ensuring the site meets its compliance obligations in accordance with IECA principles. Furthermore, the ESCP demonstrates robust processes to ensure erosion and sediment control issues are integrated into workplace operations to achieve the best possible outcomes (refer to Workplace Procedures).

Bio-Recycle is committed to conducting stormwater management in compliance with the requirements of the EPA and the respective conditions of the EPL. As a result of the above information presented, Bio-Recycle is confident that even if stormwater was to be released from the site during an emergency, environmental harm would not likely occur.

Appendix 1

Leachate and Stormwater Management Workplace and Emergency Procedures

1 Introduction

Section 2 below contains the leachate workplace procedures for the management of leachate, including erosion at the site. Stated measures contained within these procedures detail information for site employees to use as a guide when managing leachate. A leachate emergency leachate release procedure is provided within *Section 3* below. This procedure will assist employees when responding to an uncontrolled leachate release from the site.

For the purpose of accessibility, the leachate workplace and emergency procedures will be laminated and positioned in various locations throughout the site. The leachate workplace and emergency procedures are listed as follows:

Workplace Procedure

Emergency Procedures

2 Workplace Procedures

<table>
<tr><th colspan="2">Workplace Procedure 1 – Leachate Management</th></tr>
<tr><td colspan="2">Environmental Commitment:

• To ensure that uncontrolled leachate releases to the receiving environment do not occur during rainfall events up to and including a 1 in 25 year 24 hour rainfall event, therefore preventing environmental harm.
• To effectively manage leachate generated at the site so as to limit onsite erosion and sediment transport and protect the integrity of associated sediment management infrastructure.
• To prevent uncontaminated stormwater runoff generated external to the site from entering the site.</td></tr>
<tr><td>Identification of Issues:

• The development of cracks or gaps in perimeter bunding.
• Uncontaminated stormwater generated external the site is allowed to enter into the site.</td><td>Potential Impacts:

• Increased volume of leachate required to be managed.
• Increased erosion or sediment transport on site.
• Increased contamination of the water column within onsite dams.
• Increased treatment of onsite dams or installation of additional ESC controls, with associated increased costs.
• Increased chance of uncontrolled release occurring.
• Contravention of a permit condition & possible enforcement action by EPA.</td></tr>
<tr><td>• Misdirection of leachate runoff.</td><td>• Increased chance of an uncontrolled release resulting in harm.
• Increased chance of an overtopping of an onsite dam resulting in an uncontrolled release.
• Increased chance of erosion.</td></tr>
<tr><td>• Damage to pad(s) caused by vehicles continually travelling over wet pad(s).</td><td>• Damage to the pad(s) is likely to cause leachate to settle in crevices in the pad(s), potentially causing offensive odour liberation and further damage to the hardstand pad(s).

• Breeding of mosquitos.</td></tr>
<tr><td>• Surface gradients are not maintained such that leachate runoff is directed as necessary.
• The blocking or obstruction of internal drains.</td><td>• Misdirection of leachate from the various areas of the facility that could result in undesirable contamination of basin(s) or releases.
• Ponding or pooling of leachate, which may result in increase in the infiltration of leachate and the redirection of leachate.
• Ponding and pooling of leachate possibly creating anaerobic activity.</td></tr>
</table>

	• Overloading of onsite basin(s) creating anaerobic conditions that if released to the receiving environment could cause environmental harm. • Enforcement action taken by EPA.
• Undesirable/unnecessary ponding or pooling of leachate.	• Operationally inconvenient. • Anaerobic conditions may develop subsequently resulting in generation of offensive odours.
• Allowing erosion to occur as a result of high velocity or concentrated leachate runoff.	• Increased erosion or sediment transport on site. • Increased contamination of the water column within onsite dams. • Increased treatment of onsite basins, with associated increased costs. • Contravention of a permit condition & possible enforcement action by EPA.
• The allowance of significant/unnecessary volumes of sediment to be transported via leachate to onsite basin(s).	• Increased contamination of the water column within onsite dams. • Increased treatment of onsite dams or, with associated increased costs. • Increased chance of an uncontrolled release occurring. • Contravention of a permit condition & possible enforcement action by EPA.
• The allowance of gross solids to be transported via leachate to the onsite basin(s). • Leachate has not been captured, contained and re-incorporated within the windrows.	• Release of offensive odour creating odour nuisance off Site. • Overloading creating anaerobic conditions that if released to the receiving environment could cause environmental harm. • Increased chance in the overloading of one or more of the onsite pond(s) resulting in the release of odour.
• The blocking or obstruction of internal flow paths.	• Ponding or pooling of stormwater, which may result in the redirection of contaminated stormwater. • Increased chance of an uncontrolled release. • Unnecessary contamination of stormwater runoff.
Control Measures:	

- The Site Manager must ensure that perimeter bunding is installed as required to prevent ingress of external stormwater volumes.
- Ensure that all perimeter bunding is integral to prevent the ingress of external stormwater volumes.
- If the integrity of the perimeter bund is found to be compromised the repairs must be conducted immediately.
- Ensure onsite flow paths effectively allow for the direction of stormwater to the onsite sedimentation dams as desired.
- Ensure unnecessary ponding or pooling of leachate onsite does not occur.
- If unnecessary ponding or pooling of leachate is observed, flows paths must be reinstated promptly.
- Ensure unnecessary obstruction/blockage of leachate flow paths does not occur.
- All unnecessary obstructions must be removed from stormwater flow paths promptly.
- **Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** must be completed regularly (particularly after rainfall events) to assess the management of contaminated stormwater and determine where any additional ESCs may need to be installed to ensure erosion and sediment transport is maintained at a minimum.
- Ensure that additional Erosion and Sediment Control (ESC's) determined as being required following observations made as part of completing **Form 2 – Stormwater Performance** and **Form 5 – ESC Checklist** are implemented.

- Ensure all windrows are constructed such that they run parallel to the leachate flow paths.
- Maintain the hardstand pads, surface gradients (flows paths) and drainage channels such that leachate flows from the various areas of the facility are directed as desired.
- Ensure the hardstand pad(s), drainage channels and pond(s) have structural integrity (particularly after rainfall events) so that movement and storage of leachate does not result in releases to the receiving environment.
- If the integrity of a hardstand pad, drainage channels or pond(s) are found to be compromised, the Site Manager must be informed immediately and repairs must be conducted immediately, by placing clay, gravel in the affected areas and compacting to the required impermeability.
- Inspect all drainage channels regularly to ensure they are maintained free of all obstacles (including waste).
- In the event that ponding or pooling of leachate does occur, clean-up action must be initiated immediately and surface gradients re-established.
- Contain, clean up and reincorporate any bulk leachate emanating from windrows.
- Ensure that all liquid is sufficiently mixed with absorbent material (i.e. greenwaste bund or sawdust etc.) and then is incorporated into the composting process.
- If the velocity of stormwater in diversion drains is such that erosion is occurring, then consideration must be given to the installation rock check dams every 20 m to slow the velocity of water.

Pond Management

- Do not allow high BOD/COD wastes to directly discharge to the onsite basin(s).
- Do not allow solid waste to be discharged to the basin(s).
- Do not allow toxic or hazardous substance to enter the pond(s). If a release or discharge occurs to the pond(s) that results in the souring of the pond(s) and hence the liberation of noxious or offensive odour, the Site Manager must inform the Facility Manager to obtain direction.
- Ensure that once the capacity of the basin(s) is reduced by >30%, excess sediment/sludge must be removed and stockpiled/re-incorporated.
- Ensure a minimum 500mm freeboard is maintained in all ponds at all times, and that it is reinstated promptly after rainfall periods.
- Empty the onsite pond(s) for use as onsite dust suppression or compost moisture control, if required.
- Ensure that the top half of the onsite basin(s) is aerobic (i.e. > 4 ppm dissolved oxygen).

- If the onsite basin(s) have received significant loading, are anaerobic or releasing offensive odour microbial inoculums or bio-stimulants, such as BioAktiv, must be added to the basin(s) to suppress odour.
- If rapid oxidation is required above what the aerator can induce, then consideration should be given to introducing ozone or hydrogen peroxide. If initially ozone or hydrogen peroxide cannot be introduced, calcium nitrate should be utilised to increase the redox potential. **Given the hazardous nature of hydrogen peroxide, specialist help will be required when introducing it to the pond(s).**
- Do not allow pH of the onsite basin(s) to fall below 6.5 or increase above 8.5 pH units.
- If pH adjustment is required, introduce dilute solutions to neutralise. This can be determined by performing a jar or bucket test, whereby solutions of sodium bisulphite, lime or dilute solutions of either sulphuric acid or sodium hydroxide can be added to a sample of contaminated water to determine the volume required. **However, since both sulphuric acid and sodium hydroxide represent a strong acid and alkali respectively, consideration should be given to the use of weaker acids and bases if a significant adjustment is not required. Contact should be made with a person who is appropriately qualified to make this determination.**

Record Keeping:

- Record any repairs conducted to perimeter bunding or flow paths (surface gradients) (refer to **Appendix 2, Form 1 - Daily Running Sheet**).
- Record all observations with regard to stormwater management after rainfall events that induce stormwater runoff and the need for the installation of additional ESCs to maintain erosion and sediment transport at a minimum (refer to **Appendix 2**, **Form 2 – Stormwater Performance**).
- Record installation of any additional ESCs (refer to **Appendix 2**, **Form 1 - Daily Running Sheet**).
- If stormwater does release directly to the receiving environment, the release must be recorded. Refer to **Emergency Procedure 1 – Emergency Stormwater Release** in the event this does occur.
- The parameters required to be monitored when a release occurs must be recorded.

Responsibility and Communication:

- It is the responsibility of onsite employees to ensure that the above controls are carried out.
- Onsite employees must report any release to the receiving environment immediately to the Site Manager for attention and any necessary action.
- The Site Manger is responsible for advising the Facility Manager about a release to the receiving environment.
- The Site Manager is responsible for ensuring any repairs to bunding or flow paths are conducted promptly.
- The Site Manager is responsible for the collection and recording of any observations made as to the performance of the stormwater containment system. (i.e. ensuring **Form 2** is completed as required).
- The Site Manager is responsible for determining when and where additional ESCs must be implemented based on the observations made as part of completion of **Form 2**.

Relevant Legislation:

- *Protection of the Environment Operation Act 1997.*

Workplace Procedure 2 – Leachate Detention Basin Management

Environmental Commitment:

- That the sedimentation and leachate detention basins are maintained such that sufficient capacity exists for the containment of the volume of leachate generated over the disturbed area of the site up to and including an event of a 1 in 25 year 24 hour rainfall event.
- That uncontrolled release of leachate from the onsite basin to the receiving environment does not occur.
- That the re-entrainment of sediment within the water column of sedimentation basins is maintained at a minimum.
- To ensure that the functioning of the onsite basin(s) does not result in the release of offensive and noxious odour that creates environmental harm (including environmental nuisance) at an odour sensitive place.

Identification of Issues:	**Potential Impacts:**
• The allowance of significant/unnecessary volumes of sediment to be transported via leachate to onsite basin(s).	• Increased contamination of the water column within onsite basins. • Increased treatment of onsite basins, with associated increased costs. • Increased chance of uncontrolled release occurring. • Contravention of a permit conditions & possible enforcement action by EPA.
• Unacceptable build-up of sediment at the bottom of the basins.	• Increased contamination of the water column within onsite basins. • Increased treatment of onsite basins or, with associated increased costs. • Increased chance of uncontrolled release occurring. • Possible contravention of a permit condition as a result of inability to contain stormwater runoff generated over the disturbed area of the site in a 1 in 10 year 24 hour rainfall event & possible enforcement action by EPA.
• Extended weather forecast is not regularly consulted to determine when a certain rainfall event may occur (i.e. a 1 in 10 year 24 hour rainfall event or worse a 1 in 25 year 24 hour rainfall event) and the detention basin has enough capacity.	• Unexpected increases in the volume of leachate required to be managed. • Increased chance of release occurring during events that generate less of a volume than a 1 in 25 year 24 hour containment. • Possible contravention of a permit condition as a result of inability to contain leachate runoff generated over the disturbed area of the mine site in a 1 in 25 year 24 hour rainfall event or less & possible enforcement action by EPA.

• The reuse of leachate contained within the basin does not occur as required to ensure capacity to contain the volume of leachate generated as a result of rainfall falling over the disturbed area of the site in a 1 in 25 year 24 hour rainfall event or less.	• Contravention of a licence condition as a result of inability to contain leachate runoff generated over the area of the site in a 1 in 25 year 24 hour rainfall event or less & possible enforcement action by EPA. • Increased chance of release occurring without obtaining sample and therefore inability to accurately report on impact
• The structural integrity of a sedimentation basin is compromised.	• Reduction in the ability to minimise sediment releases to the detention basin. • Reduction in capacity of detention basin with increased risk of releasing contaminated waters in events < a 1 in 25 year 24 hour rainfall event.
• A significant erosion event occurs that results in excessive sediment being released to one or all of the basins.	• Inability to flocculate waters due to excessive suspended solids being present. • Requirement to dispose of waters offsite at such a facility as a composter. • Huge financial loss.
• Overloading the onsite basin(s) with high strength Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) substances, both in liquid or solid forms. • Overloading of the onsite basins(s) with excessive amounts of organic matter, such as green waste/sawdust.	• A reduction in dissolved oxygen (DO) and resulting in anaerobic conditions, which results in the liberation of offensive or noxious odour from the pond(s). • A reduction in redox potential which results in the liberation of offensive or noxious odour. • Enforcement action by the EPA.
• Dissolved Oxygen levels in contained water is < 4 mg/l; • < 2 mg/l; • < 1mg/l.	• Water quality not suitable for release. The lower the dissolved oxygen, the increased chance of causing environmental harm such a fish kills. • The lower the dissolved oxygen the increased chance of creating offensive odour.
• The Redox Potential in contained water is < -240 mv.	• The greater the chance of creating offensive odour due to reduced conditions.
• The pH of contained water is < 6.5 pH units; or • The pH of contained water is > 9.5 pH units.	• The increase in releasing offensive odour pertaining to sulphides. • The increase in chance of releasing ammonia.
• Discharging toxic and hazardous liquid wastes to the onsite basin(s).	• The killing of beneficial aerobic bacteria and the introduction of toxicants to the composting process. • Need for treatment and disposal of contaminated waters. • Financial loss.

Control Measures:

- Ensure all leachate is managed correctly (refer to **Workplace Procedure 1 – Leachate Management**).
- Ensure prolonged weather forecasts are considered to determine when a 1 in 25 year 24 hour rainfall event is possible and/or expected in order to ensure that dams are managed to ensure sufficient capacity is provided.
- Ensure that built up sediment is regularly removed from all basins, particularly the sedimentation basin to ensure their design capacity is maintained and the re-entrainment of sediment within the water column is kept to a minimum.
- Ensure that when required removal of stormwater contained within the sedimentation basin occurs to ensure sufficient capacity to contain the volume of stormwater generated in a 1 in 10 year 24 hour stormwater event over the disturbed area of the site.
- Ensure water required to be removed from onsite basins is reused for dust suppression or utilised as irrigation water within the undisturbed areas of the site when this is considered to be appropriate.
- In the event that a controlled release must occur to ensure containment for the volume of stormwater generated as a result of a 1 in 10 year 24 hour rainfall event falling over the disturbed area of the site, ensure this release is managed correctly. Refer to **Workplace Procedure 3 – Leachate Detention Basin Monitoring**.
- Inspect the respective basins regularly, particularly after rainfall events to ensure their structural integrity is maintained.
- Ensure basin is structurally integral (particularly after rainfall events) so that the storage of leachate does not result in uncontrolled releases to the receiving environment.
- If the integrity of a basin is found to be compromised, the Site Manager must be informed immediately.
- If the integrity of a basin is found to be compromised, repairs must be conducted immediately, by placing clay in the affected areas & compacting to the required impermeability.
- It the integrity of a check dam is found to be lacking then the replacement or addition of extra rocks must occur.
- Check dam spacing must be scrutinised to ensure efficacy of treatment.
- Ensure all uncontrolled releases of leachate are managed correctly. Refer to **Emergency Procedure 1 – Emergency Leachate Release**. This procedure must also be followed to ensure that leachate monitoring is conducted as required (i.e. half yearly).
- Ensure that the top half of the water column within basins is aerobic. Do not allow dissolved oxygen (DO) < 2 ppm or mg/l.
- If DO falls below 2 ppm activate aeration utilising an aerator.
- If rapid oxidation is required above what the aerator can induce, then consideration should be given to introducing hydrogen peroxide. **Given the hazardous nature of hydrogen peroxide, specialist help will be required when introducing it to the dam.**
- Ensure that every 6 months contained leachate is monitored for the insitu parameters listed in *Table 1* and *Table 2* contained in **Workplace Procedure 3**.

Record Keeping:

- Record incidental rainfall (refer to **Appendix 2**, **Form 3 – Daily Weather Conditions)**.
- Record all observations in relation to the performance of the respective basins and check dams (refer to **Appendix 2, Form 2 – Stormwater Performance**).
- Record any repairs or maintenance undertaken to basins or infrastructure including removal of built up sediment (refer to **Appendix 2, Form 1 - Daily Running Sheet)**.

- Record all reuse of stormwater as irrigation water, including the details of this activity (i.e. duration and volume removed) (refer to **Appendix 2, Form 1 - Daily Running Sheet)**.
- Record all adjustment made to basins (i.e. aeration) including details of these adjustments refer to **Appendix 2, Form 1 - Daily Running Sheet**).

Responsibility and Communication:

- It is the responsibility of the mine operator to report any variance from the control measures stated above to the Site Manager.
- The Site Manager is responsible for ensuring the maintenance of respective basins occurs and is conducted as required (i.e. the removal of sediment, reinstating design capacities).
- The Site Manager is responsible for ensuring adjustment are made to basins as required.
- The Site Manager is responsible for ensuring any repairs to the respective basins or ESC infrastructure are carried out promptly.
- The Site Manager is to promptly report to the Facility Manager any variance from the control measures that may or do result in an uncontrolled release to the receiving environment.
- The Site Manager is to promptly inform the EPA and AGL Macquarie of any variance from the control measures that result in an uncontrolled release to the receiving environment.

Relevant Legislation:

- *Protection of the Environment Operation Act 1997.*

Workplace Procedure 3 –Leachate Detention Basin Monitoring

Environmental Commitment:

- To ensure that half yearly leachate monitoring is conducted correctly.

Identification of Issues:	Potential Impacts:
• Leachate monitoring of the detention basin does not occur at half yearly intervals or as otherwise required prior to a release.	• Failure to demonstrate that release limits have been met prior to a release occurring. • Breach of permit conditions and possible enforcement action taken by the EPA.
• Leachate monitoring is not conducted for all required parameters.	• Failure in ability to demonstrate the quantities of contaminants released. • Breach of permit conditions and possible enforcement action taken by the EPA.
• Failure to take a water sample as part of leachate monitoring whereby laboratory analysis is required.	• Failure to verify the concentration of contaminants released. • Enforcement action taken resulting in a fine.

Control Measures:

- Ensure that half yearly leachate monitoring of the detention basin occurs.
- If no leachate is contained within the detention basin at the time of leachate monitoring, ensure photographs of the basin are taken to provide evidence of this as and when required.
- ½ yearly leachate monitoring must also include the parameters bulleted below:
- Dissolved Oxygen (DO);
- pH;
- Electrical Conductivity (EC);
- Redox Potential; and
- Turbidity / Total Suspended solids.
- Prior to an anticipated emergency release occurring the ranges and limits provided in *Table 1* below must be meet for the parameter listed.

Parameter	Units	Minimum	Maximum
pH	-	6.5	8.5

Table 1: Stormwater release limits

- Where practically possible, prior to an anticipated emergency release occurring, measure contained water for the insitu parameters listed in *Table 2* below.
- Where practically possible, prior to an anticipated emergency release occurring ensure that contained leachate is sampled so that if required, analysis for the parameters listed in *Table 3* below can occur.

Table 2:

Water Quality Parameter	Monitoring Frequency
Dissolved Oxygen (DO)	Regularly or at least every 6 months.
pH (field measured)	
Electrical Conductivity (EC)	
Redox Potential (Redox)	

Table 3:

Analyte	Monitoring Frequency
BOD	At least every 6 months.
COD	
Ammonia	
Nitrate	
Total Phosphorous	
Total Nitrogen	
Zinc	
Copper	
Mercury	
Selenium	
Lead	
Nickel	
Suspended Solids	

- If the monitoring prior to an anticipated emergency release indicates that the release limits outlined in *Table 1* above will not be achieved, the treatment of the water contained with basin should occur as described below. In addition water samples should be taken and retained in the event that additional testing of any stormwater released, may be required.
- **pH adjustment**
- To increase the pH such that it is within the release limit range (6.5 – 8.5) caustic soda or lime must be added to the dam.
- To reduce the pH, sodium bisulphite or sulphuric acid must be introduced. Prior to treatment, a bucket or jar test must be performed to determine the amount / litre that is required to

rectify. Ensure that a sample is taken as part of half yearly stormwater monitoring or when monitoring is conducted prior to an emergency release.
- All emergency releases must occur via the designated release point.
- Ensure that in the event of an emergency release **Emergency Procedure 1 – Emergency Stormwater Release** is followed.

Record Keeping:

- Record all stormwater monitoring conducted (refer to **Appendix 2**, **Form 1 - Daily Running Sheet**). As part of this recording ensure that a record is made of compliance with the release limits if a release occurs. Any exceedance of the release limits must be reported to the EPA.
- Record all samples taken for laboratory analysis (refer to **Appendix 2**, **Form 1 - Daily Running Sheet**).

Responsibility and Communication:

- It is the responsibility of onsite employees to report any variance from the control measures stated above to the Site Manager.
- The Site Manager is responsible for ensuring all monitoring of leachate is conducted as and when required.
- The Site Manager is responsible for ensuring the release limits are met prior to a release and that treatment of leachate occurs as and when required.
- The Site Manager is responsible for notifying the Facility Manager of any variance from the control measures.
- The Site Manager is responsible for notifying the EPA of any releases that occur which have not met the r release limits or where leachate monitoring of the water released has not occurred prior to this release.

Relevant Legislation:

- *Protection of the Environment Operation Act 1997.*

Workplace Procedure 4 – Erosion and Sediment Control Procedure

Environmental Commitment:

- To ensure that Sediment and Erosion controls are implemented and maintained to minimise erosion and release of sediment offs site.

Identification of Issues:	**Potential Impacts:**
• Poor maintenance of Erosion and Sediment Controls.	• Contaminated water is released as a result of a crack or gap in a dam. • Excessive erosion of disturbed areas. • Excessive sediment loading in sediment dams. • Potential 'clean water' mixing with contaminated water. • Contravention of a permit condition & possible enforcement action by EPA.
• Inadequate drainage control developed for the site.	• Increased risk of rill and gully erosion • Discharge of waters off site from areas other than designated points. • Contravention of a permit condition & possible enforcement action by EPA.
• On site sediment traps (rock filter traps, sediment weirs etc.) inadequately sized.	• Excess sediment in concentrated flows. • Contaminated water is released (spills) from site due. • Contravention of a permit condition & possible enforcement action by EPA.
• Onsite sediment basins have been inadequately sized.	• The containment capacity provided within onsite basins is insufficient to contain the volume of stormwater generated over the disturbed area of the site in a 1 in 10 year 24 rainfall event. • Wilful non-compliance of permit conditions & enforcement action by EPA.
• Onsite sediment basins have not been maintained correctly (i.e. excess sediment removed) and their containment capacity is reduced below the required volume	• The containment capacity provided within onsite basins is insufficient to contain the volume of stormwater generated over the disturbed area of the site in a 1 in 10 year 24 rainfall event. • TSS levels exceed site release limits. • Wilful non-compliance of permit conditions and enforcement action by EPA.
• Inadequate Stabilisation & rehabilitation of disturbed areas	• Excessive erosion of disturbed areas • Fail to meet rehabilitation performance criteria • Non-compliance with permit conditions.

Control Measures:

- Ensure all Erosion and Sediment Controls are adequately maintained (refer to **Appendix 2, Form 5 – ESC Checklist**).
- Ensure adequate drainage controls are identified, implemented which allow for effective reduction of flow velocity and erosion.
- Ensure Sediment traps are adequately sized, positioned and designed for a 1 in 10 year 24 hour rainfall event.
- Ensure Sediment basins are adequately sized and designed.
- Ensure that built up sediment is regularly removed from the sedimentation basins to ensure their design capacity is maintained and the re-entrainment of sediment within the water column is kept to a minimum.
- Ensure disturbed areas are minimised and rehabilitated as soon as practicable.
- Ensure rehabilitation of disturbed areas meets a performance target of 90% ground cover (photographic evidence to be maintained).

Record Keeping:

- **Form 5 – ESC Checklist** has been completed following rainfall events.
- Record the need for additional ESCs.
- The performance of ESCs to maintain erosion and sediment transport at a minimum must be recorded (refer to **Appendix 2**, **Form 2 – Stormwater Performance**).
- Record installation of any additional ESCs (refer to **Appendix 2**, **Form 1 - Daily Running Sheet**).
- Maintain photographic evidence of rehabilitation works and ground cover performance.

Responsibility and Communication:

- The Site Manager is responsible for ensuring monitoring of ESC is conducted.
- The Site Manager in responsible for ensuring ESCs are implemented in accordance with the ESCP.
- The Site Manager is responsible for ensuring that ESC's are maintained in accordance with the ESCP.
- It is the responsibility of onsite employees to report any variance or additional control measures required to the Site Manager
- It is the responsibility of onsite employees to report all non-conforming ESCs to the Site Manager.

Relevant Legislation:

- *Protection of the Environment Operations Act 1997.*

3 Emergency Procedures

<table>
<tr><th colspan="2">Emergency Procedure 1 – Emergency Leachate Release</th></tr>
<tr><td colspan="2">Environmental Commitment:

• To ensure that any unanticipated emergency releases of leachate to the receiving environment are minimised and/or prevented from causing environmental harm.

Note: Anticipated Emergency stormwater releases are permitted to occur following rainfall in excess of a 1 in 25 year 24 hour AEP rainfall event.</td></tr>
<tr><td>Identification of Issues:</td><td>Potential Impacts:</td></tr>
<tr><td>• A lack of observation has resulted in poor maintenance of the basin whereby water is released as a result of a crack or gap in the basin wall or spillway.</td><td>• Leachate is released as a result of a crack or gap in the basin.
• Contravention of a permit condition & possible enforcement action by EPA.</td></tr>
<tr><td>• Rainfall results in a release from detention basin when it should not have (i.e. rainfall event is < 1 in 25 year 24 hour rainfall event) due to an inadequate containment storage volume being afforded.</td><td>• Unknown quality of water being released.
• Contravention of a permit condition & possible enforcement action by EPA.</td></tr>
<tr><td>• Leachate releases from the detention basin prior to the monitoring and sampling of the water being released.</td><td>• Unknown quality of water released with an inability to quantify harm (if any). Wilful contravention of a permit condition & enforcement action by EPA.</td></tr>
<tr><td>• The detention basin has not been maintained correctly (i.e. excess sediment removed) and the containment capacity is reduced below the required volume.</td><td>• The containment capacity provided within onsite basins is insufficient to contain the volume of leachate generated over the disturbed area of the site up to and including a 1 in 25 year 24 hour rainfall event.
• Wilful non-compliance of permit conditions and enforcement action by EPA.</td></tr>
<tr><td>• The site has not been managed correctly resulting in significant erosion occurring. Minimal time is available for treatment and a release of turbid water occurs.</td><td>• Excessive contamination of onsite basin(s) and stormwaters.
• Increased maintenance and associated costs of onsite basins.
• Release of excessively turbid waters.
• Contravention of a permit conditions & possible enforcement action by EPA.</td></tr>
<tr><td colspan="2">Control Measures:

• Refer to onsite PIRMP for further information surrounding emergency management.

• Ensure all stormwater is managed correctly (refer to Workplace Procedure 1 – Leachate Management).
• Ensure that the detention basin is managed correctly (refer to Workplace Procedure 2 – Leachate Detention Basin Management).</td></tr>
</table>

- Ensure excess sediment is removed from the sedimentation and detention basin as required to ensure leachate containment capacity is maintained.
- Ensure all leachate management infrastructure required is installed as required (refer to **Workplace Procedures 1 and 2**).
- Ensure all leachate management infrastructure is maintained correctly (refer to **Workplace Procedures 1 and 2**).
- As the disturbed area of the site increases ensure progressive rehabilitation occurs.
- If increases in the disturbed area of the site occur, ensure the containment capacity of onsite basins also increases in line with the increased area of disturbance. Ensure that containment capacity exists on site for the volume of leachate that will be generated over the disturbed area of the site up to and including a 1 in 25 year 24 hour rainfall event.
- Ensure that as the activity progresses significant erosion and generation of excessively turbid stormwater is avoided.
- In the event that an emergency release to the receiving environment is occurring the Site Manager must be notified that this is occurring.
- In the event of an anticipated emergency release contained stormwater must be monitored for the insitu parameters listed in *Table 1* below.

Table 1:

Water Quality Parameter	Monitoring Frequency
Dissolved Oxygen (DO)	As required upon an emergency release.
pH (field measured)	
Electrical Conductivity (EC)	
Redox Potential (Redox)	

- In the event of an anticipated emergency release a sample should be obtained so that if analysis for the parameters listed in *Table 2* below is required, it can be.

Table 2:

Analyte	Monitoring Frequency
BOD	As required upon an emergency release..
COD	
Ammonia	
Nitrate	
Total Phosphorous	
Total Nitrogen	
Zinc	
Copper	
Mercury	
Selenium	

Lead	
Nickel	
Suspended Solids	

- In the event of an anticipated emergency release the Site Manager is responsible for ensuring that appropriate actions are taken to safely obtain a sample that is representative of the release.
- The Site Manager is responsible for ensuring that steps are taken promptly to minimise any uncontrolled releases to the receiving environment. Such measures may include the prompt plugging and repair of bund walls, dam wall or spill way or if observation determines prompt attention is required, removal of sediment within in sedimentation and detention basins or redirection of stormwater to minimise erosion and sediment transport.

Record Keeping:

- Record all estimated volumes of any anticipated emergency release (refer to **Appendix 2**, **Form 4 – Emergency Release Notification Form**).
- In the event of an emergency release from the detention dam obtain readings for dissolved oxygen (DO), electrical conductivity (EC), redox potential and pH from the dam. Use **Form 4 – Emergency Release Notification Form (**refer to **Appendix 2**) for recording data.
- Note any observations made when performing monitoring (refer to **Appendix 2**, **Form 4 – Emergency Release Notification Form**).
- Use **Form 4 – Emergency Release Notification Form (**refer to **Appendix 2**) to report information about the release to EPA.

Responsibility and Communication:

- It is the responsibility of onsite employees to report any variance from the control measures stated above to the Site Manager.
- All emergency releases that have the potential to cause material environmental harm must be brought to the attention of EPA by telephone as soon as practicable after becoming aware that there has been an emergency release.
- The Site Manager is responsible for notifying the EPA immediately upon becoming aware that an emergency release has occurred or is likely to occur which has the potential to cause material environmental harm.
- The Site Manager is responsible for notifying EPA in the first instance; however, in the absence of the Site Manager, an onsite employee must do so.

Relevant Legislation:

- *Protection of the Environment Operations Act 1997.*

Appendix 2

Forms and Checklists

Forms

Form 1 - Daily Running Sheet

Date and initials	Time	Description of daily events Include extraordinary events such as noncompliance or emergencies. This should link with information contained in other forms.

Form 2 – Stormwater Performance

Date/initials	Amount of Rainfall (mm)	Performance of Internal Drains Any cracks or blockages evident?	Performance of basins at collecting and containing stormwater	Performance of hardstand pad Any ponding or pooling evident?	Any erosion (including bund and basin walls and spill way)?

Form 3 – Daily Weather Conditions

Date	**Description of Weather** **Note**: Incorporate any changes throughout the working day and include previous night time conditions.

Form 4 – Emergency Release Notification Form

Note: In the event of an uncontrolled release the EPA must be called on 131555 and advised by telephone of the basic information regarding this release. The information on this form must be completed as soon as possible following such a release. All details must be completed and the form faxed to EPA to the number advised when reporting by telephone.

Date and time of the uncontrolled release: ……../……../…… ……am/pm	**Approximate volume of the uncontrolled release or area affected?** ……..litres/m^2
Is the uncontrolled release presenting any immediate safety risk to others? Of the receiving environment **Action(s) taken:** ……... ……... ……...	**Suspected cause of the uncontrolled release:** …… …… …… ……
Name and contact phone number of the Site Manager responsible: ……... **(Mobile)** ……... **(Landline)** ……	**Location of the uncontrolled release:** **Location description**…… ……..... ……..... ……..... ……..... **Has this action been successful?** Not at all / Somewhat / Prevented further release(s)
Have any samples been collected? YES / NO Collect a sample in a sample container or take a photograph of the release. Ensure sample is marked with the date, time and name of the person taking sample. Ensure sample is handed to the Site Manager.	**Have any actions been taken to minimise/mitigate the environmental effects of the uncontrolled release incident?**

Form 5 – ESC Checklist

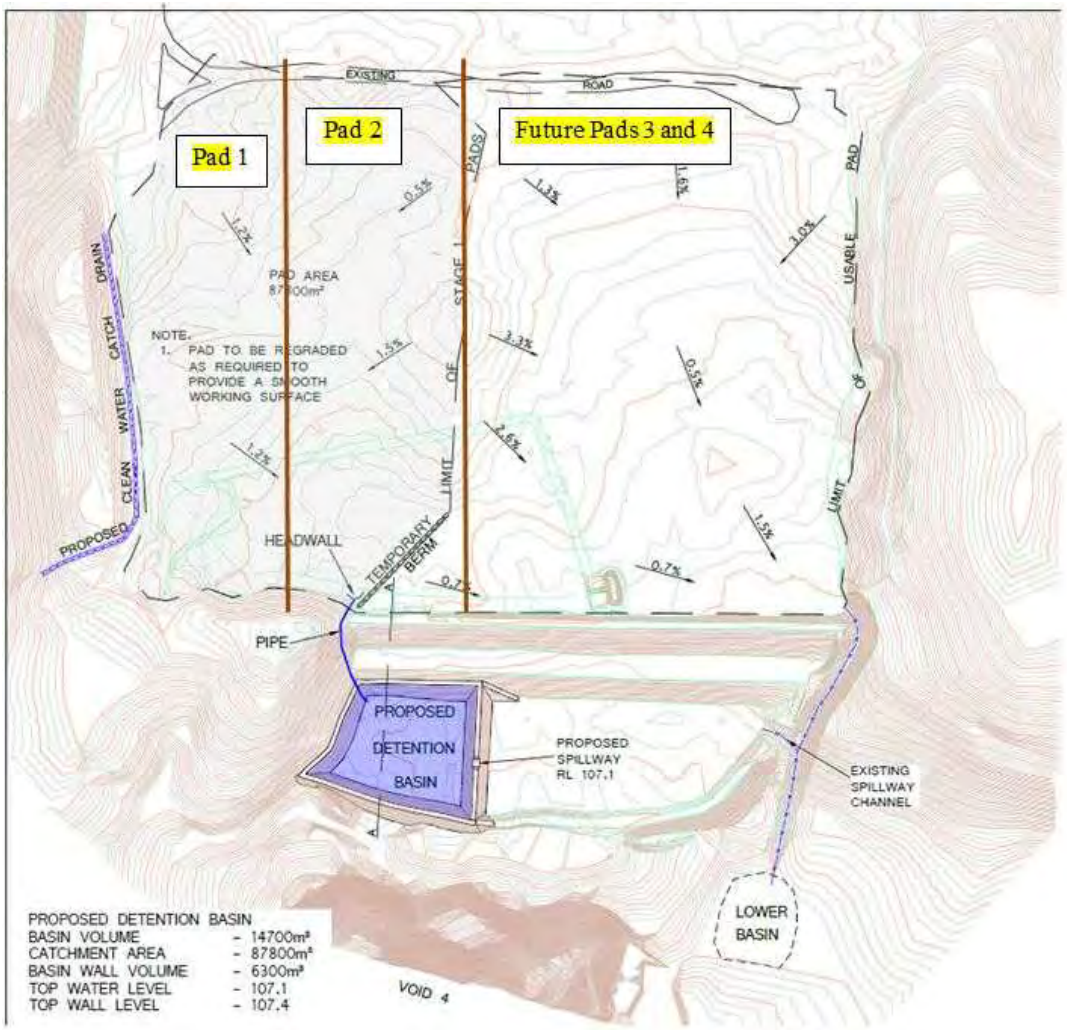
#	Item	Finding
1	Stockpile locations clearly identified and located away from protected vegetation and overland flow paths.	
2	Stockpiles located at least 5m away from top of watercourse banks.	
3	Adequate up-slope drainage controls (if necessary) and down-slope sediment controls placed adjacent to stockpiles.	
4	Temporary access roads/tracks identified, with appropriate drainage/erosion controls specified.	
5	*Temporary Watercourse Crossings* identified and protected.	
Drainage Control		
	Item	**Finding**
7	Temporary drainage controls designed to the appropriate standard and hydraulic analysis provided.	
8	Hydraulic analysis indicates appropriate flow velocities.	
9	Hydraulic analysis indicates appropriate flow capacity.	
10	Flow from "clean" external catchments diverted around/through site in a non-erosive manner.	
11	Internal "dirty" water drainage lines identified and directed to sediment controls.	
12	All site drainage inflow and outflow points identified.	
13	All water discharges from the site at legal points of discharge.	

14	All water discharges through stabilised outlets onto stable land.	
15	Maximum spacing of drains on long, open soil slopes is appropriate for the gradient and soil type.	
16	Appropriate flow velocity controls (e.g. *Check Dams*) or scour controls (e.g. turf or *Erosion Control Mats*) specified.	
17	*Catch Drains* or Flow Diversion Banks located at top of cut and fill batters.	
18	Rock *Check Dams* not specified in shallow (i.e. < 500mm deep) drains.	
19	Water flow is appropriately conveyed down constructed earth slopes (e.g. through *Slope Drains* or *Chutes*).	
20	All *Slope Drains* and *Chutes* have stabilised inlets and outlets.	
21	Appropriate drainage controls on unsealed roads and access tracks.	
22	Overland flow appropriately controlled around *Temporary Watercourse Crossings*.	
	Erosion Control	
23	The erosion control standard is consistent with the rainfall erosivity, environmental risk, and clay content of exposed soil.	
24	The erosion control standard is consistent with the requirements of regulatory authority.	
25	Specified stabilisation measures are appropriate for the soil slope (gradient).	

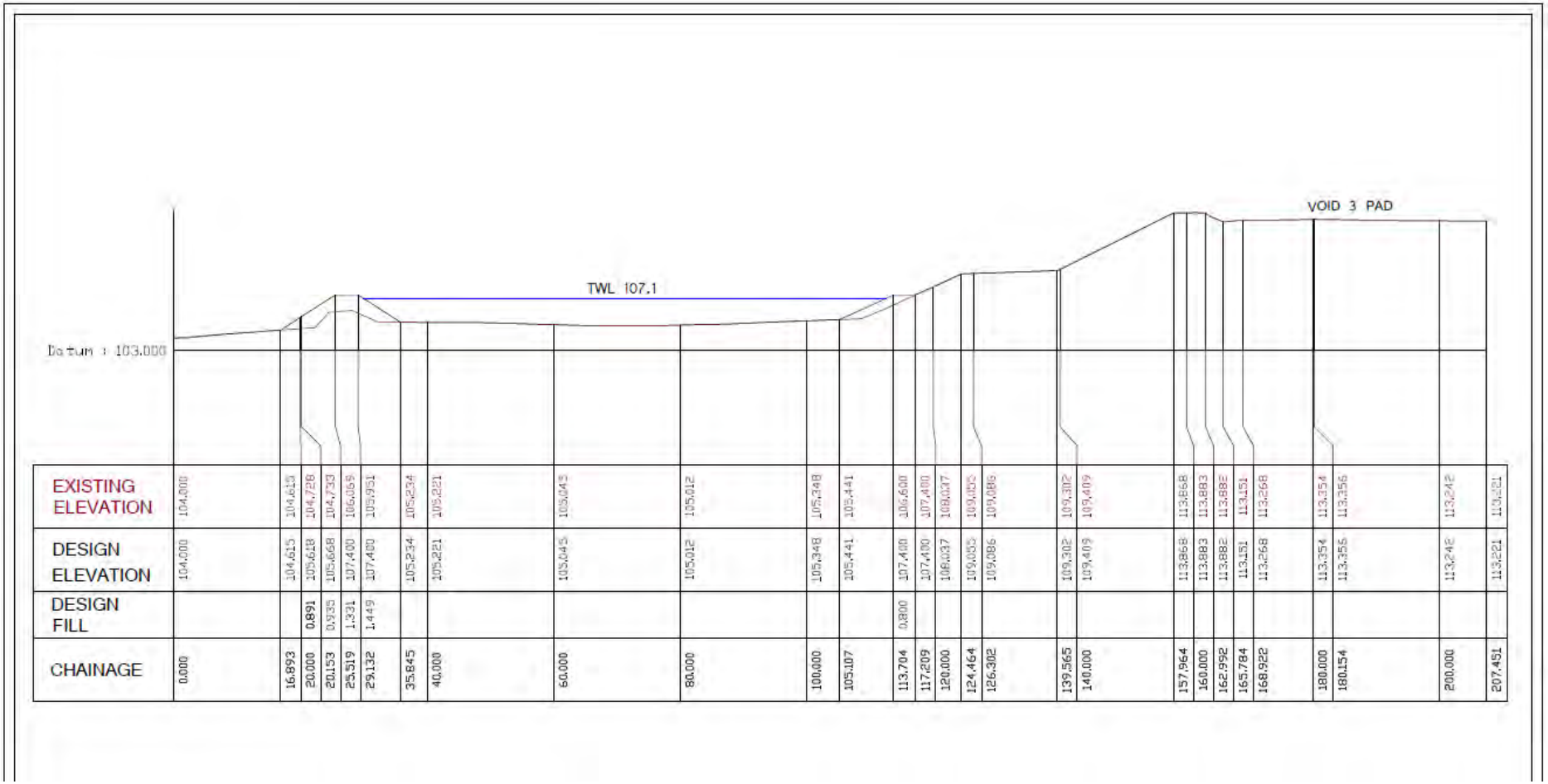
26	Appropriate drainage controls installed to minimise mulch being washed off the slope/site.	
	Sediment Control	
27	Location of all sediment control measures clearly shown on ESCP.	
28	Sediment Traps are appropriately sized and designed.	
29	All Sediment Basins have: (a) Stable inflow conditions. (b) Inlet baffle (if required). (c) Minimum 3:1 length to width, otherwise baffles installed. (d) Suitable access for de-silting and maintenance. (e) Stabilised emergency spillway and energy dissipater. (f) Stabilised batters/embankments. (g) Safety or exclusion fencing (as required). (h) Operating conditions and water quality standards specified.	
30	ESC specialist review of basin selection & design	
	Site Rehabilitation	
31	**Areas of progressive rehabilitation identified in ESCP**	
32	**Rehabilitation measures have been implemented in accordance with the design specification.**	

Appendix 3

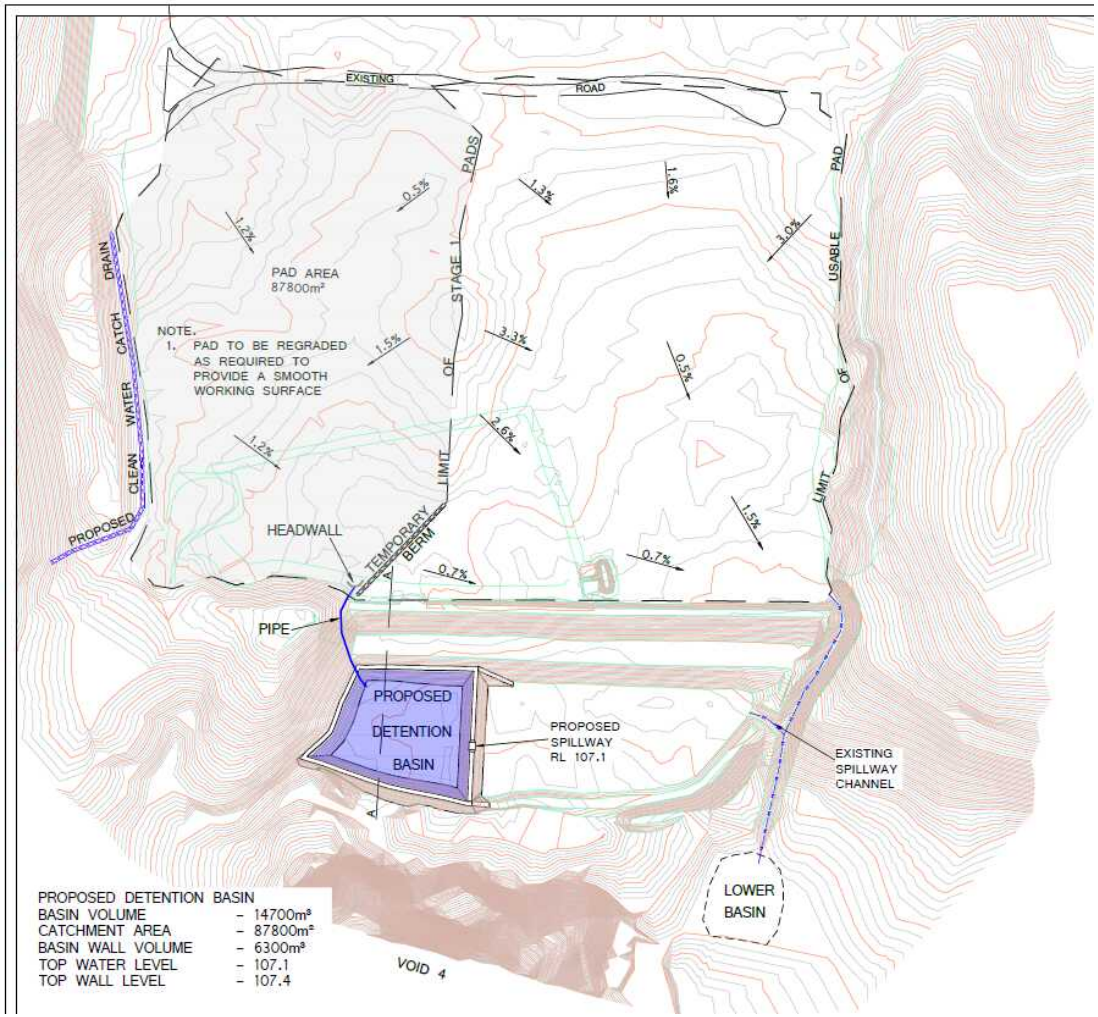
Figures



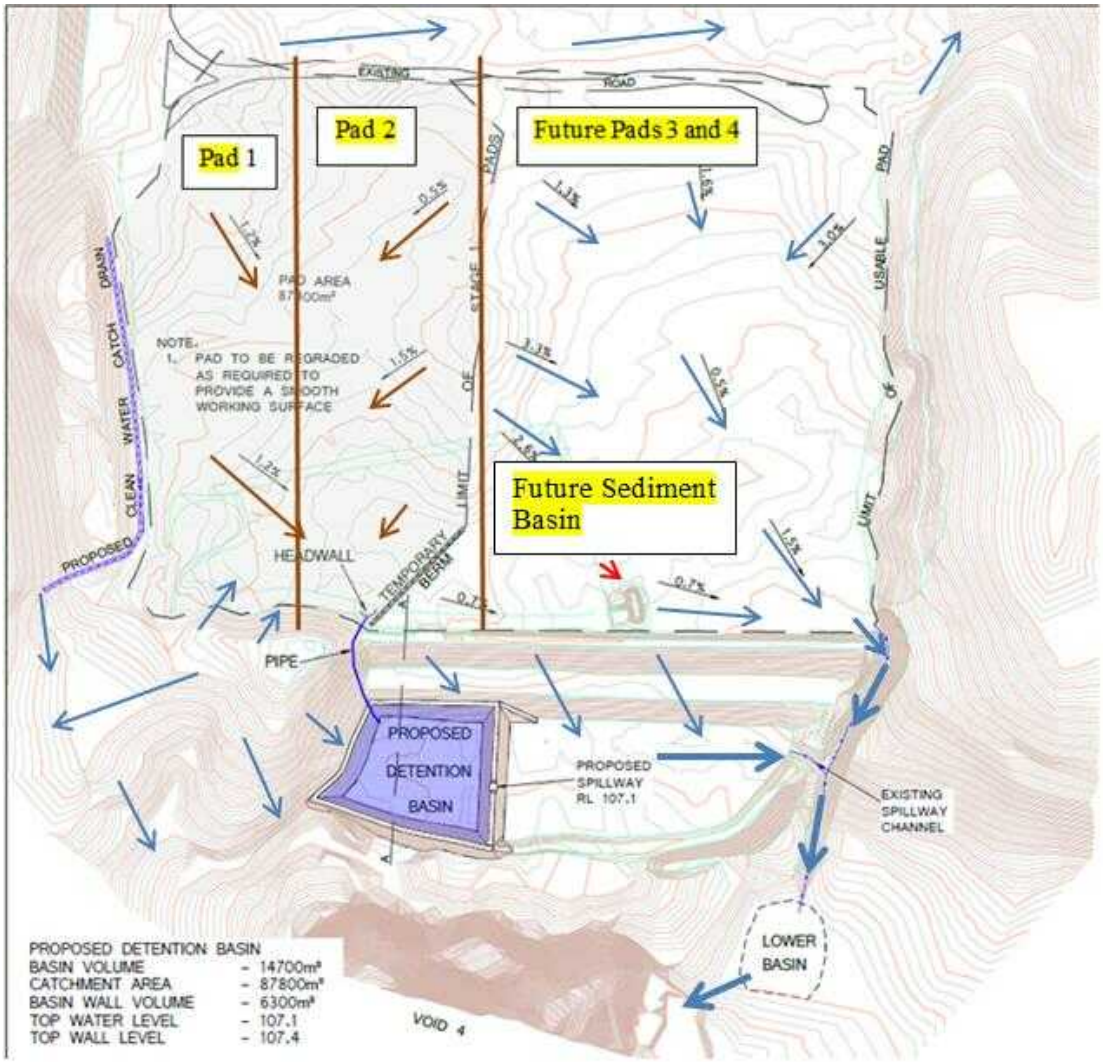
Appendix 3 - Figure 1: Layout of the Hardstand



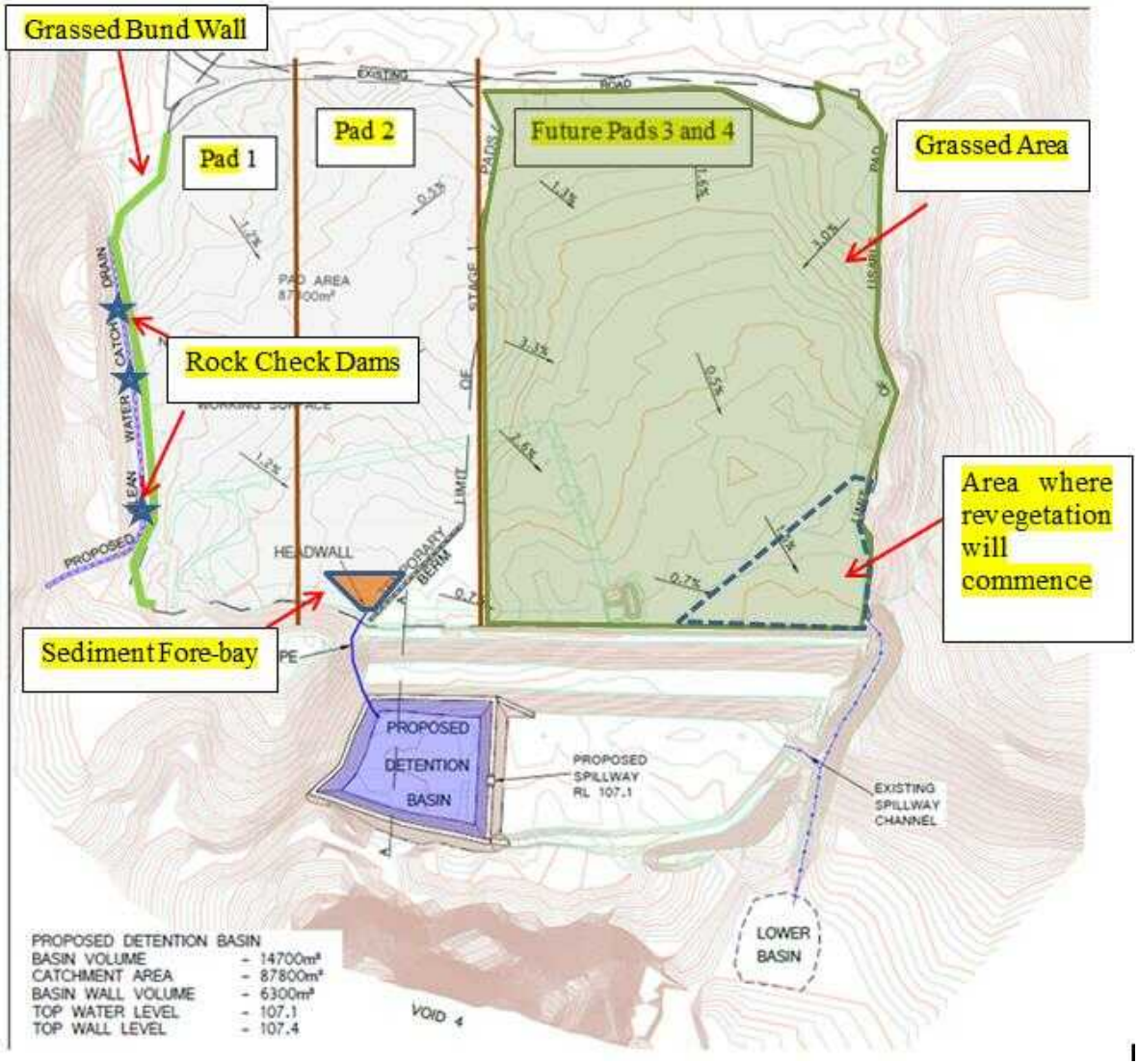
Appendix 3 - Figure 2: Cross Sections of Hardstand Pads and Detention Basin



Appendix 3 - Figure 3: Gradient of Hardstand

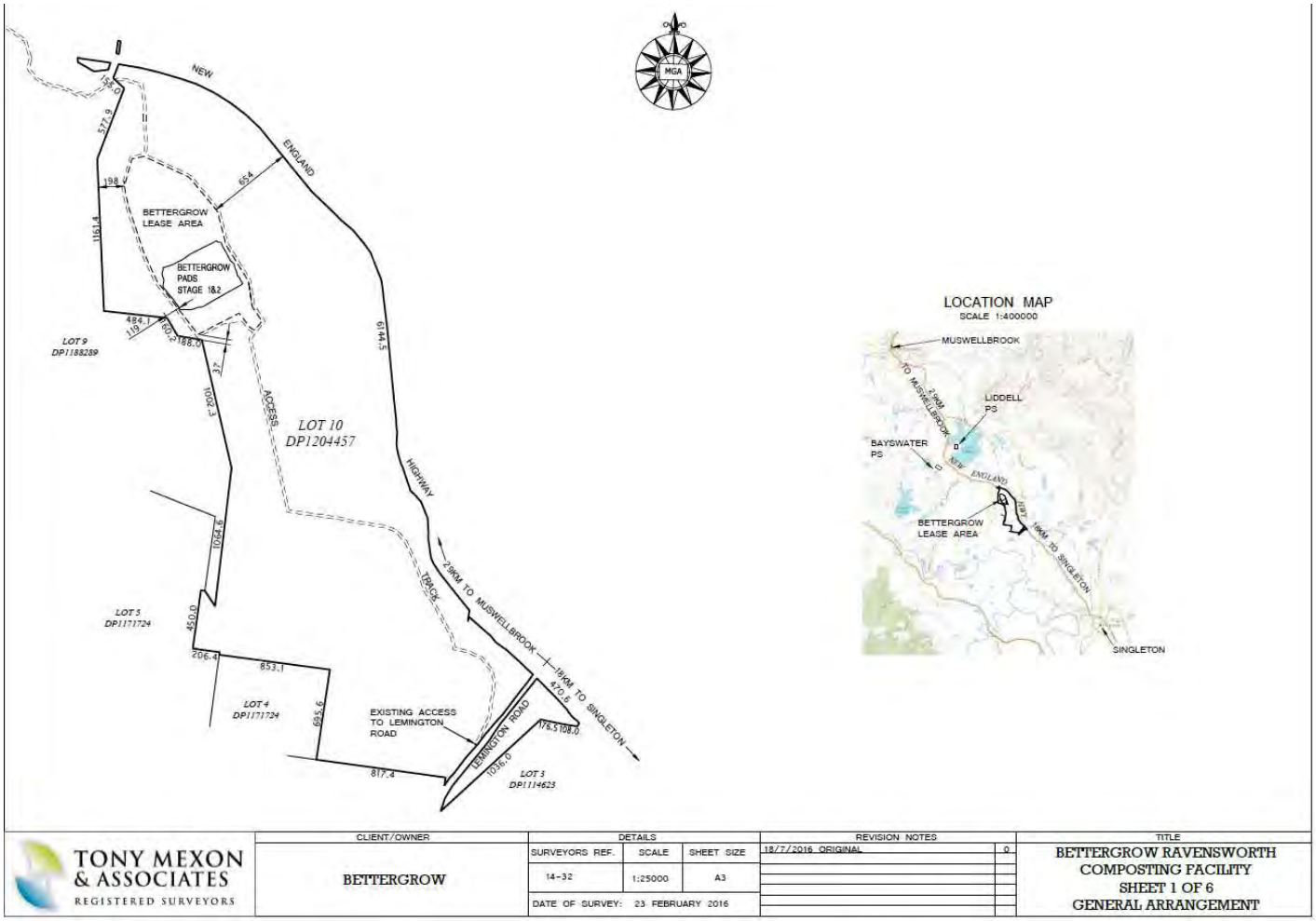


Appendix 3 - Figure 4: Stormwater Flow Diagram



Appendix 3 - Figure 5: Erosion and Sediment Control Plan

Appendix 3 - Figure 6: Location Map



Appendix 3 - Figure 7: Depicting Lease Area

Appendix 4

Density and Permeability Results

ABN: 50 103 355 531
VALLEY CIVILAB
Geotechnical, Testing & Engineering Services
Unit 3, 62 Sandringham Ave, Thornton NSW 2322 P (02) 4966 1844 F (02) 4966 1855
www.valleycivilab.com.au

Moisture Density Relationship Report

Client :	**Better Grow**	Report Number:	**P815 - 1/1**
Address :	**48 Industry Road, Vineyard, NSW, 2765**	Report Date :	**9/03/2016**
Project Name :	**Coal Reject Permeability**	Order Number :	
Project Number :	**P815**	Test Method :	**AS1289.5.2.1**
Location:	**Ravensworth Open Cut Mine , Ravensworth**	**Page 1 of 1**	

Sample Number :	S16-452	SAMPLE LOCATION	
Sampling Method :	Sampled by Client	Ravensworth Open Cut Mine	
Sampled By :	Sampled by Client		
Date Sampled :	18/02/2016		
Date Tested :	23/02/2016		
Material Type :	Coal Reject Material	Test Number :	-
Material Source :	Ravensworth Open Cut Mine	Lot Number :	-
Remarks :	-	Moisture Method :	AS1289.2.1.1

Maximum Size (mm) :	19.0	**Maximum Dry Density (t/m³) :**	**1.92**
Oversize Dry (%) :	4.4	**Optimum Moisture Content (%) :**	**8.5**
Oversize Density (t/m³) :	2.41		

NATA

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APPROVED SIGNATORY

James Wyatt - Technician - Quarry Materials
NATA Accreditation Number
14975

Document Code: RF124-7

FALLING HEAD PERMEABILITY REPORT

Client:	Valley Civilab Pty Ltd	**Source:**	S16-452 Coal Reject Material - Ravensworth
Address:	Unit 3/62 Sandringham Avenue, Thornton NSW 2322	**Sample Description:**	Silty GRAVEL
Project:	P815	**Report No:**	B26401-FHP
Job No:	S16079	**Lab No:**	B26401 (S9222)

Test Procedure:

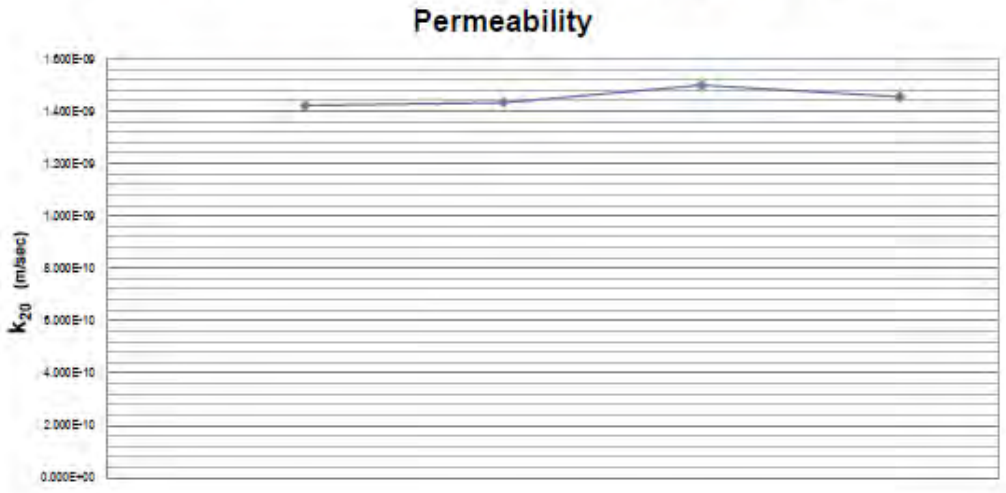
- ☑ AS1289 6.7.2 Soil strength and consolidation tests - Determination of e soil - Falling head method for a remoulded specimen
- ☐ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort

Sampling:	Sampled by Client	**Date Sampled:**	16/02/2016
Preparation:	Prepared in accordance with the test method		

RESULTS

Standard Maximum Dry Density (t/m³)	1.92	Hydraulic Gradient	0.0
Optimum Moisture Content (%)	8.5	Surcharge (kPa)	0.0
Placement Moisture Content (%)	8.6	Head Pressure Applied (kPa)	0.0
Moisture Ratio (%)	101.6	Standard Compaction	Modified
Placement Dry Density (t/m³)	1.88	Percentage Material Retained/Sieve Size (mm)	0 % on 19
Density Ratio (%)	98.1	Sample Height and Diameter (mm)	104 x 149.3

PERMEABILITY $k_{(20)}$ = **1.45E-09 (m/sec)**



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NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

9/03/2016

Date:

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