



Shoalhaven City Council

West Nowra Resource Recovery Park Environmental Impact Statement VOLUME 1

January 2016

Environmental Assessment prepared by	Name:	David Gamble
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	Address:	GHD Pty Ltd Level 15, 133 Castlereagh Street Sydney NSW 2000
	In respect of:	West Nowra Resource Recovery Park
Development Application	Applicant name:	Shoalhaven City Council
	Applicant address:	36 Bridge Road, Nowra NSW PO Box 42, Nowra NSW 2541 Australia
	Land to be developed:	The project is to be carried out on land as shown in the Environmental Impact Statement.
	Lot no, DP/MPS, vol/fol etc	Lot 342 DP 257515
Environmental Impact Statement	An Environmental Impact Statement is attached.	
Certificate	I certify that I have prepared the contents of this Environmental Impact Statement and to the best of my knowledge:	
	• It is in accordance with the requirements of Part 4; • It contains all available information that is relevant to the Environmental Impact Statement of the development; and • That the information contained in the Environmental Impact Statement is neither false nor misleading.	
	Signature	
	Name	David Gamble
	Date	14 January 2016

Executive summary

INTRODUCTION

Shoalhaven City Council (Council) proposes to construct and operate a resource recovery park (RRP) at West Nowra (referred to in this report as 'the proposal'). GHD Pty Ltd (GHD) has been engaged by Council to prepare the necessary documentation to support a staged development application for the proposal. Council is the proponent of the proposal and the Environmental Impact Statement (EIS) is being prepared by GHD in accordance with the requirements of Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act).

This EIS addresses the requirements of the Secretary of the NSW Department of Planning and Environment (the Secretary's Environmental Assessment Requirements (SSD 15_7015) dated 13 May 2015. The EIS has also been prepared in accordance with the NSW Environmental Planning and Assessment Regulation 2000 and other relevant legislation.

LOCATION OF THE PROPOSAL

The proposal would be located at 114 Flatrock Road in Mundamia (City of Shoalhaven), specifically, a 3.6 hectares (ha) site which currently operates as an animal shelter (Lot 342 DP 257515). The proposal site is approximately 5 kilometres (km) west of the Nowra Central Business District, and adjacent to the existing West Nowra Recycling and Waste Facility.

STAGED PROJECT APPROVAL

The West Nowra RRP is proposed to be assessed in stages under Section 83B of the EP&A Act. The EIS provides an assessment of the Concept Proposal (master plan) for the whole project and a detailed assessment of Stage 1 works.

The Concept Proposal for the whole West Nowra RRP project includes two stages:

- Stage 1 – clearing of land and provision of basic infrastructure on the nominated site, which would be undertaken by Council or contractors appointed by Council as part of early construction works.
- Stage 2 – construction and operation of a RRP and would be undertaken by an alternative waste technology provider/facility operator, who would be selected by a tendering process to provide the specialised resource recovery facilities.

The EIS assesses both stages at a Concept Proposal level and provides detailed environmental assessment of the Stage 1 works.

The specific technology for the composting facility (Stage 2) has not been identified at present. However the air quality assessment for the EIS is based on a worst case scenario with maturation of the compost being undertaken outdoors on an area on the former and completed landfill.

The remainder of the RRP Master Plan including the composting facility, materials recovery facility and C&D sorting and recovery facility technology/processes, buildings, services and internal roadways and weighbridges has been developed as a concept proposal only (so far).

The staged approach would enable construction of Stage 1 of the West Nowra RRP to commence (subject to planning approval) while a contractor is appointed and the details of Stage 2 are determined via the tendering and design process.

CONCEPT PROPOSAL DESCRIPTION

The West Nowra RRP would comprise a range of waste and resource processing activities aimed at maximising resource recovery and minimising the amount of waste destined for landfill disposal.

The proposal is defined as the construction and operation of a RRP with combined capacity to receive and process up to 130,000 tonnes of waste per year, comprising:

- A composting facility to process up to 65,000 tonnes of waste per year from both domestic and commercial waste sources.
- A materials recovery facility for sorting up to 40,000 tonnes of dry (non-putrescible) solid wastes per year from both domestic and commercial waste sources.
- A sorting and recovery facility for approximately 15,000 tonnes per year of construction and demolition (C&D) waste
- Other areas for processing and storing approximately 10,000 tonnes per year of other recyclable materials, such as green waste, scrap steel and concrete.

The proposal also includes ancillary infrastructure including:

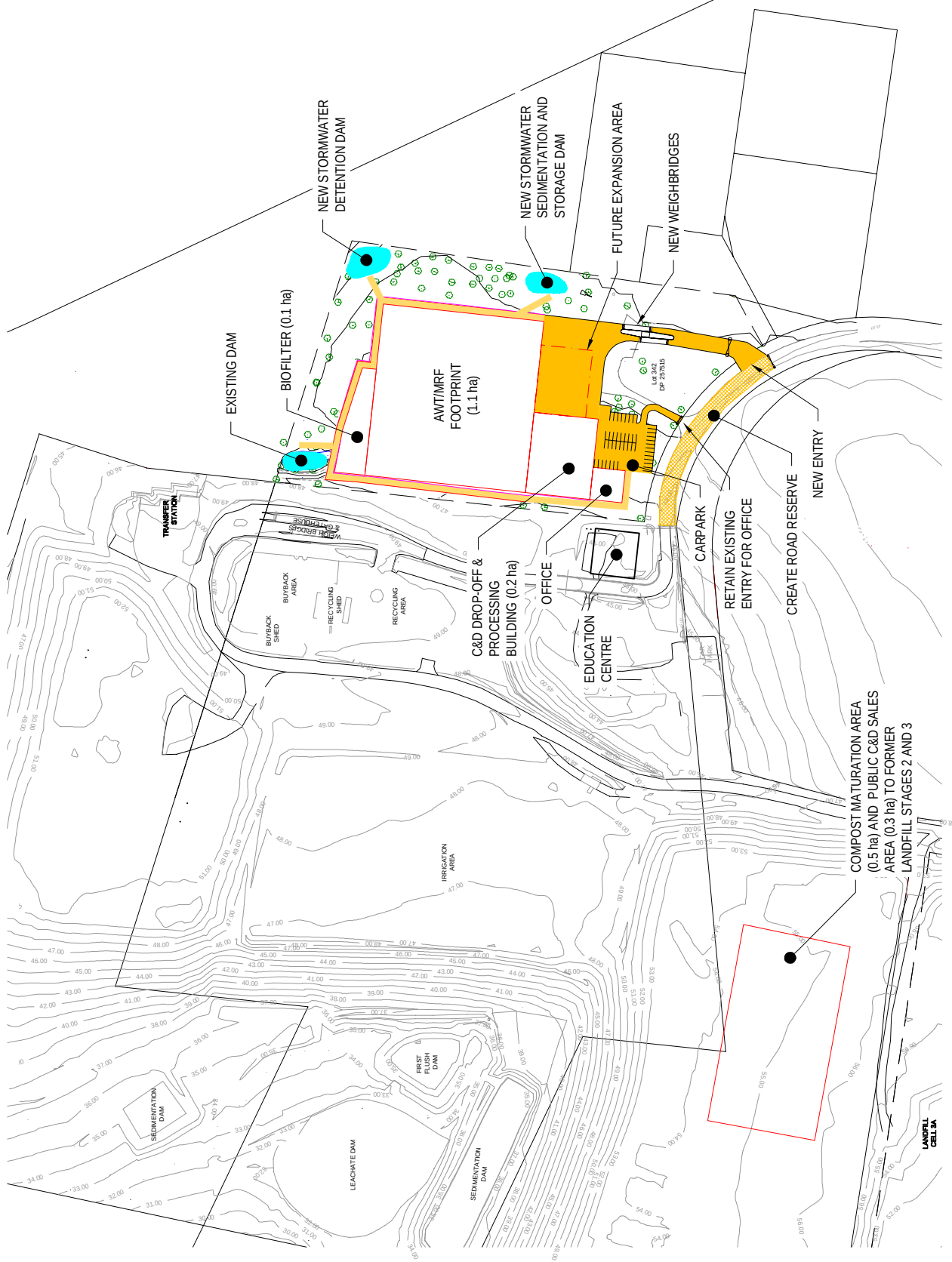
- Circulation roadways and weighbridges for entering and exiting vehicles
- Offices and amenities
- Sediment / detention basins
- Car parking for up to 30 staff vehicles plus 10 visitor vehicles
- Security fencing around the perimeter of the site
- Asset protection zones (APZs).

A preliminary Master Plan, including footprints of potential processing buildings, has been prepared for the purpose of Concept Proposal level assessment in the EIS and to indicate how the proposed facilities and infrastructure items would be integrated with related activities on the site. This is shown in Figure E.1.

Stage 1 would include:

- Clearing of land (including demolition of existing buildings)
- Site grading and preparation
- Provision of basic infrastructure including drainage works, sediment/detention basins, roads, utilities and security fencing and gates.

A schematic of Stage 1 is shown in Figure E.2.



NOTES:

1. AWT CONTRACTOR TO PROVIDE AMENITIES (SHOWERS, TOILETS, LUNCHROOM ETC.) TO STAFF WITHIN AWT BUILDING
2. OFFICE TO CONTAIN RECEPTION AREA, MEETING ROOM, OFFICES (MIN. OF 2) AND AMENITIES (TOILETS ETC.)
3. COMPOST MATURATION AREA TO BE LOCATED ON FORMER LANDFILL STAGES 2 AND 3
4. PUBLIC C&D SALES AREA TO BE LOCATED ON FORMER LANDFILL STAGES 2 AND 3

SHOALHAVEN CITY COUNCIL
WEST NOWRA RRP

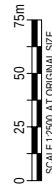
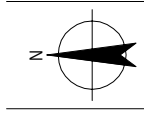


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PRELIMINARY MASTER PLAN

Figure E.1





THE PROPONENT

The proponent for the proposal is Shoalhaven City Council. Council is responsible for public facilities and providing community services across the Shoalhaven local government area.

NEED FOR THE PROPOSAL

Strategic need

The proposal would deliver outcomes consistent with national and state legislation and strategies for sustainable waste management. These include the National Waste Policy, the 'NSW Waste Avoidance and Resource Recovery Strategy 2014-21', and 'NSW 2021'.

The proposal aligns with the philosophy of viewing waste as a resource – and recovering resources in their highest net resource value state. The recovery of resources in this manner creates value from the waste stream.

The proposal forms part of an overall strategy for the council to become a leader in the recovery of recyclable materials from the waste stream, and minimise the quantities of waste disposed to landfill by re-using and processing waste types that would normally end up in landfill.

Regional drivers

There are two landfills in the local government area: the Huskisson landfill and West Nowra landfill. Huskisson landfill only accepts general solid waste (non-putrescible).

The West Nowra landfill is the only general solid waste (putrescible) landfill in the Shoalhaven. Based on carrying on operations at the current rate of disposal and current landfill design, the landfill is projected to reach full capacity in 2025.

There is a need for additional capacity to manage and dispose of putrescible waste from the Shoalhaven beyond 2025. The proposal would help reduce waste to landfill and extend the life of the West Nowra landfill potentially a further 13 years.

In addition, the increased diversion of waste from landfill would assist Council to reduce future financial liabilities associated with the section 88 Waste and Environment Levy. The proposal would reduce the volume of waste being disposed of to landfill and therefore reduce the future levy payments of Council.

ALTERNATIVES

Do nothing

The demand for landfill capacity within the Shoalhaven is expected to continue to grow. Under the do-nothing approach to waste management, a new licenced landfill site will be required to be operational by 2025. Based on available data it is estimated that the life of the West Nowra landfill could be extended a further 13 years (depending on the recovery rate of technologies selected). The do nothing approach would result in an increased / earlier need to develop new areas for putrescible waste landfilling. In addition, other values and benefits of the proposal would not be achieved including:

- Recovery of additional resources from the waste stream
- Contributing to the achievement of targets for increased recycling landfill diversion in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21
- Development of new industry and new employment opportunities in the Shoalhaven

Alternative locations and layouts

The West Nowra Recycling and Waste Facility is the only licensed general solid waste (putrescible) landfill facility within the Shoalhaven local government area and is central to the main population and growth centre of Nowra as well as the Princes Highway. Placing the RRP at the other Council waste facilities in the region would create major inefficiencies due to travelling distances required to access the landfill and for Shoalhaven residents to access and utilise the RRP. It is therefore considered essential that the RRP be located immediately adjoining or close to the existing West Nowra Recycling and Waste Facility. This would enable users and staff to access the landfill and stockpile sites and take advantage of its central location and proximity to major transport routes (Princes Highway).

Since initial planning commenced, the layout and footprint of the proposal has been developed and refined to make the proposal site easier and less expensive to develop, reduce potential environmental impacts, reduce potential traffic conflicts and suit potential future tenderers/contractors better than the footprint/layout that was originally proposed.

CONSULTATION

In accordance with the SEARs, a Consultation Plan was developed and implemented during the EIS preparation. The consultation activities were undertaken to provide details of the proposal, the proposal need and benefits and to seek input from relevant stakeholders.

Council used a wide range of activities and tools to engage with government agencies, stakeholders and the community during development of the EIS. This included:

- information distribution to residents, Waste Services account card customers, government agencies
- social media (Facebook)
- Council website
- Information displays
- Newspaper advertising
- Direct phone contacts
- Tours of the site and information sessions

All issues raised during the consultation are addressed in the EIS.

SITE DESCRIPTION

The proposal site is adjacent to the existing landfill and is located on an approximate 3.6 ha parcel of land (Lot 342 DP 257515), which is owned by the proponent. The land is currently used as an animal shelter with associated kennels and paddocks for impounded and surrendered animals.

Around the boundaries and scattered over the northern half of the land are numerous remnant and regrowth Scribbly Gums (*Eucalyptus sclerophylla*) and Red Bloodwood (*Corymbia gummifera*) with small areas of native shrubs and occasionally mown or slashed vegetation.

There are a number of small dams scattered through the north of the site. The current entrance to the site is currently off Flatrock Road. There is a small carpark in front of the animal shelter building.

The site is located between two creeks that flow northwards into the Shoalhaven River. Namely Sandy Creek which is 680 m west of the site and Cabbage Tree Creek which is 450 m east of

the site. The site elevation varies from 46.5 m AHD in the south western corner to a high point in the north of the site at 49 m AHD.

ENVIRONMENTAL ASSESSMENT

Waste management

Construction waste

The management of wastes generated during construction would be in accordance with relevant NSW legislation and the principles of the waste management hierarchy set out in the 'NSW Waste Avoidance and Resource Recovery Strategy 2014-21' (EPA 2014a).

Construction and demolition material and vegetation would be moved to the adjacent West Nowra Recycling and Waste Facility site by truck or loader for recycling and reuse where appropriate (for example shredding/mulching or for future engineering applications at the landfill). Any reuse would be in accordance with relevant EPA resource recovery orders and exemptions where applicable.

Non-reusable or non-recyclable material would be disposed of at the landfill.

General waste from site personnel would be temporarily stored in mobile or skip bins on the site before being collected for recycling or disposal.

Operation waste

The projected future waste streams and quantities are shown in Table E.1, along with expected waste classifications as per EPA (2015) 'Waste Classification Guidelines'. Future waste incomings were modelled to increase in line with expected increases in population. This shows waste received is expected to increase to close to 125,000 tonnes per year by 2037.

Table E.1 Estimated future waste streams and quantities

Waste stream	Quantity (tonnes per year)			Likely classification
Year	2017	2027	2037	
Asbestos	1,313	1,515	1,730	Special waste
Steel	644	733	835	General solid waste (non-putrescible)
Construction and demolition waste	8,890	10,259	11,715	General solid waste (non-putrescible) General solid waste (putrescible)
Commercial waste	26,339	30,393	34,707	General solid waste (putrescible)
Kerbside collected waste	26,444	30,515	34,846	General solid waste (non-putrescible)
Kerbside collected recyclables	12,980	14,785	16,840	General solid waste (non-putrescible)
Domestic drop off waste	7,931	9,152	10,450	General solid waste (putrescible)
Municipal waste	2,568	2,964	3,384	General solid waste (putrescible)
Tyres	18	21	24	Special waste
Green waste	3,192	3,684	4,206	General solid waste (putrescible)
E-waste	62	71	81	General solid waste (non-putrescible)
Mattresses	80	91	104	General solid waste (non-putrescible)

VENM	3,185	3,675	4,197	General solid waste (non-putrescible)
TOTAL	93,647	107,856	123,118	

Council will be undergoing a tendering process, which will potentially define the wastes to be managed by a contractor at the future RRP.

It is expected that waste would be delivered to the site as it currently is delivered to the existing landfill site – via a combination of kerbside collection vehicles, other trucks and small vehicles (such as cars, utes and trailers).

Waste process outputs and quality control

It is anticipated that a large proportion of C&D waste (builders waste) would be recovered, along with some additional material from the commercial waste stream.

Some product would leave the site as finished compost. The majority of kerbside recyclables and some recovered other dry recyclables would also leave the site. The quantity that would be recovered and diverted from landfill would depend on the RRP processes selected. Overall system diversion rates with various AWT/MRF options could be expected to range from 40% to 80% depending on the process adopted and the waste stream.

Finished compost products would meet the Australian Standard AS4454 'Composts, Soil Conditioners and Mulches'.

In addition, the compost derived from kerbside collected food waste, bulk green waste and source separated food waste (excluding grease trap waste) would meet the requirements of (EPA 2014c) 'The solid food waste order 2014'.

The compost derived from mixed waste would meet the requirements of (EPA 2014d) 'The organic outputs derived from mixed waste order 2014'. Compost derived from the source separated food and garden organics streams would meet the requirements of (EPA 2014e) 'The compost order 2014'.

Accurate recording of all waste movements into and out of the site would be conducted for recording customer data and associated taxes and levies.

Before leaving the site as compost, samples of the material from the AWT facility would be taken and subjected to NATA laboratory testing.

In addition, the following measures are proposed to ensure quality product outputs:

- Signs at the entrance of the RRP indicating the type of waste that can be accepted and those that cannot
- Visual inspection of incoming materials and removal of contaminants
- Training of staff to ensure their ability to recognise and manage unacceptable wastes
- Technology selection and design to maintain conditions for composting to meet Australian Standards – including managing oxygen levels, moisture and temperature
- Screening and refinement to remove coarse physical impurities

Leachate management

It is expected that any washdown water/process leachate from within the enclosed AWT/MRF building(s) would be directed to and stored in an aerated above ground leachate storage tank(s) and recirculated back into the composting process. It is estimated that the demand for process leachate from the operation of the AWT/MRF would exceed the volume of process leachate

produced from the system. The shortfall in water would be supplied from other sources on the site or potable water.

In the event that excess process leachate is produced, it would be transferred by truck to a licenced processing facility for treatment or disposal.

Washdown water from within the C&D building would also be collected and treated before discharge.

Litter

Transportation of waste to the RRP has the potential to generate litter via improper containment of loads. Where possible, vehicles accessing the site would be required to be suitably enclosed to prevent the escape of litter. Waste materials at the AWT/MRF would be delivered and unloaded within the buildings. The waste streams to the C&D facility are not expected to contain significant quantities of material that would be susceptible to being blown off-site. Therefore the likelihood for wind-blown material to escape from the site is considered to be low.

Biosecurity

If inadequately managed, the proposal would have the potential to facilitate the introduction and spread of exotic plant species or pathogens to the site or to the users of compost. Processing controls would be employed to meet the Australian Standard for composting (AS 4454-2012: Composts, Soil Conditioners and Mulches) which would result in conditions that would ensure that the resulting compost is free of pathogenic organisms (for example *Phylloxera* and *Phytophthora*) and viable weed seeds.

There is potential for pests and vermin to be attracted to the RRP due to the nature of wastes that would be accepted. Since the receipt (unloading) of all putrescible waste and processing would be undertaken inside buildings, the likelihood of large numbers of pests and vermin being attracted to the RRP would be low.

Bees can potentially source food from a waste or compost facility and encourage other bees to gather at the food source. The main biosecurity risk is the contamination of local honey and commercial colonies with disease. In addition, bee swarms can also pose an occupational health and safety risk for employees and visitors to a waste facility. However as the receipt and processing of putrescible waste would occur within buildings, the risk of bees being attracted to the RRP is considered very low. Therefore the risk of transmission of diseases via honey bees is considered very low.

Air quality

Odour

Dispersion modelling was conducted to predict the pattern of maximum off-site ground level odour concentrations resulting from odour emissions from the West Nowra RRP site for three scenarios including:

- current landfill and green waste
- current landfill only
- proposed RRP with current landfill operations.

This modelling demonstrated that for the combined proposal and current landfill operations, the 5 OU criterion adopted for the proposal would extend to the east just over Flat Rock Road. There are no receptors in this area and predicted odour impacts are expected to comply with the odour criterion.

In addition, predicted 99th percentile (1-hour average) odour levels were assessed at the discrete receivers near the proposal site. This assessment showed the highest predicted concentrations are at 43 Flatrock Road which is approximately 700 m from the proposal. Slightly lower concentrations would be expected at 41 Flatrock Road. The 99th percentile is predicted to be 2.3 OU for the combined future scenario of RRP plus landfilling operations.

The predicted odour impact at all other receivers are even lower and hence significant odour impacts are not predicted to occur due to the proposal. The largest percentage increase in odour is at 56 Stonegarth Road however the levels are still well below the criteria and at a level which cannot generally be detected against background ambient conditions.

There is a reduction in predicted odour levels at the OEH office, possibly due to the height of the biofilter stack.

Dust

An indicative worst-case dust modelling scenario was undertaken which considered both construction and operation of the RRP. The dust modelling was undertaken to determine the concentration of dust (PM₁₀) over a 24 hour period. This showed that the dust emission increment from the site was below the 50 µg/m³ criteria at all times at all surrounding receivers. Results showed that there would be potential to exceed the criteria at the OEH office (R11) with the existing background dust levels taken into consideration. Therefore a contemporaneous dust assessment was undertaken. This indicated that the proposal would not result in any additional days exceeding the dust criteria than measured in the background ambient dust data. This means that the proposal would comply with the dust criteria.

A number of mitigation measures are also proposed which would minimise dust emissions during construction and operation.

Greenhouse gas

The difference in greenhouse gas emissions between the proposal and the existing operations (the baseline) was calculated based on emissions from composting, energy usage during operations, transportation of materials from the facility and avoided emissions by diverting waste from landfill.

The difference between the baseline emissions and the proposal was estimated to be approximately 40,307 t CO₂-e over a 20 year life or approximately 2,015 t CO₂-e per year. The difference in emissions is primarily dependent on the quantities of material being composted, the amount of waste being diverted from landfill or the collection efficiency of the landfill gas collection system.

This shows that it is unlikely that the proposal would have any substantial net impact on greenhouse gas emissions associated with waste treatment at the facility.

Noise

Construction

Noise activities associated with construction are expected to include earth compaction and grading, road works and general construction works. Construction would be limited to standard construction hours.

Acoustic noise modelling was undertaken to predict construction noise levels at sensitive receivers during standard construction hours. The results indicate that no residential receiver is predicted to exceed the construction noise management levels.

A number of noise mitigation measures have been proposed to reduce potential construction noise impacts.

Operation

Acoustic noise modelling of noise was also undertaken to predict noise emissions as a result of the operation of the proposal.

The results show that the increase in operational noise levels associated with the proposal would be minimal. The predicted operational noise levels do not exceed the day time or night time operational noise criteria. Sleep disturbance impacts from operational noise are not expected. Furthermore, road traffic noise due to the proposal is not anticipated to be perceptible in relation to ambient traffic noise.

Hence, specific operational noise mitigation measures would not be required at the RRP.

Traffic and transport

Traffic generation

The proposal is expected to generate an additional 57 vehicles per day on the surrounding road network in 2017 and 102 vehicles per day by the year 2027. Based on the worst case assessment this equates to around 42 peak hour vehicle movements in 2017 and 58 peak vehicle movements in 2027.

The percentage increase on the surrounding road network is minimal and indicates negligible impact.

Intersection performance

Proposed traffic flows at the existing intersections were analysed using SIDRA to obtain the proposed operation of key intersections in 2017 and 2027 under a ten year horizon.

Modelling showed that with predicted background traffic growth and traffic associated with the proposal, the intersection of Flatrock Road / Yalwah Road would continue to operate satisfactorily in 2017 under the current intersection control arrangements.

The intersections Yalwah Road / Albatross Road, Albatross Road / Kalandar Street, and Kalandar Street / Princes Highway, would operate with an unacceptable LoS by 2027 due to the proposed background traffic growth relating to predicted urban land release areas accessing from Yalwah Road.

Council has confirmed that there are plans in the future to upgrade the intersection of Albatross Road and Yalwal Road, once the new land releases are approved.

Preliminary investigations indicate that the intersection of Albatross Road / Kalandar Street would operate satisfactorily if the roundabout was upgraded to accommodate additional lanes. These intersection arrangements would need to be investigated further as part of other studies.

Parking and access

The existing access to the site would be retained as an access to car parking and the office. A new site access would be provided to the south directly from Flatrock Road which would provide access through the proposed weighbridges.

A 40 space car park (30 staff plus 10 visitor space) is proposed to be provided on the south western side of the proposal site.

All access and parking would be designed to relevant standards.

Flora and fauna

The proposal would remove up to 2.35 ha of native vegetation. This vegetation contains 15 identified hollow-bearing trees with a highly degraded and fragmented understory and ground cover layers.

For the purpose of the FBA assessment, the proposal has been assessed based on the total loss of all vegetation on site. A total of 133 ecosystem credits required. The plant community type identified within the site (Red Bloodwood – Hard-leaved Scribbly Gum – Silvertop Ash heathy open forest on sandstone plateaux of the lower Shoalhaven Valley, Sydney Basin Bioregion) is not in benchmark condition, is not of a type that is over-cleared, an EEC or contains or directly buffers or protects riparian areas.

Whilst the site survey confirmed that a number of “ecosystem credit” threatened fauna species utilise the site, the site is not considered critical to the life cycle of viable local populations of threatened fauna due to its location, small size, and condition. In the unlikely event that threatened fauna are utilising tree hollows on the site, mitigation measures have been proposed

In terms of threatened species, one “species credit” species, the Squirrel Glider, is assumed to be present on the site on occasion based on nearby records, there being incised sap feeding and hollow-bearing trees on the site, and connectivity (for gliding possums) with the known habitat to the south. A total of 52 species credits are required for the Squirrel Glider.

Soil and water

Stormwater quality

During the construction phase there may be a significant area of exposed soils that could have a potential impact on downstream systems through sedimentation. Therefore erosion and sediment control measures are proposed based on the design principles outlined in *Landcom* (2005). This includes:

- Minimisation of disturbed areas and minimising the period of disturbance
- Diversion of clean runoff around disturbed areas
- Collection and management of disturbed runoff in sediment ponds

During the operational phase the primary potential risk to downstream surface water quality is runoff from sealed areas. Since neither incoming waste nor composting material would be stored outside, this significantly reduces the risk to downstream surface waters.

Runoff from perimeter roads is not expected to have a significant impact on downstream waters due to the fact that its road surface areas are minimal and spread throughout the site and vehicles carrying compost are not expected to travel in this area of the site.

It is considered that there is a greater risk arising from the carpark and site entrance area. Therefore a stormwater treatment system involving a gross pollutant trap (also capable of capturing hydrocarbons) buffer strip and constructed wetland would be required to manage water quality in this area.

MUSIC modelling results show that for all indicator pollutants, the predicted loading from the carpark and entrance area post development is less than the predicted pollutant loading from the equivalent area in its current condition.

Water balance

Based on the preliminary soil and water risk assessment, a water balance assessment was deemed necessary to determine whether harvesting of water collected onsite would be able to

supply enough water to meet the expected water reuse demand of the RRP. The water balance took into consideration both water available for reuse and the demand for reuse.

The water balance indicated that on average the site has an excess of water with water overflowing the basins in excess to the reuse demand.

Analysis of the time series results of the water balance indicates that the water available at the site would be able to meet the reuse demand for approximately 94% of the time. Operational refinements and optimisation measures would likely result in the reuse demand being satisfied closer to 100% of the time, by diverting water between the two basins that collect roof water.

The results of the assessment indicate that the roof runoff and proposed basins would be able to supply the majority of the reuse water demand. This would result in a major reduction in demand for potable water.

Water Sharing Plan

The site is located within the area covered by the Water Sharing Plan for the Greater Metropolitan Region Unregulated Water Sources and the Lower Shoalhaven River Management Zone of This Plan. No extraction from waterways is proposed for the proposal.

Harvesting of surface and roof water runoff is proposed however the impact on other water users is expected to be minimal based on the following:

- No licenced water users are identified along the creek downstream of the site. Once flows reach the Shoalhaven River the scale of the site compared to the river catchment is minimal.
- Harvesting is from roof areas and a significant proportion of water harvested can be considered to have been water that would have been intercepted and lost from the system due to evaporation under existing conditions

The site is also covered by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources. No extraction from groundwater is proposed and no deep excavations likely to encounter significant volumes of groundwater area proposed. The addition of impervious areas is minimal compared to the overall recharge zone. Therefore no significant impact on groundwater resources is expected.

Groundwater quality

There are no existing groundwater extraction bores at the proposal site and no groundwater extraction would be required for the proposal. All leachate generating activities would take place on sealed concrete slabs so there is minimal potential for contaminated water to enter the water table.

Contamination

The proposal would be constructed on currently vacant land, with no history of contamination. Any chemicals used on site (such as disinfectants) would be used in very small quantities within buildings. There is no possibility that soils beneath the site would become contaminated, as all buildings would be on concrete slabs and not in contact with the underlying soils. As all stormwater from the site that falls on roads and paved areas would be collected, and directed to the on-site stormwater management system, soils down gradient of the proposal site would be protected from potential contamination.

Acid sulphate soils

According to the Australian Soil Resource Information System National Acid Sulphate Soils maps, the site not located in an area of probable occurrence of acid sulphate soils. The proposal is therefore unlikely to have any acid sulphate soils impacts.

Bushfire

The proposal is subject to an elevated bush fire risk given its proximity to large tracts of native forest. The bushfire protection measures incorporated into proposal comply with the *Aims and Objectives*, and the *Acceptable Solutions* of the performance criteria, identified in *Planning for Bush Fire Protection* (NSW RFS 2006a and 2010). The proposed measures go beyond the requirements for a non-residential building due to the establishment of an APZ to the east, south and north of the proposed buildings. These measures seek to reduce the impact associated with a fire event and provide protection for the proposal.

Hazard and risk

The results of the preliminary risk screening indicated that a PHA is not required, as all materials, including transportation frequencies, do not exceed the respective thresholds, and the project is not considered potentially hazardous. However, to demonstrate that potential hazards have been considered and control measures put in place, a hazard identification process was completed.

The hazard identification process did not identify any significant hazards with the potential for offsite impact that would not be suitably controlled.

Aboriginal heritage

The Aboriginal heritage assessment established that the proposal site has low archaeological potential and low archaeological significance. It confirmed that no previously recorded Aboriginal sites and/or places and no areas of archaeological potential are located within the study area. No further Aboriginal archaeological investigation is required.

The assessment concludes that the proposed construction of the RRP would not impact on any recorded Aboriginal objects or any areas of moderate or high archaeological potential.

Non-Aboriginal heritage

No heritage listed items are located within or adjacent to the proposal site. No unlisted heritage items or areas of archaeological potential were identified during background research or the site inspection. As there are no listed or unlisted heritage items or areas of archaeological potential within the study area, there are unlikely to be impacts to items of state or local heritage significance. No further heritage investigations or approvals are required.

Socio-economic

The construction of the proposal would require the current operations of the site as an animal shelter to cease. The animal shelter activities would have to be relocated to another site within the local government area (to be determined). However the proposal would not impact on community use of the land in the surrounding area. There are no community facilities near the proposal site such as schools, churches, child care centres, open space or recreational facilities.

The proposal would also have a positive employment. As the technology has not been selected the size of the workforce during construction is not known – but there is likely to be at least 40 to 50 positions. Approximately 30 people are expected to be employed during operation.

The proposed new facilities are well located with few residential dwelling in close proximity to the site. The potential for negative amenity impacts would also be significantly reduced by the implementation of appropriate environmental management controls guided by the construction environmental management plan.

The proposal would complement existing waste related land uses at the adjacent site, and improve opportunities for resource recovery. It would play a key role in moving the general community beyond the traditional approach of disposing waste to landfill. It would assist the community to become more aware of waste as a resource and the importance of their role in resource recovery. This would increase resource recovery and engender a sense of ownership by the community, particularly when it is recognised that the region's wastes are being managed within the region by a new process to maximise recovery and landfill life.

The increased diversion of waste from landfill would assist Council in reducing future financial liabilities associated with the waste and environment levy. This is because the proposal would reduce the volume of waste being disposed of to landfill and therefore reduce future waste levy payments.

Visual amenity

A visual assessment was undertaken which considered impacts on four groups of receptors, including residential receptors, travellers on Flatrock Road and users of the Shoalhaven Campus of the University of Wollongong. All of the receptors were determined to have a sensitivity of moderate or less. This was largely due to existing vegetation and limited interest in views towards the proposal site, or distance to the site, reducing the prominence of the views.

The magnitude of impacts on each of the identified receptor group was also determined to be low or less, largely due to vegetation which limits visual accessibility of the proposal elements. Significant distance from receptors also reduces the visibility of the proposal.

The consequent assessment of impact significance found that all the identified receptors would be exposed to impacts of low to negligible significance. By ensuring building designs and colour schemes were selected to blend with the natural environment, the proposal would not have any significant visual impacts on the community.

PROJECT JUSTIFICATION AND CONCLUSIONS

The justification for the proposal is based on a number of factors:

- The proposal is consistent with the objects of the EP&A Act
- The proposal is consistent with the strategic direction for waste management in NSW and at a national level
- The proposal meets a need for alternative waste technologies
- The site is suitable
- The proposal is in the public interest

The EIS has examined a number of key issues surrounding the proposal, including identification of potential adverse impacts.

The EIS concludes that many of the potential issues identified would be effectively managed through proposal design features. To manage residual issues, and in some cases eliminate them completely, a number of mitigation and management measures (commitments) would be undertaken. The construction and operation of the project would be undertaken in accordance with all relevant legislative guidelines.

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Appendix L – CIV Calculation and Employment Estimate

1. Introduction

This section provides an overview of the proposal, the planning and approvals process relevant to the proposal. Further details of these are also presented in later chapters.

1.1 Background

Shoalhaven City Council (Council) proposes to construct and operate a resource recovery park (RRP) at West Nowra (referred to in this report as 'the proposal'). GHD Pty Ltd has been engaged by Council to prepare the necessary documentation to support a staged development application for the proposal. Council is the proponent of the proposal and the EIS is being prepared by GHD in accordance with the requirements of Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act).

This EIS addresses the requirements of the Secretary of the NSW Department of Planning and Environment (the Secretary's Environmental Assessment Requirements (SSD15_7015) dated 13 May 2015 (Appendix A). The EIS has also been prepared in accordance with the NSW Environmental Planning and Assessment Regulation 2000 and other relevant legislation.

1.2 Staged project approval

The West Nowra RRP is proposed to be assessed in stages under Section 83B of the EP&A Act. The EIS provides an assessment of the concept proposal for the whole project and a detailed assessment of Stage 1 works.

The Concept Proposal for the whole West Nowra RRP project includes two stages:

- Stage 1 – clearing of land and provision of basic infrastructure on the nominated site, which would be undertaken by Council or contractors appointed by Council as part of early construction works.
- Stage 2 – construction and operation of a RRP which would be undertaken by an alternative waste technology provider/facility operator, selected through a tendering process to provide the specialised resource recovery facilities.

The EIS assesses both stages at a concept proposal level and provides detailed environmental assessment of the Stage 1 works.

The remainder of the RRP Master Plan including the composting facility, materials recovery facility and C&D sorting and recovery facility technology/processes, buildings, services and internal roadways and weighbridges has so far been developed as a concept proposal only.

The staged approach would enable construction of Stage 1 of the West Nowra RRP to commence (subject to planning approval) while a contractor is appointed and the details of Stage 2 are determined via the tendering and design process.

The specific technology for the composting facility (Stage 2) has not been identified at present. However the air quality assessment for the EIS is based on a worst case scenario with maturation of the compost being undertaken outdoors on an area on the former and completed landfill.

1.3 Concept proposal description

The West Nowra RRP would comprise a range of waste and resource processing activities aimed at maximising resource recovery and minimising the amount of waste destined for landfill disposal.

The proposal is defined as the construction and operation of a RRP with combined capacity to receive and process up to 130,000 tonnes of waste per year, comprising:

- A composting facility to process up to 65,000 tonnes of waste per year from both domestic and commercial waste sources.
- A materials recovery facility for sorting up to 40,000 tonnes of dry (non-putrescible) solid wastes per year from both domestic and commercial waste sources.
- A sorting and recovery facility for approximately 15,000 tonnes per year of construction and demolition (C&D) waste
- Other areas for processing and storing approximately 10,000 tonnes per year of other recyclable materials, such as green waste, scrap steel and concrete.

The MRF for dry waste and the organics composting/mixed waste alternative waste technology (AWT) facility may either be housed within a combined building (as assumed in this EIS), or in separate buildings. This will depend upon the design prepared by the successful tenderer, which would be based upon the concept design outlined in this EIS.

A building would also be provided to allow for undercover sorting of construction and demolition materials. The impact assessments undertaken for this EIS are based upon all key processes (mixed waste receipt and processing, composting, material recovery and sorting of C&D waste) being undertaken within a building or buildings, but are not specific to the particular buildings shown in this EIS.

The proposal also includes ancillary infrastructure including:

- Circulation roadways and weighbridges for entering and exiting vehicles
- Offices and amenities
- Sediment / detention basins
- Car parking for up to 30 cars vehicles and 10 visitor vehicles
- Security fencing around the perimeter of the site
- Asset protection zones (APZs).

Stage 1 would include:

- Clearing of land (including demolition of existing buildings)
- Site grading and preparation
- Provision of basic infrastructure including drainage works, sediment/detention basins, roads, utilities and security fencing and gates.

1.4 Location

The proposal would be located at 114 Flatrock Road in Mundamia (City of Shoalhaven), specifically, a 3.6 hectares (ha) site which currently operates as an animal shelter (Lot 342 DP 257515). The proposal site is approximately 5 kilometres (km) west of the Nowra Central Business District, and adjacent to the existing West Nowra Recycling and Waste Facility. Refer to Figure 4.1.

1.5 The proponent

The proponent for the proposal is Shoalhaven City Council. Council is responsible for public facilities and providing community services across the Shoalhaven local government area.

1.6 Approach to the EIS

State Significant Development to which Division 4.1 of the *Environmental Planning and Assessment Act 1979 Act* (EP&A Act) applies is identified in the 'State Environmental Planning Policy (State and Regional Development) 2011' (State and Regional Development SEPP) and in declarations made by the Minister for Planning. The proposal is considered to be 'State Significant Development' as it is of a type listed in Schedule 1 of the State and Regional Development SEPP.

The NSW Minister for Planning is therefore the consent authority for the proposal and a development application is required to be lodged with the NSW Department of Planning and Environment, accompanied by an EIS. The EIS would be placed on public exhibition for a period of at least 30 days to allow public and agency submissions to be lodged, after which the proponent may be requested to respond to issues raised in the submissions.

This EIS has been undertaken to assess the significance of the potential environmental impacts associated with the construction and operation of the proposal. The EIS has been undertaken in accordance with the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

Council is seeking a staged development approval for the proposal in accordance with Section 83B of the EP&A Act. That is, the RRP Master Plan for the site would be approved in concept, and would be developed in stages. This EIS seeks approval of both the Concept Proposal and Stage 1 project approval. Therefore the EIS assesses both stages at a concept proposal level and provides detailed environmental assessment of the Stage 1 works.

The EIS has been based on the Secretary's Environmental Assessment Requirements (SEARs) developed by the NSW Department of Planning and Environment in conjunction with a range of other government agencies.

1.7 EIS structure

The EIS contains two volumes incorporating the main text within Volume 1 and appendices and specialist technical studies in Volume 2.

Volume 1 includes:

- An introduction to the EIS (chapter 1)
- An overview of the statutory framework and assessment requirements (chapter 2)
- A description of the site and existing facilities (chapter 4)
- An overview of the proposal objectives and alternatives considered (chapter 5)
- A description of the proposal including plans of proposed works, the resource recovery processes, likely waste streams, classifications and quantities, construction activities and likely staging (chapter 6)
- Identification and prioritisation of issues (chapter 7)
- The results of assessment of key environmental issues identified by the SEARs (chapters 8 to 20)
- A summary of proposed management and mitigation measures (chapter 21)

- The conclusions and justification for the project including an evaluation of the project with regard to social, economic and environmental considerations and the results of the EIS (chapter 22)
- References, Glossary of Technical Terms, Units of Measure and Abbreviations (chapters 23 to 25)

Volume 2 contains the specialist technical/background reports prepared as part of the EIS process, supporting correspondence and consultation information:

- Appendix A – Secretary’s Environmental Assessment Requirements
- Appendix B – Summary Consultation Report
- Appendix C – Air Quality Assessment
- Appendix D – Greenhouse Gas Assessment
- Appendix E – Noise Assessment
- Appendix F – Traffic and Transport Assessment
- Appendix G – Flora and Fauna Assessment
- Appendix H – Soil and Water
- Appendix I – Bushfire Assessment
- Appendix J – Hazard Analysis
- Appendix K – Heritage Assessments
- Appendix L – CIV Calculation and Employment Estimate

2. Statutory framework

This section provides a description of the approval process for the proposal. It includes consideration of the permissibility of the proposal under relevant environmental planning instruments and the requirements of relevant environmental legislation and other planning instruments.

2.1 Environmental Planning and Assessment Act 1979

The EP&A Act contains the core legislation relating to planning and development activities in NSW. It is the principal law overseeing the assessment and determination of development proposals. All development in NSW is assessed in accordance with the provisions of the EP&A Act.

2.1.1 Part 4 of the EP&A Act

Part 4 of the EP&A Act provides for the control of development that requires development consent from a consent authority. Depending on the circumstances of the project, the consent authority may be the local Council or the Minister.

Part 4, Division 4.1 of the EP&A Act establishes an approval regime for development that is declared to be State Significant Development (SSD) by either a State Environmental Planning Policy (SEPP) or Ministerial Order. In accordance with Section 89E of the EP&A Act, the Minister is the consent authority for SSD. Pursuant to sub-section 78A(8A) of the EP&A Act, an EIS is required to support a development application for SSD.

Council is seeking a staged development approval for the proposal in accordance with Section 83B of the EP&A Act. That is, the RRP Master Plan for the site would be approved in concept, and would be developed in stages. This EIS seeks approval of both the Concept Proposal and Stage 1 project approval.

2.1.2 Approval process

SSD to which Division 4.1 of the EP&A Act applies is identified in the *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) and in declarations made by the Minister. The proposal is considered to be 'State significant development' as it is of a type listed in Schedule 1 of the State and Regional Development SEPP (refer to Section 2.2.1).

The Minister is therefore the consent authority for the proposal and a development application is required to be lodged with the NSW Department of Planning and Environment, accompanied by an EIS. The EIS would be placed on public exhibition for a period of at least 30 days to allow public and agency submissions to be lodged, after which the proponent may be requested to respond to issues raised in the submissions.

2.1.3 Staged development application

The West Nowra RRP is proposed to be assessed in stages under Section 83B of the EP&A Act. The EIS provides an assessment of the Concept Proposal for the whole project and a detailed assessment of Stage 1 works.

The remainder of the RRP Master Plan including the composting facility, materials recovery facility and C&D sorting and recovery facility technology/processes, buildings, services and internal roadways and weighbridges has been developed as a concept proposal only (so far).

The staged approach would enable construction of Stage 1 of the West Nowra RRP to commence (subject to planning approval) while a contractor is appointed and the details of Stage 2 are determined via the tendering and design process.

Stage 1 would include:

- Clearing of land (including demolition of existing buildings)
- Site grading and preparation
- Provision of basic infrastructure including drainage works, sediment/detention basins, roads, utilities and security fencing and gates.

2.2 State environmental planning instruments

The State Environmental Planning Policies (SEPPs) that are relevant to the proposal and the study area are discussed below. It should be noted that Regional Environmental Planning Policies (REPs) have been removed from the hierarchy of planning instruments. From 1 July 2009, REPs are now deemed SEPPs.

2.2.1 State Environmental Planning Policy (State and Regional Development) 2011

The State and Regional Development SEPP identifies development:

- To which the State significant development assessment and approval process under Division 4.1 of Part 4 of the EP&A Act
- That is State significant infrastructure and critical State significant infrastructure.

Development that is specified in Schedule 1 or Schedule 2 is declared to be State significant development. Clause 23 of Schedule 1 states that the following development is State significant development:

(1) Development for the purpose of regional putrescible landfills or an extension to a regional putrescible landfill that:

(a) has a capacity to receive more than 75,000 tonnes per year of putrescible waste, or

(b) has a capacity to receive more than 650,000 tonnes of putrescible waste over the life of the site, or

(c) is located in an environmentally sensitive area of State significance.

(2) Development for the purpose of waste or resource transfer stations in metropolitan areas of the Sydney region that handle more than 100,000 tonnes per year of waste.

(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.

(4) Development for the purpose of waste incineration that handles more than 1,000 tonnes per year of waste.

(5) Development for the purpose of hazardous waste facilities that transfer, store or dispose of solid or liquid waste classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste that handles more than 1,000 tonnes per year of waste.

(6) Development for the purpose of any other liquid waste depot that treats, stores or disposes of industrial liquid waste and:

(a) handles more than 10,000 tonnes per year of liquid food or grease trap waste, or

(b) handles more than 1,000 tonnes per year of other aqueous or non-aqueous liquid industrial waste.

The proposal includes a resource recovery park with combined capacity to receive and process up to 130,000 tonnes of waste per year, comprising:

- A composting facility to process up to 65,000 tonnes of waste per year from both domestic and commercial waste sources.
- A materials recovery facility for sorting up to 40,000 tonnes of dry (non-putrescible) solid wastes per year from both domestic and commercial waste sources.
- A sorting and recovery facility for approximately 15,000 tonnes per year of construction and demolition (C&D) waste
- Other areas for processing and storing approximately 10,000 tonnes per year of other recyclable materials, such as green waste, scrap steel and concrete.

As the capacity of the proposed RRP is greater than 100,000 tonnes per year it is considered to be State Significant Development.

2.2.2 State Environmental Planning Policy (Infrastructure) 2007

The State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty and improved efficiency and flexibility in the location of infrastructure and service facilities, while also providing for adequate stakeholder consultation.

Clause 121 of the Infrastructure SEPP outlines waste or resource management facilities which are permissible with consent. Clause 121(1) states:

Development for the purpose of waste or resource management facilities, other than development referred to in subclause (2), may be carried out by any person with consent on land in a prescribed zone.

The proposal is considered to be for the purpose of a waste or resource management facility (but not a waste transfer station as per subclause (2)).

The site is located on land zoned SP2 – Infrastructure under the *Shoalhaven Local Environmental Plan 2014* which is a prescribed zone.

The proposal is therefore considered permissible with consent under Clause 121 of the Infrastructure SEPP.

2.2.3 State Environmental Planning Policy No. 33 - Hazardous and Offensive Development

State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33) requires the consent authority to consider whether an industrial proposal is a 'potentially hazardous industry' or a 'potentially offensive industry'. A hazard assessment is completed for potentially hazardous developments to assist the consent authority to determine acceptability. The Department of Planning has a draft guideline, entitled 'Applying SEPP 33' (July 2008), which provides guidance on how SEPP 33 is applied. The draft guideline provides guidance as to when a proposal should be considered to be a 'potentially hazardous industry' or a 'potentially offensive industry'.

The draft guideline makes it clear that 'potentially hazardous industries' are to be limited to industries which pose a physical risk, such as explosives or fire. The proposal does not pose any physical risk such as explosion or fire and is therefore not considered to be a 'hazardous industry'.

The guideline states that any proposal which requires a 'licence under any pollution control legislation' should be considered 'potentially offensive' within the meaning of SEPP 33. As discussed in Section 2.5.1, the proposal would require an Environmental Protection Licence (EPL) under the POEO Act, and should therefore be considered 'potentially offensive'. However, the guideline indicates that if the assessment can demonstrate that the offence can be controlled to a level that is not significant (i.e. within the limits and criteria of an EPL) and if the EPA is willing to issue an EPL, then the industry would not be considered offensive.

The environmental assessment provides a comprehensive assessment of environmental impacts and mitigation and management measures associated with the proposal. It demonstrates that the proposal can operate within acceptable pollution criteria. The proposal would therefore not be considered a hazardous or offensive industry and would be permissible under SEPP 33.

2.2.4 State Environmental Planning Policy No. 55 – Remediation of Land

The aims and objectives of *State Environmental Planning Policy No. 55* (SEPP 55) are to provide a state-wide planning approach to contaminated land remediation and to promote the remediation of contaminated land to reduce risk of harm.

SEPP 55 restricts consent authorities from issuing development consent on land that may be contaminated, unless the consent authority is satisfied that the land in question is suitable for development, or would be suitable if the appropriate remediation was undertaken.

The aims and objectives of SEPP 55 would be considered in the EIS and the potential for the site to be contaminated and whether this presents any unacceptable risks to human health would be assessed.

2.2.5 Illawarra Regional Environmental Plan No. 1

The *Illawarra Regional Environmental Plan No.1* (IREP) applies to all land within the Shoalhaven local government area and therefore it applies to the site.

Part 2 of the IREP relates to rural land within the Illawarra region. The proposal is not located on land which is zoned for rural purposes however it is currently used for rural purposes. Clause 11 of the REP states the following objectives relating to rural lands:

- (a) to retain the productive capacity of prime crop and pasture lands,*
- (b) to protect valuable natural environments, as identified on sheets 1–10, 14, 15 and 17 of the map,*
- (c) to provide for wildlife movement between major protected wildlife habitats,*
- (d) to effectively manage the development of rural lands having regard to flood potential, bushfire risks, salinisation, soil degradation, erosion and weed infestation,*
- (e) to allow for the development of small rural holdings in appropriate locations,*
- (f) to prevent uneconomic demand for State Government services,*
- (g) to allow for future urban expansion,*
- (h) to retain the scenic attributes of rural areas, and*
- (i) to provide for developments which by virtue of their character require siting away from urban areas.*

The proposal is considered to be consistent with the IREP as it would provide for a development (resource recovery park) which by virtue of their character require siting away from urban areas. The development of the proposal would also be a driver for the future urban expansion into the

rural lands located to the east of the rail corridor. The proposal would not significantly impact upon the scenic attributes of the area as the existing waste facility already exists on land to the west of the proposal.

There are no specific provisions of the IREP which apply to the proposal.

2.2.6 NSW Biodiversity Offsets Policy for Major Projects

The NSW biodiversity offsets policy for major projects (the policy) applies to State Significant Development and State Significant Infrastructure. Due to the capacity of this proposal being more than 100,000 tonnes per year it is considered State Significant Development and therefore this policy applies.

This policy attempts to standardise biodiversity impact assessment and offsetting for major project approvals across NSW. The aims and objectives of the policy are to improve outcomes for the environment and communities while providing a practical and achievable offset scheme for proponents. The policy refers to offsets and supplementary measures as ways of compensating for biodiversity losses.

The policy is currently in a transitional period during which the application of the policy will be compulsory but a more flexible approach will be permitted to appropriately deal with any technical issues, practical implementation issues or potential perverse outcomes that may arise.

The policy is underpinned by the Framework for Biodiversity Assessment (FBA) which commenced in October 2014. This provides the methodology for assessing impacts and determining biodiversity offsets for major projects. The FBA outlines the process of quantifying the impact assessment of a project and determining the appropriate offset or supplementary measures required.

An ecological assessment of the site in accordance with the FBA was carried out by Council. The findings of this assessment are included as Appendix G and summarised in Chapter 13.

2.3 Local environmental plans

2.3.1 Shoalhaven Local Environmental Plan 2014

The proposal is located in the Shoalhaven local government area, and therefore is subject to the *Shoalhaven Local Environmental Plan 2014* (Shoalhaven LEP).

Under the Shoalhaven LEP the site is zoned SP2 – Infrastructure (Waste/Resource Management Facility).

The development of a resource recovery park is permissible with consent in the abovementioned zone.

The objectives of the applicable zone and the consistency of the proposal with these objectives are provided in Table 2.1.

Table 2.1 Consistency with relevant zone objectives

Objective	Consistency/ discussion
SP2 – Infrastructure	
To provide for infrastructure and related uses	The proposal involves the construction and operation of a resource recovery park which is permitted under the zone. This use would also be consistent with the neighbouring zones to the west which are currently occupied by the West Nowra Landfill.

Objective	Consistency/ discussion
To prevent development that is not compatible with or that may detract from the provision of infrastructure	The proposal includes the provision of infrastructure which would benefit the Nowra and greater Shoalhaven area.

2.4 Development control plans and policies

Shoalhaven City Council do not have a single overarching development control plan (DCP) which covers the entire council area. In its place, small land or land use specific DCPs apply to the council area. The following DCPs are considered relevant to the proposal:

- DCP 18 – Car Parking Code
- DCP 82 – Signage Strategy - Section 1 & 2
- DCP 93 – Construction for waste minimisation and management

Table 2.2 outlines the relevant provisions of the above DCPs.

Table 2.2 Consistency with relevant DCP controls

Clause	Consistency/discussion
DCP 18 – Car Parking Code	
Part 2.1 – Car Parking Requirements Schedule	This schedule does not specifically outline the parking requirement for a development such as the proposal. Car parking to be provided would be suitably sized to ensure there is adequate parking for workers on site.
Part 2.2 – Parking layout and dimensions	The proposed car park would be designed in line with relevant standards and guidelines.
Part 2.3 – Access	Access to the proposed car park areas would be designed in line with relevant standards and guidelines.
Part 2.4 – Manoeuvrability	The proposal has been design to allow the movement of large heavy vehicles around the site.
Part 2.6 – Landscape design	Landscaping provisions would be developed during the detailed design phase.
Part 2.7 – Drivers with a disability	The proposal would include the provision of accessible parking spaces during the detailed design phase. These spaces would be designed in line with all relevant guidelines and requirements.
DCP 82 – Signage Strategy - Section 1 & 2	
	Any signage forming part of the proposal would be developed in line with Councils signage requirements.
DCP 93 – Construction for waste minimisation and management	
While this DCP applies to the entire council area, the nature of the proposal (resource recovery centre) meets the objectives of the DCP and would also assist in waste minimisation across the entire local government area.	

2.5 Other relevant NSW legislation

2.5.1 Legislation to be applied consistently

Under Section 89K of the EP&A Act, the following authorisations cannot be refused if necessary for the carrying out of State Significant Development that is authorised by development consent and are to be substantially consistent with the consent:

- *Fisheries Management Act 1994* – aqua culture permit under Section 144.
- *Mine Subsidence Compensation Act 1961* – approval under Section 15.
- *Mining Act 1992* – a mining lease under this act.
- *Petroleum (Onshore) Act 1991* – a production lease under Division 5 of Part 3.
- *Protection of the Environment Operations Act 1997* – an EPL under Chapter 3 of the Act.
- *Roads Act 1993* – a permit under Section 138 to impact on public roads.
- *Pipelines Act 1967* – a licence under Section 11 to construct and/or operate a pipeline.

The above mentioned acts which are relevant to the proposal and have been applied consistently are discussed in the below sections.

Protection of the Environment Operation Act 1997

The POEO Act establishes, amongst other things, the procedures for issuing of licences for environmental protection on aspects such as waste, air, water and noise pollution control. EPLs are generally issued for scheduled activities or scheduled development work.

Clause 41 of Schedule 1 defines 'Waste processing (non-thermal treatment)' activities which are deemed to be scheduled activities. Under Clause 41 the proposal is considered to be a scheduled activity, as it would process over 30,000 tonnes per year of general waste and therefore an EPL would be required to be obtained.

The existing West Nowra Recycling and Waste Facility, which is located on the land adjacent to the proposal currently holds an EPL (licence number 5877). Council would be required to determine whether it modifies the current licence to include the proposal or apply for a separate licence for the proposal.

Roads Act 1993

The Roads Act is administered by the Roads and Maritime Services (RMS), councils or the Department of Primary Industries (Crown Lands Division). RMS has jurisdiction over major roads, councils over minor roads and the Department of Primary Industries (Crown Lands Division) over road reserves or Crown roads.

Clause 5 of Schedule 2 of the *Roads Act 1993* relates to the application of Section 138 and states that:

'Section 138 does not require a public authority, or a network operator within the meaning of the Gas Supply Act 1996, to obtain a roads authority's consent to the exercise of the public authority's or gas distributor's functions in, on or over an unclassified road other than a Crown road.'

All roads in the vicinity of the proposal are unclassified roads under the care and control of Shoalhaven City Council. Due to the application of Clause 5 of Schedule 2, Shoalhaven City Council does not require consent to disturb the surface of the roads.

2.5.2 Approvals that do not apply¹

Section 89J of the EP&A Act specifies certain authorisations which are not required for State Significant Development that is authorised under a development consent. These include the following authorisations, which may otherwise have been relevant to this proposal:

- NSW *Fisheries Management Act 1994* – permit for work or structures within a waterway
- NSW *Heritage Act 1977* – approval to disturb an item or an excavation permit
- NSW *National Parks and Wildlife Act 1974* – an Aboriginal heritage impact permit under Section 90
- NSW *Native Vegetation Act 2003* – consent to clear native vegetation
- NSW *Rural Fires Act 1997* – a bush fire safety authority under Section 100B
- NSW *Water Management Act 2000* – water use approval, water management work approval or activity approval.

These approvals would not be required if the Minister grants development consent to carry out the proposal under Division 4.1 of Part 4 of the EP&A Act.

2.5.3 Other relevant legislation

Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides legal status for biota of conservation significance in NSW. The Act aims to, *inter alia*, ‘conserve biological diversity and promote ecologically sustainable development’. It contains schedules that list endangered, critically endangered and vulnerable species, populations, ecological communities, and key threatening processes in NSW.

Section 5A of the EP&A Act lists a number of factors to be taken into account in deciding whether there is likely to be a significant impact on threatened species, populations or ecological communities or their habitats. Should a threatened species or community be impacted, an Assessment of Significance must be completed to determine the significance of the impact. A Species Impact Statement is required if there is likely to be a significant impact on a threatened species, population or ecological community or its habitat.

An ecological assessment of the site was carried out by Council. The findings of this assessment are included as Appendix G and summarised in Chapter 13. Based on the conclusions of this assessment, impacts are not considered to be significant and therefore a species impact statement would not be required.

National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife Act 1974* (NPW Act) aims to protect native flora and fauna, and the integrity of any Aboriginal heritage items in NSW.

The NPW Act was amended in 2010 with the major changes relating to the Aboriginal heritage provisions and, in particular, due diligence and liability associated with impacts on items of Aboriginal heritage significance.

A Section 90 Aboriginal heritage impact permit under the NPW Act is not required for approved State Significant Development.

A cultural heritage assessment was undertaken for the proposal by Artefact Heritage to assess potential impacts on items of Aboriginal heritage and is included as Appendix K. A summary of

¹ The EIS assesses the risks from fire its mitigation and heritage, flora and fauna and water issues.

the cultural heritage assessment is provided in Chapter 17. The conclusion of the due diligence assessment was the proposal would not result in any impacts to Aboriginal heritage and therefore no further assessment would be required.

Contaminated Land Management Act 1997

The general object of the *Contaminated Land Management Act 1997* (CLM Act) is to establish a process for investigating and, where appropriate, remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment.

Under the CLM Act, OEH can issue investigation and remediation orders for sites that are considered to be contaminated. No such orders have been issued in relation to the subject site.

2.6 Commonwealth legislation

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any 'actions' which are likely to have a significant impact on matters of national environmental significance ('NES matters'), or a significant impact on Commonwealth land, require approval from the Commonwealth Minister of the Environment.

A search of the EPBC Act protected matters online search tool was undertaken on 3 February 2015 for an area within a five kilometre radius of the site. The report indicated that:

- There are no world heritage properties in the vicinity of the study area.
- There are no national heritage places in the vicinity of the study area.
- The study area is within the catchment of no wetlands of international significance (Ramsar listed wetlands).
- There are no Commonwealth marine areas in the vicinity of the study area.
- There is the potential for one threatened ecological community to occur in the vicinity of the study area.
- There is the potential for 74 threatened species to occur in the vicinity of the study area.
- There is the potential for 107 migratory species to occur in the vicinity of the study area.

The report also indicated that there are three Commonwealth lands in the vicinity of the proposal. None of these properties are located within the proposal area or in close proximity and therefore no impacts are anticipated.

The proposal is not a nuclear action and nor does it involve a coal seam gas development or a large coal mining development. The proposal is not located within the Great Barrier Reef Marine Park.

Potential impacts on the Ramsar listed wetlands, endangered ecological community, threatened species and migratory species would be considered in the EIS. Based on preliminary assessment work, no impacts on any NES matters are predicted to occur in the vicinity of the proposal, therefore a referral would not be required.

3. Consultation

The information presented in this chapter is based on the consultation undertaken for the proposal by Council. The full report is included in Appendix B in volume 2 of this EIS.

3.1 Consultation with government agencies

Letters were sent to relevant government agencies requesting comment on any issues that should be addressed in the EIS. Agencies consulted included:

- Environmental Protection Authority
- Department of Primary Industries
- Office of Environment and Heritage
- NSW Roads and Maritime
- Endeavour Energy

Responses/issues identified in government agency consultation and where each is addressed in the EIS is shown in Table 3.1.

Table 3.1 Issues raised from government consultation

Agency/stakeholder	Response/issue	Where addressed in the EIS
OEH NSW National Parks and Wildlife Service	Traffic – safety turning in and out of the NPWS property and exacerbation of problems by increase in traffic movements.	Chapter 12
	Noise – noise impacts on the NPWS property.	Chapter 11
	Air quality – Odour and dust impacts on the NPWS property and staff	Chapter 9

3.2 Consultation with the community, landholders and local residents

3.2.1 Information mail outs to residents, waste services account card customers

A total of 813 residents and business in a four kilometre radius of the proposal site were identified using Council's geographic information system. Information was mailed out to each of the residents and businesses. The mail out information included a letter, proposed site location plan and submission form.

Information regarding the proposal was also sent to 525 commercial, industrial and other customers who use a card system when delivering waste or recycling to Council waste facilities (waste services account card customers).

3.2.2 Social media

Information was posted on a weekly and fortnightly basis on the Council Facebook page.

The following table provides a summary of the number of people reached and the number of people who 'clicked' for further information or links to other sites related to the proposal. This information can show how many people were able to access the information on Facebook and whether it was referred to other people or other sites.

Table 3.2 Weekly Facebook updates and summary statistics

Dates information posted	Reach	Clicks
2nd August	0218	021
9th August	1297	182
14th August	0337	031
17th August	0948	184
22nd August	0959	065
9th September	0804	094
14 September	0344	031
Total	4908	608

3.2.3 SCC website

Detailed information about the proposal was posted on the Council website under 'Council Notices' and in the 'Major Projects' sections. This information was posted on the website on 7 August 2015 and contained a reciprocal link to the Facebook page.

Information supplied by the Website Administrators showed that the Council webpage was viewed 186 times by 125 people.

3.2.4 Information flyers

Information flyers containing detailed information about the proposal at the West Nowra Recycling and Waste Facility weighbridge/gatehouse were handed to weighbridge customers as they entered or exited the site from 21 August 2015 to 9 October 2015. Flyers were also displayed in the reception areas at both of the Administration Centres located in Nowra and Ulladulla.

3.2.5 Newspaper advertising

A notice regarding the proposal was placed in the public notices section of the South Coast Register on 2 September 2015.

3.2.6 Direct contacts by phone

The Waste Services Unit main contact telephone number was included in all information. Stakeholders were encouraged to contact the Waste Services Unit for more information and to book for tours of the site and information sessions. A number of telephone contacts were made during the consultation period. These consisted of:

- 6 telephone calls about the proposal and where to find details
- 1 face to face counter enquiry from a resident in Depot Road
- 4 calls requesting information flyer
- 5 residents booking into tours

3.2.7 Tours of the site and information sessions

A number of site tours and information sessions were scheduled to provide information and give stakeholders an opportunity to raise any issues, ask questions and seek clarification regarding the details of the Concept Proposal. Details and dates were posted on the Facebook page, on the Council website and in the Flyer.

Resource Recovery Park site tours

10 am 17 September 2015. Five residents attended.

10 am 26 September 2015. Cancelled. No bookings received

Resource Recovery Park Information Sessions

10 am 14 September 2015 - no attendees

6 pm 16 September 2015 - no attendees

3.2.8 Submission issues and concerns raised

Key issues raised during the consultation activities with the community, landholders and local residents are shown in the following table. Further detail is provided in Appendix B.

Table 3.3 Issues raised at community information sessions

Issue	Response/where addressed in the EIS
Impact on RSPCA activities	Information regarding the relocation of the Animal Shelter was sent to the resident. Addressed in Section 18.2.
Traffic impacts due to increased traffic on Cabbage Tree Lane	Chapter 12

3.3 Aboriginal community consultation

The Nowra Local Aboriginal Land Council (NLALC) was contacted and a member invited to participate in the aboriginal archaeological survey, but no one was available at the time of the survey. In addition, a draft copy of the Aboriginal Survey Report was provided to NLALC for review and comment on 7 August 2015. No comments were received from the NLALC.

3.4 Secretary's Environmental Assessment Requirements

Table 3.4 shows the SEARs and where each has been addressed in the EIS.

Table 3.4 SEARs and where addressed in the EIS

SEARs requirement	Where addressed in EIS
A detailed description of the development including • Need for the proposed development • Justification for the proposed development • The proposed staging of the development including an appropriate amount of Concept and Stage 1 detail • Likely interactions between the development and existing, approved and proposed developments within the site and in the vicinity • Plans of any proposed works	Chapter 5 and Chapter 6
Consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments	Chapter 2
Risk assessment of the potential environmental impacts of the development, identifying key issues for further assessment	Chapter 7
Detailed assessment, where relevant, of the key issues below, and any other potential significant issues identified in the risk assessment	See below
Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS	Chapter 21
Report from a qualified quantity surveyor • A detailed calculation of the capital investment value (as defined in clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>) of the proposal, including details of all assumptions and	Appendix L

components from which the CIV calculation is derived • An estimate of the jobs that will be created during the construction and operational phases of the proposed development • Certification that the information provided is accurate at the date of preparation	
Strategic Landuse Planning • Demonstration that the proposal is generally consistent with the aims and objectives of all relevant environmental planning instruments, policies and strategies including, but not limited to Southern Council's Group Regional Waste Avoidance and Resource Recovery Strategy 2014, State Environmental Planning Policy (Infrastructure) 2007, the NSW Waste Avoidance and Resource Recovery Strategy 2014-21, NSW State Plan 2021 – Goal 23, the <i>Waste Avoidance and Resource Recovery Act 2001</i>, the National Waste Policy and relevant Development Control Plans • Justification for any inconsistency between the proposed development and these plans • Consideration of opportunities under the NSW government's Waste Less Recycle More initiative • Details on the suitability of the site for the proposed development	Chapter 2 and Chapter 5
Waste Management • The proposed classifications of waste • Estimates of the quantity of the likely waste streams that would be processed at the facility • The proposed size, location and management of stockpiles of unprocessed and processed waste • A description of how this waste would be transported to and from the site • The likely waste processing operations, including likely composting technology and outputs, and the quality control measures that would be implemented • Measures that would be employed to ensure that the project's outputs would comply with the EPA's relevant resource recovery orders • Litter, leachate, weed and feral animal control, including an assessment of biosecurity risks	Chapter 8
Air Quality • A quantitative assessment of the potential air quality, dust and odour impacts of the project on surrounding landowners in accordance relevant EPA guidelines • Details of proposed mitigation, management and monitoring measures	Chapter 9
Traffic and Transport • Details of all traffic types and volumes likely to be generated during construction and operation, including a description of haul routes • 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 • Details of any proposed road upgrades, infrastructure works or new roads required for the development	Chapter 12
Noise • A quantitative assessment of potential construction, operational and transport noise and vibration impacts, including potential impacts on nearby noise sensitive receivers • Details and justification of the proposed noise mitigation and monitoring measures	Chapter 11
Soil and Water • Identification of drainage lines, watercourses, riparian lands and groundwater dependent ecosystems • The proposed erosion and sediment controls during construction	Chapter 14

• A site water balance, including details on water supply and a description of the measures to minimise the water use at the site • Compliance with the rules in any relevant Water Sharing Plan (WSP) and legislation • The proposed stormwater/wastewater management systems including the capacity of onsite detention systems and measures to treat, reuse or dispose of water • Consideration of any potential salinity, soil contamination, flooding and acid sulfate soil impacts of the project.	
Hazards and Bushfire Risk • Bushfire protection measures that comply with RFS guidelines • A preliminary risk screening undertaken in accordance with SEP33 and if necessary, a PHA	Chapter 15 and Chapter 16
Flora and Fauna • A biodiversity assessment in accordance with the FBA • Targeted species surveys as specified by OEH	Chapter 13
Greenhouse Gas • A quantitative assessment of the potential scope 1 and 2 greenhouse gas emissions of the project, and a qualitative assessment of the potential impacts of these emissions on the environment • A detailed description of the measures that would be implemented on site to ensure that the development is energy efficient	Chapter 10
Visual • Including an assessment of potential visual impacts of the project on the amenity of the surrounding area	Chapter 19
Heritage • Including potential Aboriginal and non-Aboriginal heritage impacts of the project	Chapter 17
Socio-economic • Including an assessment of the economic and social impacts of the development, particularly of any benefits to the community	Chapter 18
Consultation	Chapter 3

4. Description of the site

This chapter provides information on the proposal site, the location and surrounding land uses.

4.1 Site location and ownership

The proposal site is approximately five kilometres (km) to the west of the Nowra Central Business District and is accessed from Flatrock Road, off Yalwal Road in Mundamia (refer to Figure 4.1).

The proposal site is adjacent to the existing landfill and is located on an approximate 3.6 ha parcel of land (Lot 342 DP 257515), which is owned by the proponent.

4.2 Site description

The land is currently occupied by an animal shelter and associated buildings (Photo 4.1). The majority of it is cleared with some small paddocks around the kennels (Photo 4.2). The current entrance to the site is currently off Flatrock Road. There is a small carpark in front of the animal shelter building.



Photo 4.1 Main animal shelter building and car park



Photo 4.2 Rear of animal shelter with holding yards

There is approximately 0.5 ha of relatively intact (though degraded) vegetation in the south of the lot where the site fronts Flatrock Road (Photo 4.3). The north western portion of the site comprises open grassy paddocks, framed by denser vegetation (Photo 4.4).



Photo 4.3 Vegetation in the south of the site



Photo 4.4 Open grassed areas in the north west of the site

Around the boundaries and scattered over the northern half of the land are numerous remnant and regrowth Scribbly Gums (*Eucalyptus sclerophylla*) and Red Bloodwood (*Corymbia*

gummifera) with small areas of native shrubs and occasionally mown or slashed vegetation (Photo 4.5). The central part of the site is mostly densely grassed with some earthen mounds (Photo 4.6).



Photo 4.5 Typical vegetation around the edges of the northern part of the site



Photo 4.6 Grassed area in the central part of the site

There are a number of small dams scattered through the north of the site.

4.3 Surrounding land uses

The surrounding land uses are shown on Figure 4.2. A small number (approximately six) of rural residential properties are located approximately 700 m south of the proposal site and a rural residential property located approximately 900 m to the north east. The Shoalhaven Campus of the University of Wollongong is located approximately 1.3 km to the south-east.

The existing West Nowra landfill is immediately to the west of the proposal site.

The Office of Environment and Heritage (OEH) Nowra Area Office and Depot is located immediately to the southeast.

The remaining land to the north and east of the proposal site is undeveloped bushland – primarily the Bamarang Nature Reserve and/or land owned by the Nowra Local Aboriginal Land Council and the proponent.



LEGEND

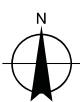
Site boundary

Major Roads

Highways

Paper Size A4
0 160 320 640 960 1,280
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



Shoalhaven City Council
West Nowra Resource Recovery Park

Job Number 21-22855
Revision 0
Date 14 Sep 2015

Proposal Site Location

Figure 4.1



Shoalhaven City Council West Nowra Resource Recovery Park EIS and Masterplan	Job Number 21-22855
	Revision A
	Date 14 Sep 2015



Surrounding Land Uses Figure 4.2

5. Proposal need and alternatives

This chapter provides details on the objectives of the proposal, the alternatives considered and justification for the proposal after consideration of the alternatives.

5.1 Strategic context

5.1.1 Objectives

Council is striving to become a leader in the recovery of recyclable materials from the waste stream, and minimise the quantities of waste disposed to landfill by re-using and processing waste types that would normally end up in landfill.

The objectives of the proposal are to:

- Reduce the amount of waste requiring landfill disposal, and thereby extend the life of the West Nowra Recycling and Waste Facility, to allow it to continue to serve the local community's waste disposal needs further into the future.
- Improve resource recovery rates in line with the objectives of the NSW Waste Avoidance and Resource Recovery Strategy 2014-21, which includes targets for diverting more waste from landfill and increasing recycling.

5.1.2 National Waste Policy

In 2009 the Commonwealth Government released a National Waste Policy: *Less Waste More Resources* (Environment Protection and Heritage Council 2009). The policy, which was adopted on 5 November 2009, builds on the 1992 *National Strategy for Ecologically Sustainable Development* and attempts to reduce the environmental impact of waste disposal. The policy sets the direction for Australia over a 10 year period, aiming to produce less waste for disposal and manage waste as a resource to deliver economic, environmental and social benefits. The policy establishes a comprehensive program for national coordinated action on waste across six key areas, being to:

- Provide a coherent, comprehensive national framework for waste management, resource recovery and waste avoidance over the next decade
- Enable Australia to meet its international obligations in regards to the management of hazardous wastes and substances and persistent organic pollutants into the future and reduce the risk and legacy for future generations
- Address market impediments and streamline the regulatory frameworks so that national companies and small businesses can operate effectively and efficiently and manage products and materials responsibly during and at end of life
- Provide national leadership on waste and resource recovery where it is needed and facilitate collaboration between the states on national issues
- Contribute to climate change, sustainability, innovation and employment opportunities
- Be high impact and cost effective by setting clear national directions and through collaborative, carefully targeted action that incrementally builds on the existing efforts of governments over a ten year period.

The overall objectives of the National Waste Policy are that all wastes, including hazardous wastes, are managed in a way that is consistent with Australia's international obligations, to protect human health and the environment. The policy also seeks to ensure that risks

associated with waste are understood and managed to minimise intergenerational legacy issues.

The proposal would:

- Manage waste as a resource
- Deliver economic, environmental and social benefits
- Contribute to sustainability, innovation and employment opportunities

The proposal is therefore consistent with the aims and objectives of the National Waste Policy.

5.1.3 NSW strategic planning drivers

The NSW strategic policy framework for waste management incorporates policy to drive waste reduction and resource recovery. The framework has been strengthened with legislation to streamline development of waste management infrastructure, and a strategy to provide for increasing resource recovery and reducing toxicity in products.

NSW 2021 and the NSW Waste Avoidance and Resource Recovery Strategy 2014-21

'NSW 2021: A plan to make NSW number one' is a 10 year plan for NSW. The plan identifies reducing waste generation and keeping materials circulating within the economy as priorities for NSW. A state-wide waste avoidance and resource recovery strategy is prepared every five years to address this priority. The latest strategy is the 'NSW Waste Avoidance and Resource Recovery Strategy 2014-21', which provides the framework for maximising conservation of natural resources and minimising environmental harm from waste management and disposal of solid waste. The strategy proposes long-term directions for waste in NSW and includes targets for:

- Avoiding and reducing waste generation
- Increasing recycling
- Diverting more waste from landfill
- Managing problem wastes better
- Reducing litter
- Combating illegal dumping

Relevant to the proposal are the following targets:

- By 2021-22, increase recycling rates for:
 - Municipal solid waste from 52% (in 2010-11) to 70%
 - Commercial and industrial waste from 57% (in 2010-11) to 70%
 - Construction and demolition waste from 75% (in 2010-11) to 80%
- By 2021-22, increase waste diverted from landfill from 63% (in 2010-11) to 75%

The proposal would assist Council in achieving the increased recycling rates and landfill diversion targets listed above. The proposal is consistent with the 'NSW Waste Avoidance and Resource Recovery Strategy 2014-21' and 'NSW 2021' as it is built around the diversion of kerbside collected waste, commercial waste and construction and demolition waste.

Waste Less Recycling More

The NSW Government 'Waste Less, Recycling More' initiative is a five year \$465.7 million package which provides funding for business recycling, organics collection, market development, managing problem wastes, new waste infrastructure, local councils and programs

to tackle illegal dumping and litter. The funding priorities of the program include organics infrastructure and waste and recycling infrastructure.

The Organics Infrastructure Fund includes a total of \$43 million with individual grants ranging from \$5,000 to \$ million. This fund is designed to provide funding for both large and small organics infrastructure and equipment to reduce food and garden organics waste going to landfill.

The Waste and Recycling Infrastructure Fund includes two programs to provide funding for new recycling facilities or upgrades to existing facilities, one of which is the 'Major Resource Recovery Infrastructure Program' for new council and private sector facilities. This fund provides a total of \$43.1 million with grants between \$1 million and \$10 million for councils to cover up to 50% of project capital costs. This fund is designed to accelerate and stimulate investment in new waste and recycling infrastructure.

The proposal has both organic processing and waste and recycling infrastructure and therefore aligns with the objectives of the Waste Less Recycling More initiative. The proposal may be eligible for a grant under one of the funds in this program.

5.1.4 Regional drivers

Southern Councils Group Regional Waste Avoidance and Resource Recovery Strategy

The Southern Councils Group (SCG) *Regional Waste Avoidance and Recovery Strategy* is a regionally coordinated strategy that covers Wollongong, Shellharbour, Kiama, Shoalhaven and Wingecarribee local government areas. The main strategic themes of the regional strategy are aligned with the 'NSW Waste Avoidance and Resource Recovery Strategy 2014-21'. It contains a number of strategic themes:

- Theme 1 - Avoid and reduce waste generation
- Theme 2 - Increase recycling
- Theme 3 - Increase community reuse and recycling and improve problem waste capture
- Theme 4 - Reduce littering and increase public place recycling
- Theme 5 - Reduce illegal dumping
- Theme 6 - Increase regional collaboration.

Specifically, and relevant to the proposal are the following objectives listed under 'Theme 2 – increase recycling':

- Progressively implement local AWT-based waste processing for either food/garden organics waste or mixed waste
- Maximise recovery and recycling of dry C&I waste that would otherwise be deposited into local landfill

The proposal would assist in addressing the above two objectives through development of an AWT facility and resource recovery capacity for dry C&I waste.

Current services

Council currently provides a combination of collection and disposal services to residents including a weekly kerbside collection service for waste and a fortnightly service for recycling. There are two landfills and eight recycling and waste transfer depots throughout the local government area which provide convenient access for drop-off waste and recycling. Some separated recyclable materials can be delivered to these depots free of charge and there are reduced fees for other separated materials.

While there is no regular kerbside collection service for organics, there is an on-call kerbside service for green waste and/or bulky waste for a nominal charge, provided by a contractor. In addition, two no-charge tipping vouchers are provided to ratepayers each year.

West Nowra landfill life

There are two landfills in the local government area: the Huskisson landfill and West Nowra landfill. Huskisson landfill only accepts general solid waste (non-putrescible).

The West Nowra landfill is the only general solid waste (putrescible) landfill in the Shoalhaven Region. Based on carrying on operations at the current rate of disposal and current landfill design, the landfill is projected to reach full capacity in 2025.

There is a need for additional capacity to manage and dispose of putrescible waste from the Shoalhaven beyond 2025. The proposal would help reduce waste to landfill and extend the life of the West Nowra landfill.

Section 88 waste and environment levy

The NSW Government, under section 88 of the POEO Act, applies the waste and environment levy to every tonne of waste delivered to certain licenced waste facilities in NSW. This levy increases every year. In 2015-2016, it is \$133.10/tonne in the extended regulated area. It is scheduled to rise by CPI each year. The cost of the levy now exceeds the underlying cost of landfill disposal.

The levy is designed to encourage resource recovery and recycling of waste. It is generally added to the disposal charges set by facility operators. It provides businesses, councils and individuals an incentive to reduce the amount of waste generated, and encourages them to seek alternatives to landfill disposal. A deduction from the waste levy may be claimed for waste subsequently transported from the site to another facility for processing, recovery or recycling or offsite for other lawful activity after being processed, recovered or recycled on site.

Increased diversion of waste from landfill would assist Council to reduce future financial liabilities associated with the levy. The proposal would reduce the volume of waste being disposed of to landfill and therefore reduce the future levy payments of Council.

5.2 Benefits

Overall the proposal would:

- Divert valuable resources from landfill and remit recovery and recycling of resources from the waste stream
- Extend the life of the West Nowra Recycling and Waste facility to allow it to continue to serve the local community's waste disposal needs further into the future
- Contribute to the achievement of the targets for increased recycling and landfill diversion in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21
- Provide benefits through development of a new industry and new employment opportunities in the Shoalhaven

5.3 Site selection

The West Nowra Recycling and Waste Facility is the only licensed general solid waste (putrescible) landfill facility within the Shoalhaven local government area and is centrally located in relation to the main population and growth centre of Nowra as well as close to the Princes Highway. One alternative to the proposal would be to locate the RRP at the Huskisson landfill site. This is some 25 km from the existing waste facilities at West Nowra and would create

major inefficiencies for Council and RRP staff due to travelling distances required to access the landfill.

It is therefore considered essential that the RRP be located immediately adjoining or close to the existing West Nowra Recycling and Waste Facility. This would enable users and staff to access the landfill and stockpile sites and take advantage of its central location and proximity to major transport routes (Princes Highway).

Other nearby Council owned land located adjacent (across the road) to the site (Lot 1 DP1104402) was previously identified and considered for the development of the RRP. This other land has been identified for potential future landfilling. Furthermore, it is further away from existing recycling and public waste receival areas.

Therefore Council is proposing to develop the RRP at the proposal site.

5.4 Alternatives considered

5.4.1 Do nothing

If the proposal does not proceed, the proposal site is likely to continue to be used as an animal shelter, until the existing facilities need to be upgraded. At that point in time, a decision would be made by Council about whether the site is the most suitable location for an animal shelter.

Demand for landfill capacity within the Shoalhaven is expected to grow, as shown in Figure 5.1. Under the business as usual / do-nothing approach to waste management, a new licenced landfill site will be required and operating by 2025.

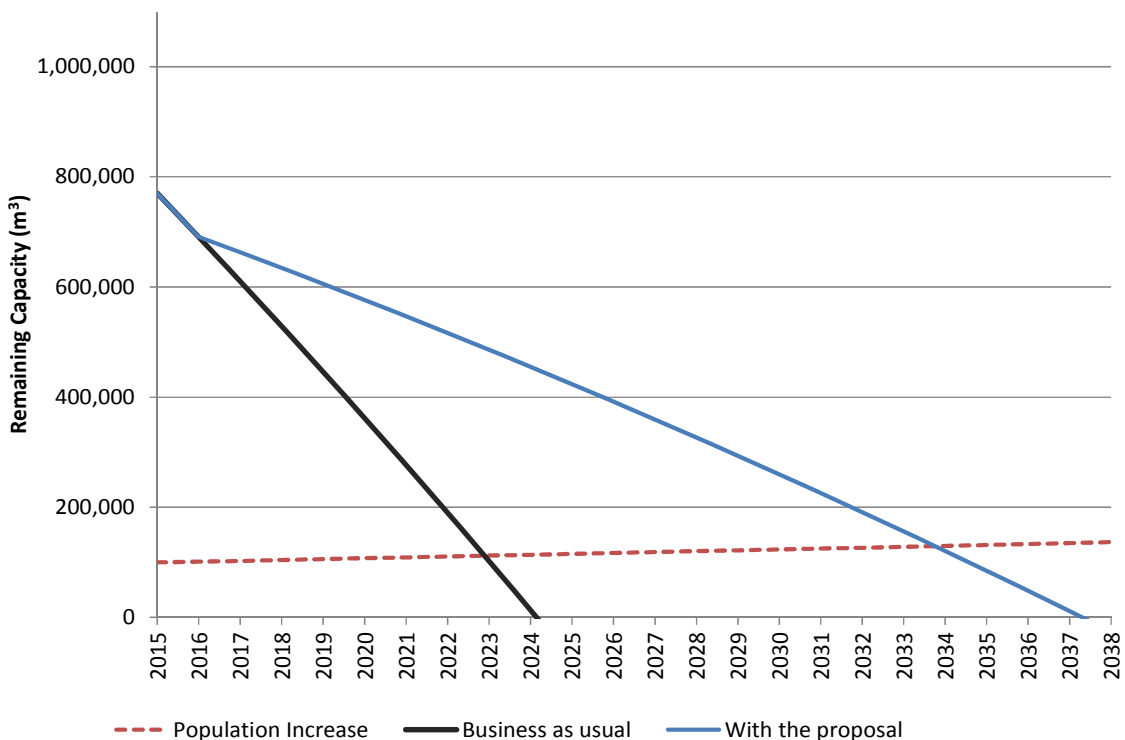


Figure 5.1 Comparison of projected landfill life

Based on data supplied by Council, GHD estimates that the life of the landfill could be extended by a further 13 years through increased resource recovery. This assumes that the proposal is operational from 2017 and achieves 75% overall recovery of waste coming to the site in the

future². The actual recovery rate would depend on the technologies selected and landfill life may be extended further with higher diversion.

Not only will the 'do nothing' approach result in an increased need to develop new areas for landfill, but other values and benefits of the proposal would also not be achieved, such as (Wright Corporation 2008):

- the recovery of more resources which may in turn reduce greenhouse gas emissions both at the landfill and in the manufacture of replacement products
- the promotion and leadership in non-metropolitan waste management initiatives
- reduction of the impact on the environment through the extraction of material that could otherwise be recovered
- increased employment opportunities.

Waste recycling and landfill diversion benchmarks as identified in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (as discussed in Section 5.1.3) would also be difficult to achieve if the proposal does not go ahead.

² Accounting for projected population growth and based on recovery assumptions

6. Proposal description

This chapter provides details of the Concept Proposal – including how it fits within the context of a master plan for the overall site, the proposed facilities and infrastructure, processes, construction and operation. It also describes the Stage 1 project.

6.1 Summary of Concept Proposal

As discussed in Section 1.2, the Concept Proposal is proposed to be approved in stages under section 83B of the EP&A act. Approval is initially being sought for the Concept Proposal and the Stage 1 project.

This section describes the Concept Proposal in its entirety.

The overall proposal (Concept Proposal) comprises the Stage 1 site preparation (Stage 1 project) and the Stage 2 construction and operation of a RRP (Stage 2 project). Collectively these comprise the Concept Proposal which would broadly include the following:

- Clearing of land and provision of basic infrastructure
- An RRP with combined capacity to receive and process up to 130,000 tonnes of waste per year, comprising:
 - A composting facility to process up to 65,000 tonnes of waste per year from both domestic and commercial waste sources.
 - A materials recovery facility for sorting up to 40,000 tonnes of dry (non-putrescible) solid wastes per year from both domestic and commercial waste sources.
 - A sorting and recovery facility for approximately 15,000 tonnes per year of construction and demolition (C&D) waste
 - Other areas for processing and storing approximately 10,000 tonnes per year of other recyclable materials, such as green waste, scrap steel and concrete.
- Other ancillary infrastructure including:
 - Circulation roadways and weighbridges for entering and exiting vehicles
 - Offices and amenities
 - Sediment / detention basins
 - Car parking for up to 30 vehicles and 10 visitor vehicles
 - Security fencing around the perimeter of the site
 - Asset protection zones (APZs).

A preliminary Master Plan including footprints of potential buildings has been prepared for the purpose of assessment in the EIS and to indicate how the proposed facilities and infrastructure would be integrated with related existing and future activities on the existing landfill site. This is shown in Figure 6.1 and Figure 6.2. Additional facilities would also be required at the existing landfill site to support the operation of the RRP. These include a waste education centre (separate proposal), a compost maturation area and public C&D sales area.

Footprint areas have been nominated for the various elements of the RRP Master Plan based on the size of other similar facilities. It is recognised that these may need to be modified following the conclusion of the RRP tendering process, when a tenderer is selected and their specific facility requirements are known. Areas would be finalised once the RRP technology or technologies have been determined and detailed in the Stage 2 SSD application. However it should be noted that the largest facilities that would fit onto the site (allowing for appropriate

setbacks from the boundary and bushfire asset protection zones where required) have been allowed for in this Master Plan.

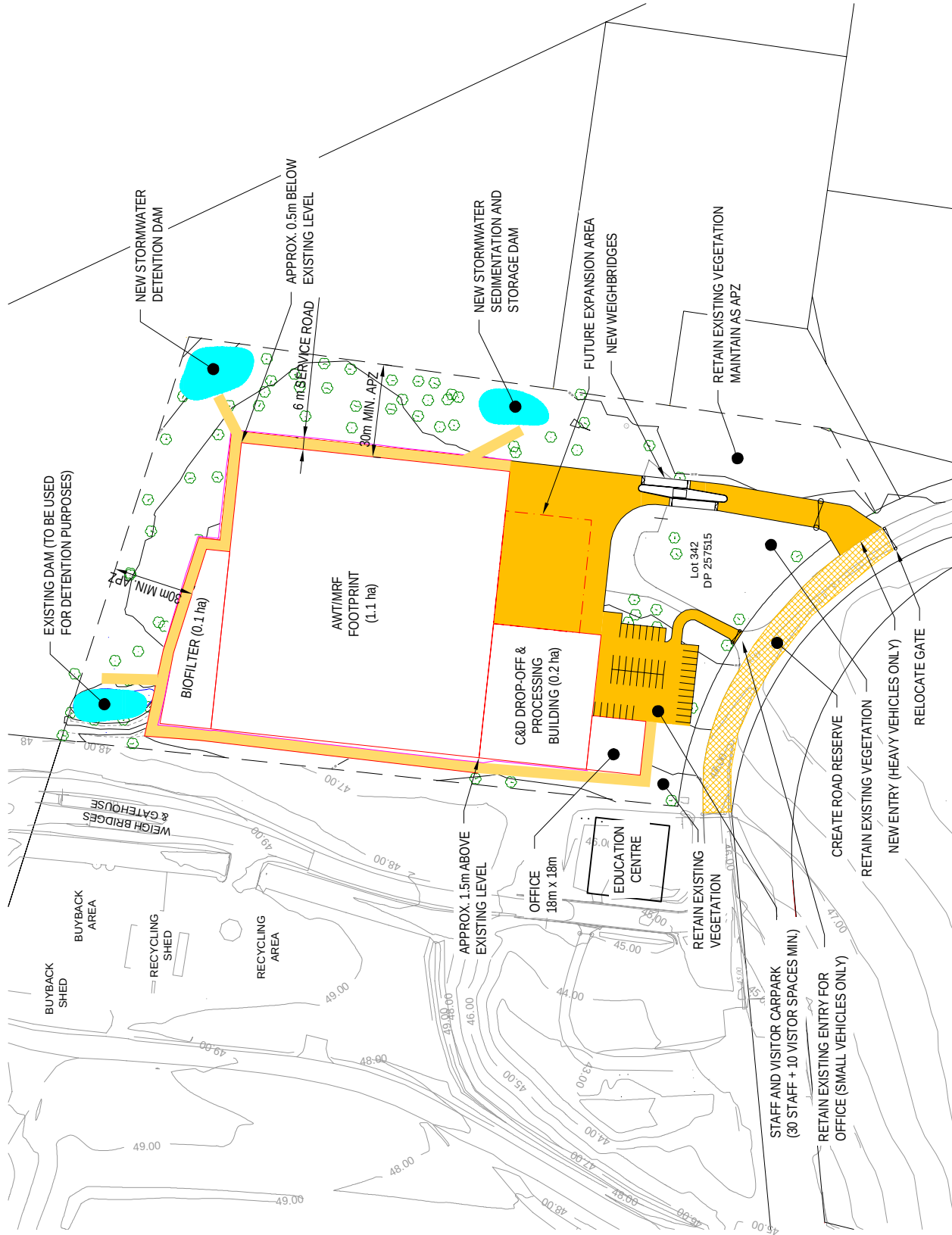
In relation to bushfire protection, the Concept Proposal provides for up to 30 m clearance for a proposed building from bushland on the eastern, southern and northern site boundaries.

The biodiversity assessment has been based upon a conservative assumption that the entire site would be cleared.

A proposed technology for the composting facility has not yet been selected. Two potential options are that the facility may process either:

- (1) Three bin system (1 x kerbside food and garden organics (FOGO) bin collection, 1 x kerbside mixed waste bin collection and 1 x kerbside recycling bin collection)
- (2) Two bin system (1 x kerbside mixed waste bin collection and 1 x kerbside recycling bin collection)

This would be determined during Stage 2.



NOTES:

1. AWT CONTRACTOR TO PROVIDE AMENITIES (SHOWERS, TOILETS, LUNCHROOM ETC.) TO STAFF WITHIN AWT BUILDING
2. OFFICE TO CONTAIN RECEPTION AREA, MEETING ROOM, OFFICES (MIN. OF 2) AND AMENITIES (TOILETS ETC.)
3. COMPOST MATURATION AREA TO BE LOCATED ON FORMER LANDFILL STAGES 2 AND 3
4. PUBLIC C&D SALES AREA TO BE LOCATED ON FORMER LANDFILL STAGES 2 AND 3



SHOALHAVEN CITY COUNCIL
WEST NOWRA RRP

PRELIMINARY FUTURE SITE LAYOUT

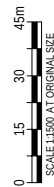
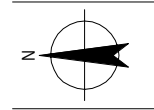
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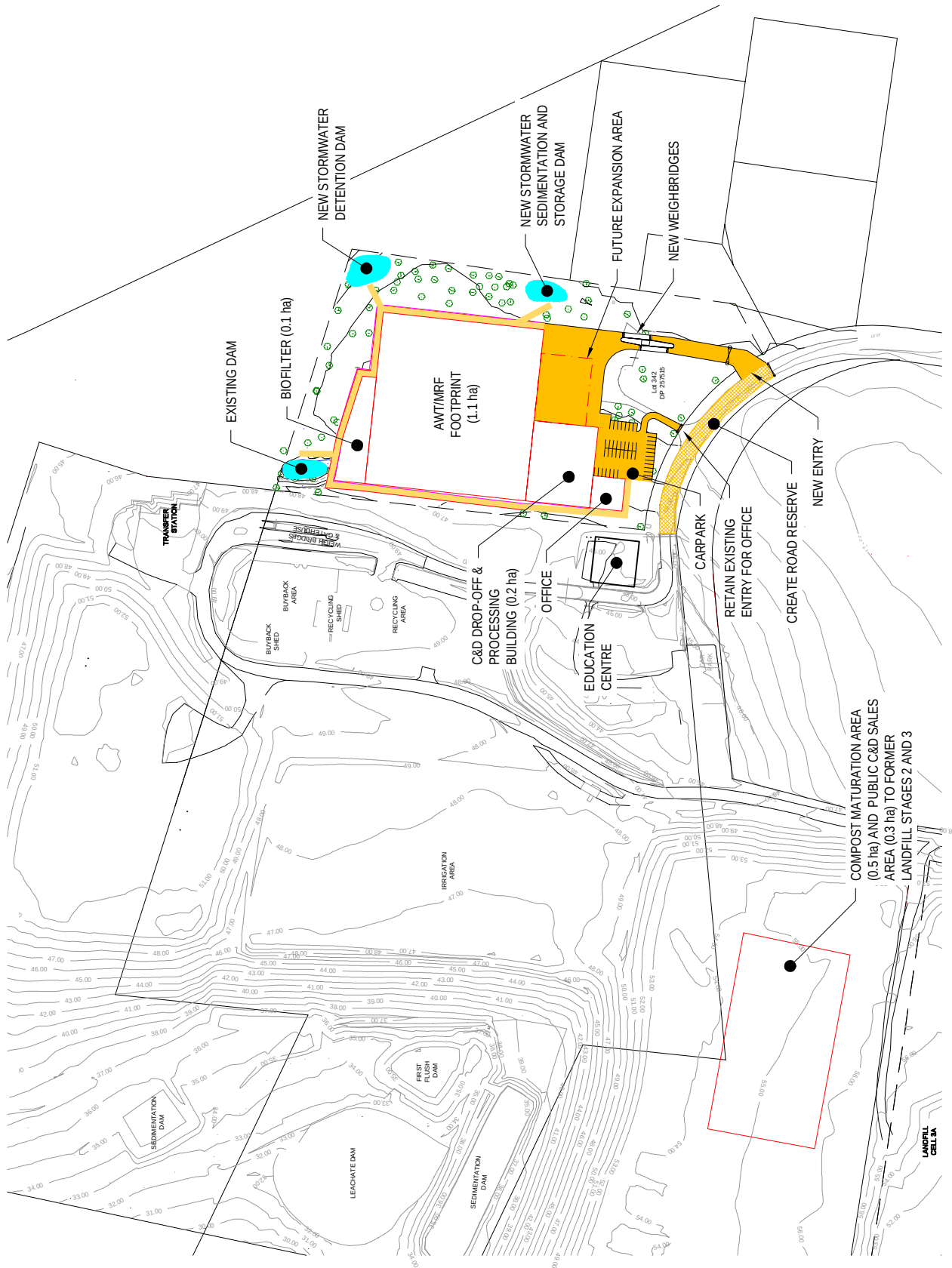
Revision | A

Date | SEPT 2015

Figure 6.1

Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com W www.ghd.com





NOTES:

1. AWT CONTRACTOR TO PROVIDE AMENITIES (SHOWERS, TOILETS, LUNCHROOM ETC.) TO STAFF WITHIN AWT BUILDING
2. OFFICE TO CONTAIN RECEPTION AREA, MEETING ROOM, OFFICES (MIN. OF 2) AND AMENITIES (TOILETS ETC.)
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SHOALHAVEN CITY COUNCIL
WEST NOWRA RRP



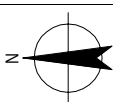
Job Number | 21-22855
Revision | B

Date | SEPT 2015

PRELIMINARY MASTER PLAN

Figure 6.2

Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia T 61 2 9239 7100 F 61 2 9239 7199 E sydmal@ghd.com W www.ghd.com



0 25 50 75m
SCALE 1:2500 AT ORIGINAL SIZE

6.2 Concept Proposal – facilities and infrastructure

6.2.1 Resource recovery park buildings

AWT/MRF building

An overall building size requirement of approximately 1.1 ha has been estimated to be sufficient for an enclosed AWT/MRF facility capable of processing up to 65,000 tonnes per year of organic material (either separated organics or mixed garbage), and up to 40,000 tonnes per year of inorganic light dry waste streams.

The major component of the inorganic wastes is expected to be light and dry materials from the mixed waste bins at the existing public waste drop off area, and from Council's other transfer stations in the region, as well as dry commercial light wastes from retail and other commercial customers.

The proposed size of the AWT/MRF building may not be sufficient for maturation of the compost from the technology option selected, as the processed material needs to be matured for a minimum period of 12 weeks to satisfy Australian Standard compost quality criteria. Maturation of compost is usually a slow process, and it can be performed outdoors, as it generates much lower odour emissions than the early stage composting processes. An area of land available on the former and completed landfill area (formerly Stages 2 and 3), is proposed to be used for compost maturation.

Green wastes (garden organics) are already being received at the landfill in a capped area of the former and completed landfill (the former Stage 1 landfill area) at the northern end of the site. Here the processed material is placed in windrows and turned to produce a crude green waste material. This material is then provided free to customers. The proposed compost maturation area, which would also serve as a public drop-off area for garden organics, would be located to the north of the existing landfilling operations at the site where former landfill Stages 2 and 3 are located.

Construction and demolition waste sorting area

It is anticipated that up to 15,000 tonnes per year of mixed C&D wastes, mainly sourced from skip bins, would be sorted in the proposed construction and demolition waste area. A building would be provided to allow for undercover sorting of materials. This would enable dust and litter from such activities to be reduced. Water sprays would be used for dust suppression within the building, and outdoors, if needed. Raw materials and finished products are likely to be stored in bulk on the existing landfill areas, but interim stockpiles of raw materials and finished product are likely to be kept on the RRP site.

6.2.2 Odour control

The Concept Proposal allows space for a biofilter at the far northern end of the proposal site. This would be used to treat exhaust air from building ventilation systems, and prevent unpleasant odours being emitted from the organic waste sorting and composting processes. A biofilter is a large bay of woodchips or bark, which deodorises odorous air that is passed through it.

Subject to the technology option selected for composting, either the entire processing building may need to be sealed from outdoors and actively ventilated or only specific areas of the buildings, for example the composting tunnels or composting hall, may need to be sealed from

the outdoors and actively ventilated. The exhaust air from forced ventilation would be filtered through a biofilter or another odour mitigation system.

Other indoor areas where waste is received and inspected before processing may only require sufficient ventilation to create a negative pressure environment. The air exhausted from these areas may not require treatment before discharge, as it may not be very odorous. In addition, odours may only be present at certain times of the day, when material is being delivered and inspected, and prepared for processing. It may therefore only be necessary to ventilate via a biofilter or other odour control device during these times.

The biofilter would be enclosed and vented via a biofilter stack. The actual size and type of biofilter would be determined by the technology type, and by consideration of which areas of the buildings are to be ventilated and the overall air volumes contained within them.

6.2.3 Water management

Once the facility is operating, three detention ponds would be located in the north west, north east and eastern parts of the site. Runoff from the roof and parking and access route would be diverted to these ponds.

Runoff from undisturbed areas within the property boundary would be diverted to ensure that it does not intercept the flows from the road and roof areas – to avoid contamination.

Roof water that is captured in the north western and north eastern ponds would be reused. However these ponds would also be designed to overflow during high rainfall periods. Potential uses for the roof run off water include the RRP processes, dust suppression, flushing toilets, wash-down tap / facilities and watering of landscaped areas.

Rain falling on perimeter roads would flow across the roads, and away from the building. In this way, the discharge of this water would be spread out and not concentrated. This water, which is expected to be clean, given the infrequent use of the perimeter roads, would be discharged directly from site, minimising the impact of the proposal on the surrounding areas.

Run off from the car park and outdoor site entrance area, where there are a greater number of vehicles present, would be directed to a stormwater management system including a gross pollutant trap, grass buffer strip and wetland.

Further details of the proposed soil and water management arrangements for the proposal are provided in Chapter 14 and Appendix H.

6.2.4 Site access and ancillary structures

Access and internal roadways and weighbridges

A new entry to the site would be constructed for heavy vehicles with weighbridges for both entering and exiting vehicles. The existing entry would be retained and used for light vehicles. The existing entry would lead to a carpark for staff and visitors and the office.

Once vehicles enter the RRP area, they would go to the AWT/MRF building, where they would unload waste for processing, or to the C&D processing building.

As mentioned previously, a service road would be provided to permit sealed vehicle access around the perimeter of the site.

Offices and amenities

An office would be provided at the south western portion of the proposal site, next to the carpark. The office would include amenity facilities including toilets, shower facilities and

kitchenette. All facilities would meet regulatory and building requirements related to the number of people employed as well as disabled access requirements.

Carparking

Employee parking for up to 40 vehicles (30 staff and 10 visitor) would be provided within the proposal site. Buses would be required to park offsite, on neighbouring land to the west of the proposal site.

Security fencing

The proposal site would be fenced with two metre high cyclone security fencing, with two barbed wire strands at the top of the fence. The western side of the site is already fenced, so this would match the existing fence.

6.2.5 Utilities and services

Electricity

Electricity is already supplied to the existing animal shelter facility (proposal site) and to the West Nowra Recycling and Waste Facility, and is also being generated from the landfill gas power plant. This Endeavour Energy (electricity provider) infrastructure would be utilised to supply electricity for the composting and material sorting equipment. The peak power supply requirements are likely to be in the order of 1.0 to 1.5 MW. The capacity of the existing supply wires and transformers, and of the district supply infrastructure is currently being verified. If necessary, required upgrades would be implemented.

Communications

The proposal site would be provided with telephone, computer and data cable access. Standard telephone cabling and two-way radio / mobile telephones would provide the required telecommunication services. Internet access would be provided via ADSL or Wi-Fi.

Water supply

Water would be drawn from local reticulated main supplies. Apart from potable water, which would be used for showering and drinking purposes, water collected in large rainwater tanks would be used to clean equipment and floors, toilet flushing, and for other industrial purposes. It would also be used for watering landscaped areas.

The water requirements for process purposes are discussed in Chapter 14 and would depend on the composting/waste treatment technology selected and determined at the detailed design stage.

Wastewater management

Wastewater from the proposal site from the amenities facilities would be managed separately to any wastewater arising from composting or other RRP activities. Since Council's reticulated sewerage system does not currently service the site, an onsite sewage package treatment plant would be provided.

6.2.6 Hours of operation

The proposal would operate from 8 am to 5 pm seven days a week, apart from Christmas Day and Good Friday.

6.2.7 Operational workforce

Approximately 20 people are expected to be employed in the composting facility/MRF, and approximately 10 people would work in the C&D waste processing area.

6.2.8 Operational plant and equipment

The following operational plant and equipment is expected (but not limited) to be used within the proposal site.

For the AWT/MRF operations:

- Trommels and screens
- Conveyors
- A tyred/tracked front end loader with grab and shear attachments
- Vegetation shredder
- Rotating screen
- Magnets to remove metals
- Air classifier
- Ballistic separator
- Eddy current separator to remove non-ferrous metals
- Composting tunnels or a compost hall with an aerated floor and mist irrigators
- Fans to provide air for composting
- Fans to provide air for ventilation of the building
- Fans to extract odorous air from composting operations
- Floor cleaning machine.

For the C&D operations:

- Front end loader
- Excavator with magnet attachment to remove metals
- Rock hammer / pulveriser attachments for excavator (to crush hard and oversized materials)
- Concrete crusher
- Metal shredder
- Conveyors
- Trommels and screens
- Eddy current separator to remove non-ferrous metals
- Vibrating screens

6.3 Concept Proposal – construction activities

The Concept Proposal is likely to take approximately 12-18 months to construct. Before any work commences, an environmental management plan would need to be approved and implemented.

The existing buildings would be demolished and the site would be cleared of vegetation. Once clearing has occurred, and sediment management infrastructure is in place, security fences would be erected to ensure that the clearing does not extend beyond the approved boundary of the site, and that impacts to surrounding bushland are minimised.

Earthworks would then take place to create a working platform for the new buildings and paved areas. Heavy equipment would be used to shift rock and earth to low areas and out of high areas of the site, to achieve the specified design levels.

Once the platform is constructed, building foundations would be created, and a building erected with a combination of concrete panel and coloured metal sheeting walls and a metal roof with skylights. Services such as water, sewerage, communications and electricity would be installed internally, and connected to the building. Roads and hardstand areas would be paved, and the weighbridges installed, along with a weighbridge office for the operator.

Equipment used for processing wastes would then be brought in to the buildings and other areas and assembled. It would be connected to power supplies and tested. A period of commissioning the various items of equipment, initially in isolation, then as a process train, would then commence. Control systems would be commissioned so that the equipment can be remotely monitored and controlled. Once the equipment is fully commissioned, the first loads of waste can be processed. This may take several months.

The construction workforce is likely to range from about five to 10 people during the earthworks phase and peak at 25 people, when major concrete pours are occurring. There would probably be on average 10 to 15 people on site for the duration of construction works.

Construction working hours would be undertaken during the periods specified in the Interim Construction Noise Guidelines (DECC, 2009). Those are:

- 7 am to 6 pm Monday to Friday
- 8 am to 1 pm Saturdays
- No work on Sundays or Public Holidays.

6.4 Stage 1 project – footprint and key project elements

A summary of key Stage 1 project elements is provided here and illustrated in Figure 6.3:

- Site preparation, clearing of the site and grading including demolition of the existing animal shelter buildings and associated infrastructure
- Construction of entry/exit and service roads and line marking
- Installation of perimeter/boundary security fencing and gates
- Detention and sedimentation dams/basins

Existing buildings and related structures would be demolished, with the resulting material being transported to the adjacent West Nowra Recycling and Waste Facility site for recycling or disposal as appropriate. The Stage 1 footprint would then be cleared and graded. Approximate site levels would be determined with the aim of balancing cut and fill on the site and achieving suitable falls for drainage. The levels would be selected on the basis that they should permit minimum falls of 1 per cent on pavements.

A new site entrance would be constructed for future heavy vehicles.

The security fencing would comprise two metre high cyclone fencing, with two barbed wire strands at the top of the fence. Gates would be installed at the new site entrance and the existing small vehicles entrance.

During the Stage 1, the proposed soil and water management system would include three permanent and one temporary sediment basin which would be used to minimise sediment runoff. These are shown on Figure 6.3. The sediment basins would be sized in consideration of Managing Urban Stormwater: Soils and Construction (DECC, 2008) design criteria for sediment basin sizing. Further detail of proposed soil and water management is provided in Chapter 14.



7. Identification and prioritisation of issues

7.1 Overview

The SEARs for the proposal specify that the EIS needs to identify the potential environmental impacts of the proposal and prioritise the key issues for further assessment.

This chapter provides the results of the identification and prioritisation of issues. The analysis was undertaken in the form of a preliminary, desktop level risk assessment, to broadly assess the potential environmental risks that may arise as a result of the proposal. The preliminary environmental risk assessment identifies and ranks potential proposal environmental risks with the aim of identifying potential impacts for detailed technical studies.

The outcome of the assessment was used to inform the scope of further work and investigations, as described in Chapters 9 to 18.

The detailed impact assessment chapters that follow this chapter consider a wider range of environmental issues than those identified in the SEARs, and address the issues identified by this preliminary risk assessment. A compilation of the proposed mitigation measures is provided in Section 21.1.

7.2 Risk assessment method

7.2.1 Impacts, risks and risk analysis

The proposal would result in impacts to the surrounding environment. An impact can be considered as any change to the environment either wholly or partially resulting from activities associated with the proposal. Impacts may either be beneficial to the environment and the community, or may give rise to changes that are considered less desirable. The events or activities that would lead to impacts that do not provide a benefit would require some level of monitoring, mitigation and/or management. The extent of management or monitoring required would depend on the level of risk that may be associated with the impact.

Risk is generally measured as the result of a combined consideration of:

- How likely is it that an impact would occur ('likelihood')
- What would be the outcomes if it did occur ('consequence')

The environmental risk assessment was undertaken with general consideration of (Australian Standards 2009b) 'AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines'. This involves:

- Evaluating likelihood of occurrence
- Evaluating consequence
- Assigning a risk rating

7.2.2 Evaluating likelihood

The likelihood of an impact occurring can be described in terms of probability. Overlaying this is the need to recognise the uncertainty that may be associated with the potential impacts, particularly during the initial risk assessment process. Where there is scientific uncertainty a cautious approach will identify a higher level of risk.

Each identifiable impact can be assigned a likelihood between remote and almost certain. In simplifying the possible impacts for the purpose of a risk assessment an element of subjectivity is introduced. The purpose of the risk assessment is not necessarily to agree on the probability of any particular impact, but to facilitate an understanding of the relative probability of different impacts.

To undertake the risk analysis for this proposal, potential risks were given a ranking between one and three with regard to the likelihood of it occurring (assuming that the proposal is designed and implemented with standard environmental controls) in accordance with the following definitions:

- Likelihood of occurrence:
 - 1 Lower: unlikely to occur.
 - 2 Medium: potential to occur.
 - 3 Higher: likely to occur.

7.2.3 Evaluating consequence

Assessing the consequences of a potential risk requires a degree of subjective assessment, as the likely consequences of an impact may consist of several elements. To undertake the risk analysis for the proposal, potential risks were given a number between one and three with regard to the perceived consequence if left unmanaged, in accordance with the following definitions:

- Consequence of unmanaged impacts:
 - 1 Lower: potential for insignificant to minor environmental change; localised implications; imperceptible or short term cumulative impacts; offsets readily available.
 - 2 Medium: potential for moderate adverse environmental change; regional implications; modest or medium term cumulative impacts; offsets available.
 - 3 Higher: potential for adverse environmental change; inter-regional implications; serious or long term cumulative impacts; offsets not readily available.

7.2.4 Risk rating

Based on the assessment of likelihood and consequence a foreseeable impact/risk can be assigned a risk rating. This enables higher rating risks to be identified early in the process for the purpose of focusing the environmental assessment process. The matrix shown in Table 7.1 was used to prioritise potential proposal environmental risks as either category A, B or C.

Table 7.1 Impact priority matrix

	<i>Consequence</i>		
<i>Likelihood</i>	3 Higher	2 Medium	1 Lower
3 Higher	<i>Category A</i>	<i>Category A</i>	<i>Category B</i>
2 Medium	<i>Category A</i>	<i>Category B</i>	<i>Category C</i>
1 Lower	<i>Category B</i>	<i>Category C</i>	<i>Category C</i>

Category A issues were considered the highest priority and were the main focus of the environmental impact assessment.

In general, the following was applied when scoping requirements for the environmental impact assessment:

- Category A issues – require detailed specialist investigations and field work, and were the highest priority to enable identification of appropriate management and mitigation options;
- Category B issues – desirable to undertake further investigations as part of the environmental assessment to address some uncertainties; and
- Category C issues – may not require detailed specialist investigations, particularly where identifiable management/mitigation guidelines exist, only broad or desktop investigations were undertaken.

7.3 Assessment results

The preliminary risk assessment for the proposal involved:

- Identifying potential environmental issues (listed below)
- Identifying potential key risks (or impacts) associated with each of these potential issues
- Evaluating the likelihood of occurrence and consequence in accordance with the definitions provided in Section 7.2
- Assigning a risk ranking/priority using Table 7.1
- Deciding on a response – it was decided that a specialist study would be undertaken for any overall issues which included a risk ranking of category A or B.
- The potential environmental issues associated with the proposal that require further assessment were considered to include (in no particular order):
 - Air quality
 - Surface water and soils
 - Biodiversity
 - Traffic and transport
 - Noise
 - Hazards and risk
 - Waste management
 - Greenhouse gas
 - Heritage

Table 7.2 provides the results of the preliminary environmental risk assessment for the proposal. It includes:

- A summary of the potential issues and potential key risks (columns 1 and 2);
- Likelihood of occurrence and consequence (columns 3 and 4);
- The risk ranking/prioritisation categories that were assigned (column 5); and
- A comment regarding the findings of the assessment (column 6).

Table 7.2 Results of risk assessment and prioritisation of environmental issues

Issue	Potential key risks	Likelihood	Consequence	Priority category	Comment/response
Air quality	Dust emissions from construction activities and ongoing operations causing nuisance to sensitive receptors.	Medium	Lower	C	Some dust emissions would be generated during earthworks and general construction activities. The proposal has potential to generate odour from a number of activities including receipt of waste, composting/processing of waste, ongoing landfill operations (including reprofiling). The proposal incorporates features in the design and operation to reduce potential odour impacts including process controls, odour controls (biofilters), enclosure or partial enclosure of odorous activities and additional odour management techniques. Therefore, despite an increased overall throughput of waste to the site, odour impacts are expected to reduce.
	Odour emissions from waste, raw material, leachate, compost or finished product at levels that exceed odour limits and affect sensitive receptors.	Higher	Medium	A	The SEARs have also identified this as a key issue requiring assessment. Potential air quality impacts including both dust and odour are considered in Chapter 9.
Surface water and soils	Erosion and sediment and surface water quality impacts during construction leading to contamination of surface water	Medium	Medium	B	There is potential for erosion and sedimentation during construction. However appropriate mitigation measures would be implemented to reduce the potential for off-site impacts.
	Erosion and sediment and or other surface water quality impacts during operation	Lower	Medium	C	The proposal has potential for erosion and sedimentation during operation from run-off from disturbed areas. Appropriate stormwater management controls are proposed to manage surface water run-off. The SEARs have identified soil and water as a key issue requiring assessment.
	Flooding impacts	Medium	Medium	B	Potential surface water and soils impacts are considered in Chapter 14.
Groundwater	Impacts on groundwater quality, availability and groundwater elevations from operation of the proposal	Lower	Lower	C	All activities at the AWT facility and MRF would be undertaken indoors on sealed surfaces with appropriate leachate collection and storage. Any excess leachate would be transferred offsite and not discharged to the

Issue	Potential key risks	Likelihood	Consequence	Priority category	Comment/response
					environment. Construction of the resource recovery facilities has the potential to create 'dirty' water which may migrate to underlying groundwater systems (or surface water systems). However a number of mitigation measures would be implemented to effectively minimise any potential groundwater impacts. The SEARs have not identified this as a key issue requiring assessment. This issue has not been assessed further.
Heritage	Encounter and disturb items of European or Aboriginal cultural heritage during construction and operation	Lower	Lower	C	The proposal would occur on a previously disturbed site with limited potential for heritage impacts. Heritage searches identified no Aboriginal heritage or non-Aboriginal heritage items on the proposal site or in the vicinity. The SEARs have identified this as a key issue requiring assessment. This issue has been considered in Section 17.
Biodiversity	Effects on threatened or vulnerable species through removal of vegetation and destruction of habitat.	Lower	Medium	C	Most of the proposal site is located on land which has been previously developed or cleared therefore there is limited vegetation across the majority of the proposal site. However there would be some vegetation clearance as a result of construction of the proposal. The SEARs have identified this as a key issue requiring assessment. This issue has been considered in Chapter 13
Traffic and transport	Increase in traffic during construction and or operation affecting the operation of local roads.	Lower	Medium	C	Traffic increase as a result of the proposal – mostly due to export of finished product or recyclables off site, as well as due to a small increase in waste received to the site. The SEARs have also identified this as a key issue requiring assessment. Potential traffic impacts are considered in Chapter 12.
Greenhouse	Emissions from fuel use in	Lower	Lower	C	The proposal would require power and fuel for operating

Issue	Potential key risks	Likelihood	Consequence	Priority category	Comment/response
gas	construction equipment and electricity use, mobile equipment and transport significantly contributing to global warming.				the RRP, which would generate greenhouse gases. However, the proposal would divert organics from landfill which would reduce potential greenhouse gas emissions from the onsite landfill. The SEARs have also identified this as a key issue requiring assessment. Potential greenhouse gas impacts of the proposal are considered in Chapter 10.
Noise	Noise emissions from site activities during construction affect sensitive receptors	Medium	Medium	B	During the construction of the RRP, the proposal has potential to create noise impacts. However construction activities would be short-term, and given the proximity of the site to sensitive receivers, noise impacts are not expected to be significant.
	Noise emissions during operation exceed noise limits and affect sensitive receptors.	Lower	Medium	C	There would be an increase in traffic to the site and additional plant and equipment operating at the site. Most RRP activities would be undertaken within buildings, however activities at the C&D facility would be undertaken partially outdoors. Maturation of finished compost would also occur outdoors. Hence there is potential for some increased noise emissions from RRP operations. However given the proximity of the site to sensitive receivers, the proposal is not expected to have any significant operational noise impacts. The SEARs have also identified noise as a key issue requiring assessment. Potential noise impacts are considered in Chapter 11.
Weed and feral animal control and biosecurity risks	Operation of the proposal leading to a spread of noxious weeds or pathogens in the local area or in products.	Lower	Medium	C	Regular monitoring of temperature within the RRP processes would enable suitable composting conditions to be maintained to ensure that the resulting compost is free of pathogenic organisms.
	Operation of the proposal attracting pests and vermin, resulting in a nuisance to nearby sensitive receptors.	Lower	Medium	C	Composting operations would take place within buildings, hence the likelihood of pests and vermin being attracted to the operations would be minimal. This issue is considered in Section 8.

Issue	Potential key risks	Likelihood	Consequence	Priority category	Comment/response
Hazards and risk	Dangerous or hazardous materials or scenarios causing harm to the environment or people.	Medium	Medium	B	No significant hazards with the potential for offsite impacts are expected. New controls and procedures would be put in place for the RRP to address potential hazards and risks. The SEARs have also identified this as a key issue requiring assessment. Potential hazard and risks are considered in Chapter 16.
Visual	Visibility of the proposed facilities reducing the amenity of nearby sensitive receptors.	Low	Low	C	Part of the RRP is expected to be visible from users of Flatrock Road in the immediate vicinity of the proposal site. However the overall potential for the proposal to impact on visual amenity is considered to be low. The proposal would be located immediately adjacent to the existing West Nowra Landfill. There is extensive vegetation surrounding the site which would assist in screening the RRP from more distant potential receptors. The SEARs have identified this as a key issue requiring assessment. Potential visual impacts are considered in Chapter 19.
Utilities and infrastructure provisions	Utilities demand exceeds supply available and places a burden on existing infrastructure.	Lower	Lower	C	The capacity of the existing supply wires and transformers, and of the district supply infrastructure is currently being verified. If necessary, required upgrades would be implemented. Onsite sewage package treatment plant or a storage tank with pump out capacity would be provided. This is not considered a key issue. It has not been identified as a key issue in the SEARs.
Socio-economic	Amenity impacts during construction and operation.	Medium	Lower	C	There is potential for some amenity impacts during construction and operation of the proposal. These are addressed in various specialist studies and chapters of the EIS. The proposal includes design features and mitigation measures to reduce the potential for amenity impacts.
	Employment during construction and operation.	Medium	Lower	C	The proposal would generate around 30 new jobs during operation and 40 to 50 jobs during construction.

Issue	Potential key risks	Likelihood	Consequence	Priority category	Comment/response
					The SEARs have identified this as a key issue requiring assessment. Potential socio-economic impacts are considered in Chapter 18.
Land use	Construction impacts to adjacent and nearby land uses Operational impacts to adjacent and nearby land uses	Medium	Lower	C	The proposal would require the relocation of the current animal shelter operations to an alternative site. However the land is already zoned for waste and resource recovery, and it has not been identified as a key issue in the SEARs.
Fire	Large scale bushfire impacting the proposal facilities over the course of the proposal life.	Medium	Medium	B	There is potential for bushfire to impact the facility given the proximity of large areas of vegetation and forest, with risk of damage to property and life. Bushfire is considered in Chapter 15.
Waste management	Potential impacts associated with treating, storing, using and disposing of waste and waste products.	Medium	Medium	B	The proposal would include the handling storage and disposal of a number of waste streams. The proposal design incorporates a number of measures to mitigate against potential impacts associated with the storage, handling and disposal of waste. Waste management is considered in detail in Chapter 8.

8. Waste management

This chapter addresses the SEARs requirements for waste management including information on the proposed quantities, classifications and sources of waste, proposed size, location and management of stockpiles of unprocessed and processed waste, waste transport, waste processing operations, technologies, outputs, leachate management, quality control, resource recovery orders, litter, weed and feral animal control and biosecurity risks.

8.1 Construction impact assessment

8.1.1 Concept Proposal

The following wastes may be generated during construction:

- Demolition material from the existing buildings, kerbings, signage etc
- Other construction material including spoil/fill and vegetation from site clearing and grading
- Surplus material from construction of buildings, roads, fencing, steel, formwork etc
- General waste from site personnel (such as food scraps, aluminium cans, glass bottles, plastic and paper containers, paper, cardboard and other packaging wastes and general office wastes)
- Wastewater and sewage from site compounds.

The management of wastes generated during construction would be in accordance with relevant NSW legislation and the principles of the waste management hierarchy set out in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2014a).

Construction and demolition material and vegetation would be delivered to the adjacent West Nowra Recycling and Waste Facility site by truck for recycling and reuse where appropriate (for example shredding/mulching or for future engineering applications at the landfill). Any reuse would be in accordance with relevant EPA resource recovery orders and exemptions where applicable.

Non-reusable or non-recyclable material would be disposed of at the landfill.

General waste from site personnel would be temporarily stored in mobile or skip bins on the site before being collected for recycling or disposal.

8.1.2 Stage 1 project

Waste generation and waste streams identified above for the Concept Proposal are applicable to construction of Stage 1. However as building construction would occur, the amount of surplus material would be expected to be minimal. The majority of waste generated during Stage 1 would be from the demolition of the existing buildings and infrastructure.

During Stage 1 wastes generated would be managed in accordance with relevant NSW legislation and the principles of the waste management hierarchy set out in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2014a) and as outlined above.

8.2 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

8.2.1 Concept Proposal

Waste streams, quantities and classifications – incomings

Current waste incomings

Quantities of wastes received at the West Nowra Recycling and Waste Facility in 2013/14 are shown in Table 8.1. In 2013/14, approximately 72,000 tonnes of waste was received. Kerbside collected recyclables are not currently brought to the West Nowra Recycling and Waste Facility.

Table 8.1 2013/14 waste streams and quantities

Waste stream	Quantity (tonnes per year)	Likely classification
Asbestos	1,244	Special waste
Steel	611	General solid waste (non-putrescible)
Construction and demolition waste	4,922	General solid waste (non-putrescible) General solid waste (putrescible)
Commercial waste	24,951	General solid waste (putrescible)
Kerbside collected waste	25,051	General solid waste (putrescible)
Domestic drop off waste	7,513	General solid waste (putrescible)
Municipal waste	2,443	General solid waste (putrescible)
Tyres	17	Special waste
Green waste	3,024	General solid waste (non-putrescible)
E-waste	59	General solid waste (non-putrescible)
Mattresses	76	General solid waste (non-putrescible)
VENM	3,017	General solid waste (non-putrescible)
Total	72,928	

Future waste incomings

The projected future waste streams and quantities are shown in Table 8.2, along with expected waste classifications as per EPA (2015) *Waste Classification Guidelines*. Future waste incomings were modelled to increase in line with expected increases in population. This shows waste received is expected to increase to about 125,000 tonnes per year by 2037.

Table 8.2 Estimated future waste streams and quantities

Waste stream	Quantity (tonnes per year)			Likely classification
Year	2017	2027	2037	
Asbestos	1,313	1,515	1,730	Special waste
Steel	644	733	835	General solid waste (non-putrescible)
Construction and demolition waste	8,890	10,259	11,715	General solid waste (non-putrescible) General solid waste (putrescible)
Commercial waste	26,339	30,393	34,707	General solid waste (putrescible)
Kerbside collected waste	26,444	30,515	34,846	General solid waste (putrescible)
Kerbside collected recyclables	12,980	14,785	16,840	General solid waste (non-putrescible)
Domestic drop off waste	7,931	9,152	10,450	General solid waste (putrescible)
Municipal waste	2,568	2,964	3,384	General solid waste (putrescible)

Tyres	18	21	24	Special waste
Green waste	3,192	3,684	4,206	General solid waste (putrescible)
E-waste	62	71	81	General solid waste (non-putrescible)
Mattresses	80	91	104	General solid waste (non-putrescible)
VENM	3,185	3,675	4,197	General solid waste (non-putrescible)
TOTAL	93,647	107,856	123,118	

Council will be conducting a tendering process for the construction and operation of the RRP, which would specify the waste streams to be managed by the RRP. Wastes that are already segregated or sorted would not pass through the RRP, which would focus on sorting wastes brought to the West Nowra site in a mixed form. Pre-sorted wastes would be delivered by customers direct to stockpiles elsewhere at the RRP site. In addition, members of the public would not have direct access to the RRP facility. This is because combining residential and commercial vehicles at the RRP would complicate operations and create potential safety issues.

Asbestos waste would be excluded from the RRP, since recycling of this waste is not possible, and the risk of it being incorporated with other waste arriving at the facility and contaminating other waste is high.

Waste storage and handling

Waste transport

It is expected that waste would be delivered to the site as it currently is delivered to the existing landfill site – via a combination of kerbside collection vehicles, other trucks and small vehicles (such as cars, utes and trailers).

Waste handling

Vehicles carrying waste would be weighed over the weighbridge as they enter the site. Material would be directed to either the AWT/MRF building(s) or C&D building. Only council vehicles, pre-qualified commercial customers, and landfill transfer vehicles would be able to enter the RRP. Residential customers would continue to use the existing domestic waste transfer station, other facilities at the landfill site (green waste drop-off, household hazardous waste drop-off, construction waste drop-off and recycling areas), as would smaller non-qualified occasional commercial customers, such as builders.

Waste destined for the AWT/MRF building(s) would be delivered directly to those building(s). Material handling within the building(s) would occur via a combination of skid steers, loaders and or a variety of conveyors.

Residual wastes from the AWT/MRF processes would be stored temporarily in skip bins within the building(s), before being periodically transferred to the adjacent landfill.

Further details of waste handling procedures and waste processing are provided in Section 6.2.

Stockpiles

Stockpiles of compost undergoing maturation would be stored in a specified area of the former closed landfill at the adjoining site. The proposed locations of these stockpiles are shown on the Master Plan (Figure 6.2).

Based on the expected quantities of waste and the composting process/technology it is anticipated that maturation stockpiles would occupy an area of approximately 3,000 m² on the

former landfill areas at any one time. Stockpiles of C&D products ready for sale and mulch that can be taken by local residents would also be stored in this location (also indicated on the Master Plan).

Likely waste processing operations and technology

Composting (AWT) process

The specific composting technology to be used at the RRP has not yet been selected, as it depends upon what is offered by tenderers. However it is expected to comprise either tunnel composting, or composting in bays in a ventilated composting hall. It has also not been decided whether mixed waste containing food, or source segregated food and garden waste. Whichever process is chosen would generate odour from the composting processes, so there would be a need for exhaust air from the composting processes to be passed through a biofilter or another odour management device, before it can be discharged to the external environment.

The first process to occur on site would be an inspection of the incoming waste materials, which would likely be deposited onto the floor. If food and garden organics are processed, any contamination would be removed from the raw material whilst it is on the floor.

It is likely that the material would then go through a manual picking line, where people stand alongside a conveyor belt, and the material is visually inspected and contamination removed before going into another stockpile prior to a shredder. The material would be loaded into a shredder using a front end loader or grab system. The shredder would be used to grind the material into a fine material that can be composted.

If mixed waste containing food is processed, rather than source separated food and garden organics, any large items or foreign items (such as batteries) would first be removed from the waste manually, whilst the material is on the floor. A manual picking line using a conveyor belt would be used to remove any remaining foreign items (such as batteries), and other items unsuitable for composting. The material would then likely pass through one or more rotating trommels and screens, with the fine fraction of the material passing through the screens and onto a conveyor to be transported to the composting area.

Material rejected by the facility would be disposed of at the existing landfill, or otherwise managed in accordance with regulatory requirements e.g. car batteries or gas cylinders.

Staff would be trained to identify hazardous items and procedures for their handling and management/disposal.

Materials recovery facility (MRF) process

The materials recovery facility process would be designed specifically to suit the waste stream that is delivered to it. There are likely to be a number of sources of waste – retail shops, offices and factories, and kerbside domestic recyclables. Only dry wastes would be processed at the MRF facility.

The processes used at the MRF may include equipment such as manual picking lines to remove recyclable items, and hazardous items, trommels to separate paper from bulky materials, vibrating screens to sort materials by weight, and magnets and eddy current separators to recover steel and non-ferrous metals.

If food and garden organics only processing occurs in the composting facility, the materials recovery process line would be completely separated from the organics line. On the other hand, if the composting facility processes mixed waste, the receipt and sorting component of the materials recovery facility may be either fully or partially integrated with the front end of the composting facility.

Material rejected by the facility would be disposed of at the existing landfill, or otherwise managed in accordance with regulatory requirements e.g. car batteries or gas cylinders.

Recycling and construction and demolition sorting process

The activities conducted in this area would involve inspection of wastes brought into the building to determine if hazardous materials are present (unlikely but possible). Unsuitable items would be removed at this point, if they have not already been removed at the landfill site (where the domestic customer and non-regular commercial customer construction and demolition wastes would be dropped off). Registered/pre-qualified commercial customers would be required to ensure that loads deposited at the RRP do not contain hazardous wastes such as car batteries.

Once a stockpile has been inspected and any contaminants removed, long and bulky items such as lengths of wood or metal or heavy items such as blocks of concrete would be put into skips using a front end loader. They would be transferred to the stockpiles of segregated materials on top of the landfill at the adjoining site as shown on Figure 6.2, if deemed suitable for recovery, or to be disposed of landfill if not recoverable. Mechanical and/or manual processes would be used to sort the remaining material into different types – timber, concrete and brick, cardboard, metal, plastics and miscellaneous materials or items such as tyres.

Likely waste processing outputs and quality control

Process outputs

Some material is currently taken offsite for disposal or recycling (4,612 tonnes in 2013/14). As the RRP process has not been selected, the projected recovered material quantities associated with the proposal have not been confirmed at this stage. However it is anticipated that by employing the process outlined above to pre-sort materials prior to the RRP, and use the RRP to process the mixed remaining materials, that a large proportion of the currently landfilled C&D waste (builders waste) would be able to be recovered, along with some additional material from the commercial waste stream.

Some product would leave the site as finished compost, or as aggregates and gravels. Metals would be sent to metal recyclers. Plastics and cardboard would be baled and sent to Australian reprocessors or exported. The majority of sorted kerbside recyclables and some other recovered dry recyclables would also be sent to local or overseas reprocessors. The quantity that would be recovered and diverted from landfill would depend on the RRP processes selected and the quality or extent of mixing of the incoming wastes. Overall system diversion rates with various AWT/MRF options are expected to range from 40% to 80% depending on the process adopted and the waste stream.

For the purpose of the Concept Proposal assessment, assumptions made in estimating future outgoing material quantities were as follows:

- 75% of C&D waste (builders waste) (excluding asbestos) delivered to the site would be recovered and transported off-site for reuse
- 40% of kerbside collected waste would be turned into outgoing product (e.g. compost, fertiliser, recyclables) for offsite transport. Note that there would also be some moisture loss (say, above 30%).
- 100% of kerbside recyclables would be recovered and sent off site for recycling
- 65% of other dry recyclable commercial waste and domestic drop off waste would be recovered and sent off site for recycling.

Table 8.3 provides the estimated outgoing material quantities associated with the proposal.

Table 8.3 Estimated future outgoing material quantities

Material outgoing	Estimated off-site / outgoing material quantity (t/yr)	
Year	2017	2027
Finished compost/fertiliser product	10,578	12,206
Recovered C&D material	6,668	7,694
Recovered kerbside recyclables	6,824	7,875
Recovered other dry recyclables material	3,192	3,684
TOTAL	27,262	31,459

Finished compost products would meet the Australian Standard AS4454 *Composts, Soil Conditioners and Mulches*.

In addition, the compost derived from kerbside collected food waste, bulk green waste and source separated food waste (excluding grease trap waste) would meet the requirements of (EPA 2014c) 'The solid food waste order 2014'.

The compost derived from mixed waste would meet the requirements of (EPA 2014d) 'The organic outputs derived from mixed waste order 2014'. Compost derived from the source separated food and garden organics streams would meet the requirements of (EPA 2014e) 'The compost order 2014'.

Quality control measures

Accurate recording of all waste movements into and out of the site would be conducted for recording customer data and associated taxes and levies.

Before leaving the site as compost, samples of the material from the AWT facility would be taken and subjected to NATA laboratory testing. For some markets, testing would demonstrate that the product complies with the Australian Standard (Australian Standards 2012) for composting (AS 4454-2012: Composts, Soil Conditioners and Mulches) and inform the purchaser of the nutrient value of the product. Where required, testing would also be undertaken in accordance with the requirements of the respective resource recovery orders.

In addition, the following measures are proposed to ensure quality product outputs:

- Signs at the entrance of the RRP indicating the type of waste that can be accepted and those that cannot
- Visual inspection of incoming materials and removal of contaminants
- Training of staff to ensure their ability to recognise and manage unacceptable wastes
- Technology selection and design to maintain conditions for composting to meet Australian Standards – including managing oxygen levels, moisture and temperature
- Screening and refinement to remove coarse physical impurities

Leachate management

AWT/MRF buildings

It is expected that any washdown water/process leachate from within the enclosed AWT/MRF building(s) would be directed to and stored in an aerated above ground leachate storage tank(s) and recirculated back into the composting process. The leachate storage tanks would provide capacity for several days of storage. Bunding would be provided around the leachate storage

tank farm to prevent discharge of leachate from the site in the unlikely event of failure or during maintenance.

Water is required for application to the composting material to maintain the moisture content for effective quality control and accelerate the composting process. It is estimated that the demand for process leachate from the operation of the AWT/MRF would exceed the volume of process leachate produced from the system. The shortfall in water would be supplied from other sources on the site or potable water.

In the event that excess process leachate is produced, it would be transferred by truck to a licenced processing facility for treatment or disposal.

C&D building

Washdown water from within the C&D building would also be collected and treated before discharge.

Litter

Combating litter and illegal waste dumping is a major priority for the NSW Government. Goal 22 (Protect our Natural Environment) in NSW 2021 identifies the reduction in illegal dumping as a priority and the NSW EPA has a strategic waste enforcement and compliance program. The program also supports and provides assistance to public land managers and councils to help them combat litter and illegal dumping.

Transportation of waste to the RRP has the potential to generate litter via improper containment of loads. All vehicles accessing the site would be required to be suitably enclosed or their loads covered to prevent the escape of litter.

Waste materials at the AWT/MRF would be delivered and unloaded within the buildings. The waste streams delivered to the C&D facility are not expected to contain significant quantities of material that would be susceptible to being blown off-site. Therefore the likelihood for wind-blown material to escape from the site is considered to be low.

Biosecurity

Weeds

If inadequately managed, the proposal would have the potential to facilitate the introduction and spread of exotic plant species or pathogens to the site or to the users of compost through:

- Transport of vegetative and seed bearing material in green waste to the site for composting;
- Movement through the site and surrounds by work staff (on foot or in vehicles); and
- Distribution more widely through the use of compost products.

It is important that weeds, weed seeds, plant propagules and pathogens are not transmitted to other locations via the products.

The technology selected for the processing of putrescible waste would result in compost products that meet the Australian Standard for composting (AS 4454-2012: Composts, Soil Conditioners and Mulches) being produced. The technology would include aeration and continuous monitoring of oxygen levels and temperature. This would ensure that required temperatures are reached for the required durations (a minimum of 55°C for at least three days). These processing controls would result in conditions that would ensure that the resulting compost is free of pathogenic organisms (for example *Phylloxera* and *Phytophthora*) and viable weed seeds.

In addition, before leaving the site as compost, samples of the material would be taken and subjected to laboratory analysis to demonstrate that the product complies with AS 4454-2012.

With these proposal designs and controls, noxious weeds, weed seeds, plant propagules and pathogens are not expected to be transmitted to other locations via the products.

Feral animals, pests and vermin

There is potential for pests and vermin to be attracted to the RRP due to the nature of wastes that would be accepted. This has potential to lead to noise problems and the spread of food scraps away from the site, reducing local amenity. Large numbers of pests or vermin at the RRP may also pose an environmental or health hazard.

Possible pests and vermin include feral animals (e.g. foxes, dogs and cats), seagulls/ibises, rodents, flies and other insects. Birds at the RRP would have the potential to transfer pathogens to nearby reservoirs and dams. Other pests/vermin such as rodents and insects can be a nuisance to site staff and neighbours and also have the potential to transfer germs and disease.

Pests and vermin are generally attracted to waste facilities in search of food sources. Larger numbers of pests and vermin are generally attracted to facilities with exposed, rapidly biodegradable organics. However, as the receipt (unloading) of all putrescible waste and processing would be undertaken inside buildings, the likelihood of large numbers of pests and vermin being attracted to the RRP would be low.

With the proposal designs and proposed controls (receipt and processing within buildings), pests and vermin are not expected to be present at the site in sufficient numbers to pose an environmental hazard or loss of amenity in the areas neighbouring the site.

Apiary considerations

Bees can potentially source food from a waste or compost facility and encourage other bees to gather at the food source. The main biosecurity risk is the contamination of local honey and commercial colonies with disease. Of particular consideration is the *American foulbrood* disease, which is the most serious brood disease of honey bees in NSW.

In addition, bee swarms can also pose an occupational health and safety risk for employees and visitors to a waste facility.

As the receipt and processing of putrescible waste would occur within buildings, the risk of bees being attracted to the RRP is considered very low. Therefore the risk of transmission of diseases via honey bees is considered very low. In the unlikely event that a bee swarm inhabits the site, a suitably qualified apiarist would be engaged to remove the bees.

8.3 Mitigation and management measures

8.3.1 Construction

A waste management sub-plan would be prepared as part of the construction environmental management plan for the proposal. The plan would include procedures for the management of wastes in accordance with relevant NSW legislation and the principles of the waste management hierarchy set out in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2014a).

8.3.2 Operation

The RRP would be operated in accordance with the OEMP. The OEMP would include:

- Waste handling procedures:

- weighbridge operations and record keeping.
 - requirements for inspection and removal of contaminants.
 - waste storage and handling requirements.
- Waste processing procedures
- Quality control procedures and protocols including sampling and testing
- Finished product storage and handling requirements.

Sampling and testing would also be carried out in accordance with the requirements of the relevant resource recovery orders to allow compost from the proposal to be applied to land. If necessary, Council would apply for a specific resource recovery order for any other products from the proposal not covered under a general exemption.

9. Air quality

The information presented in this chapter is based on the air quality assessment undertaken for the proposal by GHD. The full report is included in Appendix C in volume 2 of this EIS.

9.1 Method

The air quality assessment was undertaken in accordance with the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (DECC 2005) and the technical framework and notes for the *Assessment and Management of Odour from Stationary Sources in NSW* (DECC 2006).

The air quality assessment included:

- Initial review of project information provided by Council covering the facility layout and the operational sequence, including any site layout plans and elevations. Review of odour emission data from other Council composting operations.
- Site visit to ascertain the local terrain and the nearest sensitive receptors / residences
- Development of an inventory of source odour emission rates (OERs) for the facility from Council data and from other organics processing facilities
- Confirmation with EPA model of choice and use of appropriate emission rates
- Synthesis of meteorological data for the site using Nowra Airport Automatic Weather Station (AWS)
- Level 2 modelling assessment to predict odour and dust impact at the nearest residences during operation
- Check compliance with the OEH/EPA odour criterion
- Identification of suitable mitigation measures, if required, in order to meet criterion.

9.2 Air quality goals

9.2.1 Odour criteria

The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* ('the Approved Methods') (DEC, 2005) defines odour criteria and how it should be applied in dispersion modelling. Criteria have been refined by DEC (2005) to take account of population density in the area.

Table 9.1 lists the odour certainty³ thresholds, to be exceeded not more than 1% of the time, for different population densities.

³ In the process of odour measurement, the odour certainty threshold is, by definition, the minimum concentration at which the panellist is certain they can detect the odour.

Table 9.1 Odour criteria for the assessment of odour (DEC, 2005)

Population of affected community	Odour performance criteria (nose response odour certainty units at 99th percentile)
Single Residence ($\leq \sim 2$)	7
~ 10	6
~ 30	5
~ 125	4
~ 150	3
Urban ($\sim 2,000$)	2

The criteria assumes that 7 OU at the 99th percentile would be acceptable to the average person, but as the number of exposed people increases there is a chance that sensitive individuals would be encountered. The criterion of 2 OU at the 99th percentile is considered to be acceptable for the whole population.

The proposal site is surrounded primarily by vegetated land including the Bamarang Nature Reserve to the west. There are less than 10 houses within a 1 km radius of the proposal site with an expected population of less than 30 people. This population is present adjacent the existing West Nowra RRP, and with this density, an odour criterion of 5 OU (at receivers) would apply to this proposal.

9.2.2 Dust criteria

Table 9.2 and Table 9.3 summarise the current air quality assessment criteria for in-air dust and deposited dust prescribed in the Approved Methods (DEC, 2005).

Table 9.2 NSW criteria for particulate matter

Pollutant	Criterion	Average period
Total Suspended Particulate Matter (TSP)	90 $\mu\text{g}/\text{m}^3$	Annual
Particulate Matter < 10 μm (PM10)	50 $\mu\text{g}/\text{m}^3$	24 hour maximum
	30 $\mu\text{g}/\text{m}^3$	Annual

In addition to health impacts, airborne dust also has the potential to cause nuisance impacts by depositing on surfaces. Table 9.3 shows the maximum acceptable increase in dust levels.

Table 9.3 NSW assessment criterion for dust deposition

Pollutant	Average Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 $\text{g}/\text{m}^2/\text{month}$	4 $\text{g}/\text{m}^2/\text{month}$

9.3 Existing environment

9.3.1 Background air quality

The NSW EPA used to operate an air quality station at the Nowra Sewage Treatment Plant however it was decommissioned in December 2001. The nearest existing EPA air quality monitoring station is at Albion Park South in the Illawarra region approximately 40 km north of the site. Air quality data from the Albion Park site was analysed for the five years 2009 to 2013.

Annual PM₁₀ averages for daily mean levels, daily max levels and number of days exceeding the criteria for Albion Park were calculated. The results are detailed in Table 9.4. No other relevant air quality data is available in the area.

Table 9.4 Albion Park PM₁₀ average annual daily mean levels, µg/m³

Year	Annual mean	70th percentile	Number of days exceeding criteria
2009	18.3	21.5	45
2010	14.0	16.2	14
2011	13.6	15.7	10
2012	13.6	15.3	9
2013	14.7	16.5	9
Five yearly mean	14.8	17.1	17

Table 9.5 Albion Park PM₁₀ average annual daily max levels, µg/m³

Year	Annual mean	70th percentile	Number of days exceeding criteria
2009	42.8	42.7	191
2010	29.3	34.3	132
2011	28.9	33.3	129
2012	31.2	33.8	146
2013	33.3	35.6	155
Five yearly mean	33.1	35.9	151

9.3.2 Sensitive receptors

A sensitive receptor is defined in the DEC (2006) odour assessment guideline as a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area. Figure 9.1 shows the location of the existing nearby sensitive receptors in relation to the project. The nearest sensitive receptors would be those workers on site at the RRP. The nearest residential receptors are approximately 700 m to the south. The nearest sensitive receptors to the site are listed in Table 9.6.

The OEH offices to the east of the site would only be in use during standard daytime office hours. Worst case odour impacts would generally occur outside standard office hours.

Table 9.6 Air quality sensitive receivers and land uses

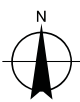
Receptor type	Receptor ID	Receptor Address
Residential	R1	43 Flatrock Road, Mundamia
	R2	41 Flatrock Road, Mundamia
	R3 to R6	3 Flatrock Road, Mundamia
	R7	18 Bamarang Road, Mundamia
	R8	Jim Da Silva Farm, 38A Old Bamarang Road, Mundamia
	R10	56 Stonegarth Road, Mundamia
Educational	R9	University of Wollongong Shoalhaven Campus
Office	R11	OEH buildings adjacent to the West Nowra Recycling and Waste Facility



Legend

- Site boundary
- Sensitive receivers

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Metres



Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

Shoalhaven City Council
West Nowra Resource Recovery Park
Air Quality Assessment
Air quality sensitive receptors

Job Number	21-22855
Revision	0
Date	07 Oct 2015

Figure 9.1

9.4 Construction impact assessment

The main potential air quality impact during construction is dust. Dust dispersion modelling has been undertaken to assess the potential worst-case dust impact of the proposal.

9.4.1 Concept Proposal

Dust

Maximum dust impact scenario

An indicative worst-case dust modelling scenario was undertaken for the Concept Proposal. Significant sources of dust at the site would be wheel generated dust from trucks travelling on unpaved surfaces, wind erosion from unsealed surfaces such as the intermediate cover and stockpiles, unloading waste and bulldozers moving waste around. The worst-case dust scenario considers both construction of the RRP facilities and operational activities occurring at the same time.

Dust dispersion modelling

Potential dust impacts were modelled with the significant proposed construction and operational sources of dust. Dust modelling was undertaken with consideration to the Approved Methods to determine the concentration of dust (PM₁₀) over a 24 hour period. Modelling was conservative as dust depletion was not considered in the modelling. Dust depletion allows material to be removed from the plume as it is deposited on the ground surface, and if no depletion is modelled it would result in an overestimate of the predicted dust concentrations.

Predicted dust impacts

The highest five results from the predicted maximum (100th percentile) 24 hour dust impact modelling of the proposal are shown in Table 9.7. Predicted dust increments (levels) at the five sensitive receptors are listed in the table. It can be seen that dust emission increments from the proposal alone (not taking into account background levels) are below the 24 hour PM₁₀ dust criteria of 50 µg/m³ at all times at all surrounding receivers.

As the average background dust level at the EPA monitoring station in Albion Park for the year 2010 was less than 15 µg/m³, and a day with high background level would need to coincide with site activities generating maximum dust emissions, it is unlikely that cumulative dust impacts exceeding the criteria (50 µg/m³) would occur. In addition, dust depletion from the plume, which would reduce the predicted dust impact, was not considered in the modelling.

Table 9.7 Predicted maximum dust impact 24 hour PM₁₀ µg/m³

Rank	OEH Office	43 Flatrock Rd	38 Bamarang Rd	University of Wollongong Shoalhaven Campus	56 Stonegarth Rd
1	38.9	16.5	10.1	4.7	2.6
2	19.4	15.7	7.5	3.1	1.9
3	18.6	14.9	7.1	3.1	1.8
4	17.6	13.4	6.8	2.8	1.8
5	16.5	13.0	6.6	2.4	1.8

The OEH office is the closest receptor to the proposal site, but is relatively remote from the operational areas of the landfill (where higher background dust levels have greater potential to occur). Roads in the resource recovery area nearest the OEH office are all sealed. There is a slight possibility that the 50 µg/m³ criteria could be exceeded at the OEH office (R11) with the

existing background dust levels taken into consideration. Therefore a contemporaneous dust assessment was undertaken to determine if the proposal would result in any additional days exceeding the dust criteria, than those recorded by background ambient dust data (where the background levels exceeded 50 µg/m³).

Review of the background ambient dust monitoring data indicates two days historically where the background dust levels exceeded 50 µg/m³. When the predicted site dust increment is added to the corresponding background levels for those days, there are no additional days that exceed the PM₁₀ criteria.

This means that the proposal complies with the dust criteria. Full details of the contemporaneous dust impact and background dust data is provided in Appendix C, with two days in total predicted to exceed the 24 hr PM₁₀ dust criteria, due to unusually high background levels, rather than the proposal.

A number of mitigation measures are proposed, as described in Section 9.6.2.

9.4.2 Stage 1 project

Some of the construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts which showed that construction activities would comply with the dust criteria.

9.5 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

9.5.1 Concept Proposal

Dust

The operation of the proposal would be managed to avoid dust emissions beyond the premises. Dust may be generated by movement of materials by front end loaders and delivery trucks. Such operations may need to be suspended on very windy days.

Dust can also occur during storage, mixing, screening and transport of feedstocks and products. Although dust from the turning of composting materials is less likely due to the normally high moisture content of compost. In addition, the composting process also maintains high levels of moisture in the fresh compost exiting the windrows such that after screening the material can be set up in external piles without being a likely source of dust emissions. It is noted that the proposal is mostly contained within enclosed buildings, thereby limiting the potential for these kinds of dust emissions.

The maximum dust impact scenario and dust assessment (section 9.4.1) includes consideration of operational dust generating activities. This showed that even during worst case dust impact scenario (both construction and operation activities occurring at the same time) that the proposal would comply with the dust criteria.

A number of additional mitigation measures are proposed to reduce dust emissions during operation, as discussed in Section 9.6.2.

Odour

The two main sources of odour from the proposal are the RRP building and the maturation area. The receivals area for garden organic waste, along with shredding and composting activities would all be housed within an enclosed building maintained at negative air pressure. All air

within the building would be directed through a biofilter for treatment prior to being released into the surrounding environment.

The maturation and product storage area would not be enclosed and would be located on the landfill on the adjacent site.

Dispersion modelling was conducted to predict the pattern of maximum off-site ground level odour concentrations resulting from the West Nowra RRP and adjacent landfill for three scenarios including:

- Current landfill only
- Current landfill with existing green waste operations
- Current landfill operations with proposed RRP

The results of the dispersion modelling are discussed below.

Current landfill operations

Figure 9.2 shows the predicted maximum odour impact from the site for normal operations, expressed as a 1-hour average at the 99th percentile.

The 5 OU criterion adopted for the proposal can be seen to extend in the south east out from the existing West Nowra Recycling and Waste Facility as far as Flatrock Road.

Current landfill with existing green waste operations

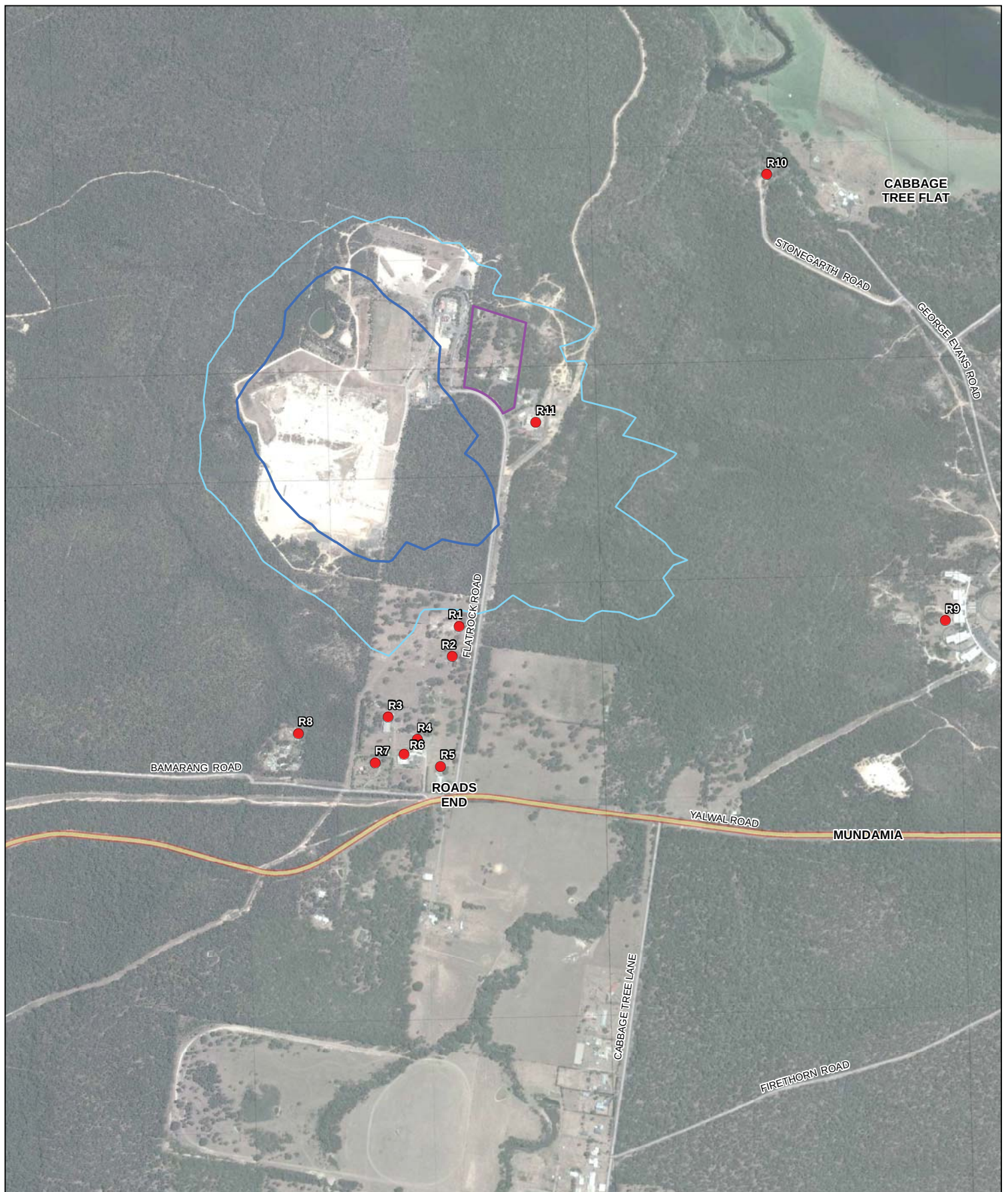
Figure 9.3 shows the predicted maximum odour impact from the site for normal operations, expressed as a 1-hour average at the 99th percentile. The figure shows the predicted peak off-site odour impact for the current landfill and green waste operations.

The 5 OU criterion adopted for the project can be seen to extend to the east of the existing West Nowra Recycling and Waste Facility just over Flatrock Road. There are no sensitive receptors here however the 5 OU odour contour encroaches slightly into the Office of Environment and Heritage (OEH) Nowra Area Office and Depot (Receptor R11).

Proposed RRP with current landfill operations

Figure 9.4 shows the predicted maximum odour impact from the site for normal operations, expressed as a 1-hour average at the 99th percentile. The figure shows the predicted peak off-site odour impact for the current landfill with the proposed RRP.

The 5 OU criterion adopted for the proposal can be seen to extend to the east, just over Flatrock Road. There are no receptors in this area and predicted odour impacts are expected to comply with the 5 OU odour criterion.



Legend

- Site boundary
- Odour contour - 50u
- Sensitive receivers
- Odour contour - 20u

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Metres



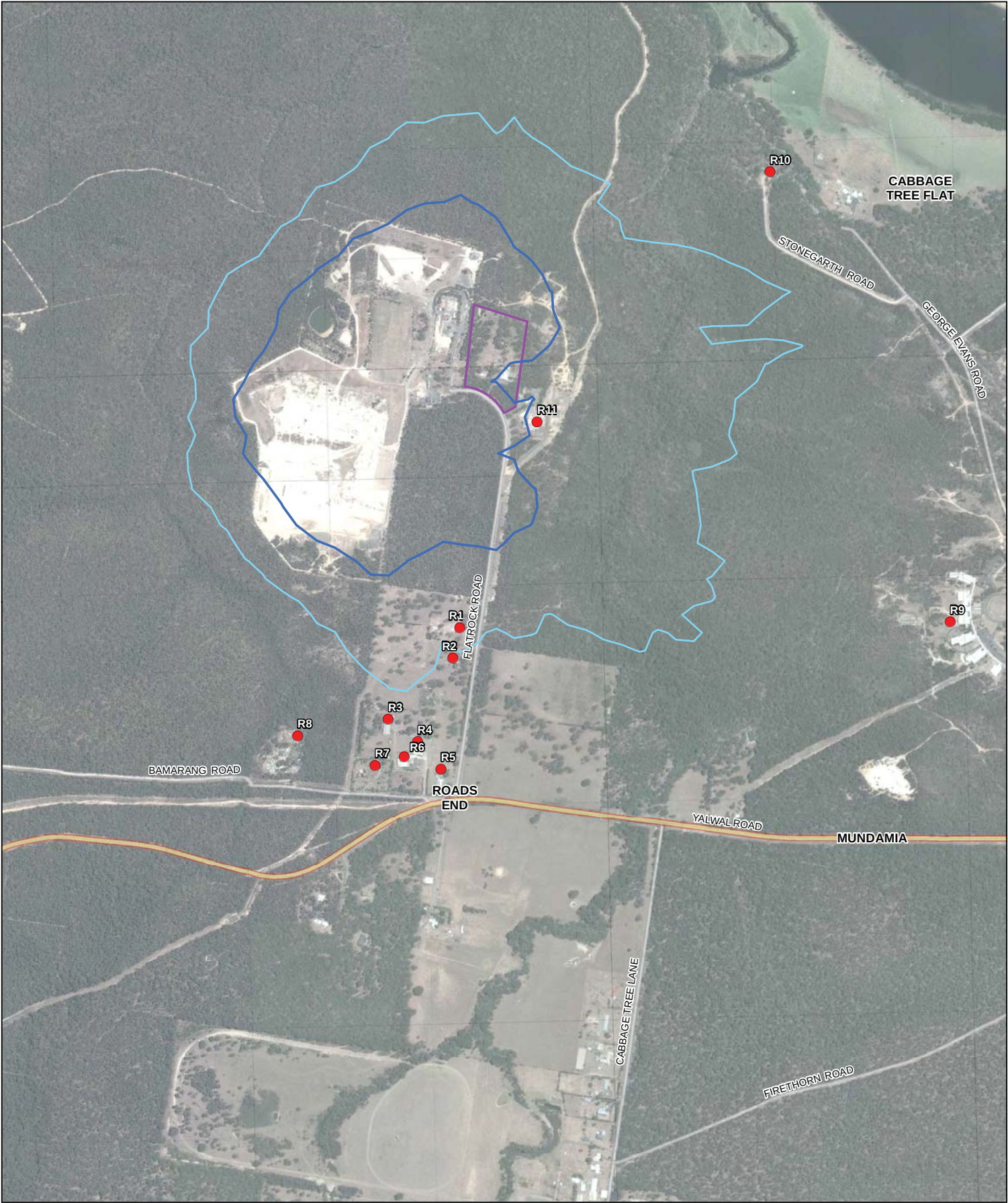
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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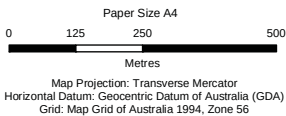
Predicted peak odour impact (99th Percentile, P/M60)
Current landfill

Job Number	21-22855
Revision	0
Date	07 Oct 2015

Figure 9.2



- Legend
- Site boundary
 - Odour contour - 50u
 - Sensitive receivers
 - Odour contour - 20u

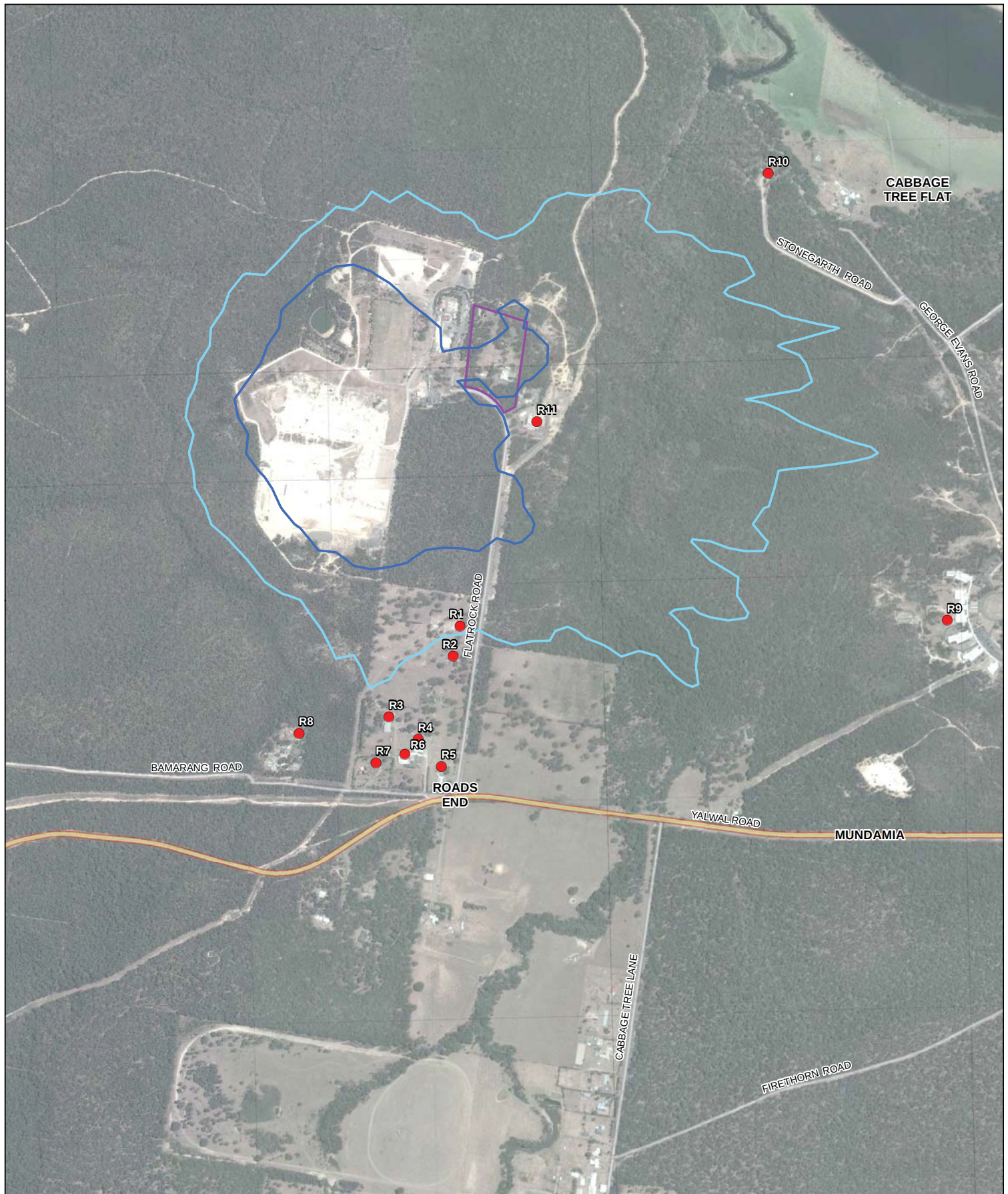


Shoalhaven City Council
West Nowra Resource Recovery Park
Air Quality Assessment

Predicted peak odour impact (99th Percentile, P/M60)
Current landfill and existing green waste operations

Job Number 21-22855
Revision A
Date 07 Oct 2015

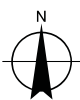
Figure 9.3



Legend

- Site boundary
- Odour contour - 50U
- Sensitive receivers
- Odour contour - 20U

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Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



Shoalhaven City Council
West Nowra Resource Recovery Park
Air Quality Assessment

Predicted peak odour impact (99th Percentile, P/M60)
Current landfill and proposed RRP

Job Number	21-22855
Revision	1
Date	07 Oct 2015

Figure 9.4

Predicted peak impact at discrete receivers

The predicted peak 99th percentile (1-hour average) odour levels were assessed for some of the discrete receptors near the site, as shown in Table 9.8.

The highest predicted concentrations are at 43 Flatrock Road (Receptor R1) which is approximately 700 m from the proposal. The 99th percentile odour level at this receptor is predicted to be 2 OU for the combined future scenario of the proposed RRP and existing landfilling operations. Slightly lower concentrations would be expected at 41 Flatrock Road (Receptor R2), based on the contours shown on Figure 9.4.

No significant odour impacts are predicted as a result of the proposal. Decreases in odour impacts are predicted at 43 Flatrock Road (Receptor R1) and the OEH office (Receptor R11) due to composting of garden organics occurring within the RRP in future rather than outdoors.

Biofilter emissions from the RRP may result in slight increases in odour levels at receptors such as 38A Bamarang Road (Receptor R8) and 56 Stonegarth Road (Receptor R10) however the levels are still well below the criteria, would be characteristic of woody odours rather than composting emissions and would be at a level which cannot generally be detected against background ambient conditions.

Table 9.8 Predicted peak odour impact at receptors (OU)

Residence (Closest resident to West Nowra Recycling and Waste Facility)	OEH Office (R11)	43 Flatrock Rd (R1)	38A Bamarang Rd (R8)	University of Wollongong Shoalhaven Campus (R9)	56 Stonegarth Rd (R10)
Scenario 2 current green waste operations and landfill	5.6	2.3	0.7	1.3	1.1
Scenario 3 proposed RRP and landfill	4.6	2.0	0.8	1.5	1.5
% change	-17.9	-13.0	14.3	15.4	36.4

9.6 Mitigation measures

9.6.1 Odour

Most mitigation measures to reduce odour are already incorporated into the design of the RRP. It is noted however, that there is potential for other sources of fugitive odours to be generated on-site. These odours would generally occur from the biofilter, receipt of waste to the receipt area, and general handling. Management practices to mitigate odour from these sources would include:

- Ensure monitoring and review of the odour control system (biofilter)
- Equipment maintenance and inspection routines
- Periodical air emissions testing
- Supply or storage of critical spare parts for ventilation and odour control system
- Traffic management procedure to co-ordinate the delivery schedule and avoid a queue of the incoming or outgoing trucks outside the area for extended periods of time
- Spill management procedures to ensure immediate clean-up of any spill from the incoming and outgoing of trucks
- Maintaining an odour complaint logbook and in the event of a complaint immediate investigation of any odour sources, together with appropriate actions to eliminate them

- No stockpiling of raw materials for more than a day under normal operating conditions
- Management of stockpiles to facilitate natural ventilation in order to prevent the development of anaerobic zones.

9.6.2 Dust

Construction

Council would require the construction contractor(s) to develop and implement construction environmental management plans (CEMPs) for both stages of the proposal. The use of Council's standard environmental protection measures and some additional project specific controls would be incorporated into the CEMPs.

Proposal-specific controls are proposed to reduce risks to air quality and these are outlined in Table 9.9. These controls are based on GHD experience as well as from EPA (1996) 'Best Practice Environmental Management - Environmental Guidelines for Major Construction Sites'.

Table 9.9 Proposal-specific construction dust controls

Management type	Specific controls
Prevention	Methods for management of emissions would be incorporated into site inductions, training and pre-start talks.
	Prompt remedial strategies, such as watering, would be implemented in the event of visible dust emissions.
	Reduce dust production on site by scheduling work into stages to reduce land disturbance in the planning and design stage, including scheduling installation of control measures for dust prevention, while having regard for seasonal dryness.
	Limit vehicle movements to designated entries and exist, haulage routes and parking areas. Site exits would be fitted with hardstand material or other appropriate measures to limit the amount of material transported off-site (where required).
	Regular sweeping of access roads (including Flat Rock Road) to ensure material is not transported onto the roads around the site.
	Identify dust sources prior to carrying out works in a particular area.
	Keep the areas of land cleared to a minimum, and the period of time areas remain cleared to a minimum.
	Minimise working areas and define haul routes to be used wherever it is necessary for vehicles to traverse unformed roads.
	Rehabilitate cleared areas promptly.
	Locate stockpiles in areas that are protected from wind where possible and/or away from sensitive receptors.
	Ensure plant and machinery is regularly checked and maintained in a proper and efficient condition.
Monitoring	Identify all possible dust sources at the beginning of each day and throughout the day. Sources may include: haul roads, earthworks, windblown dust, general construction and stockpiles.
	Visually monitor dust and where necessary implement controls
Mitigation	The primary method for controlling dust generated by construction and maintenance activities would be the application of water and/or an approved suppression agent, via water.
	The Site Supervisor should determine the frequency of passes and number of water tankers required, based on the following: weather conditions; volume of traffic on exposed or dusty surfaces;

	extent of stripped area; and extent of unprotected areas.
	Plant and machinery would be turned off when not in use and would be fitted with emission control devices complying with Australian Design Standards.

Operation

The following measures are proposed to reduce dust emissions during operation of the proposal:

- Dust suppression – such as covering dusty or fine materials or applying a light water spray and enclosing fixed mechanical equipment used to process the raw and finished materials – would be implemented if required.
- Sealed surfaces would be regularly swept to minimise dust.
- If organic material arrives at the site in an excessively dry state, a water spray truck would be used on the material. Similarly the shredder would have a water mist spray that can be activated to prevent windblown dust.

10. Greenhouse gas

The information presented in this chapter is based on the greenhouse gas assessment undertaken for the proposal by GHD. The full report is included in Appendix D in volume 2 of this EIS.

10.1 Method

A comparative greenhouse gas assessment was undertaken to estimate the change in greenhouse gas emissions between the baseline (i.e. the current waste disposal activities) and the proposed resource recovery activities.

The greenhouse gas assessment was prepared in accordance with the general principles of:

- 'The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition', developed by the World Resource Institute and the World Business Council for Sustainable Development (GHG Protocol)
- The Commonwealth 'National Greenhouse and Energy Reporting (Measurement) Determination 2008'
- The Commonwealth Department of the Environment 'National Greenhouse Accounts (NGA) Factors', December 2014 (DoE, 2014).

These are considered to represent current good practice in Australian greenhouse gas accounting.

10.2 Existing environment

Australia's and New South Wales' total greenhouse gas emissions for 2013 were estimated as 548.6 million tonnes of carbon dioxide equivalent (Mt CO₂-e) and 141.8 Mt CO₂-e respectively. The major emission sources for New South Wales were fuel combustion for stationary energy purposes and fuel combustion for transport purposes.

In 2012, global GHG emissions for Annex 1 Parties to the United Nations Framework Convention on Climate Change were 17 gigatons of carbon dioxide equivalent (Gt CO₂-e) (UNFCCC, 2014).

10.3 Impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only. Construction emissions are likely to be negligible compared with emissions over the life of the proposal and were therefore excluded from the assessment.

10.3.1 Concept Proposal

The difference in greenhouse gas emissions between the proposal (the baseline) and the existing operations was calculated based on emissions from composting, energy usage during operations, transportation of materials from the facility and avoided emissions by diverting waste from landfill.

Scope 1, 2 and 3 emissions for the proposal are summarised in Table 10.1. Emissions were based on the facility operating for 20 years. The full inventory is provided in Appendix D.

Composting emissions were estimated as the major source of additional emissions for the proposal, followed by the transportation of material from the facility and the consumption of

diesel in mobile equipment. These additional emission sources however would be partially offset by the avoided greenhouse gas emissions by diverting waste from landfill.

Table 10.1 Greenhouse gas emissions over the proposal life (20 years)

Emission source	Scope 1 emissions (t CO ₂ -e)	Scope 2 emissions (t CO ₂ -e)	Scope 3 emissions (t CO ₂ -e)	Total emissions (t CO ₂ -e)
Composting	62,400	0	0	62,400
Diesel consumed by mobile plant	6,720	0	507	7,227
Electricity imported from the grid	0	66,226	10,249	76,475
Transportation of compost from site	0	0	899	899
Transportation of construction and demolition material from site	0	0	269	269
Transportation of dry recyclable material from site	0	0	10,561	10,561
Avoided emissions by diverting MSW from landfill	-76,232	0	0	-76,232
Avoided emissions by diverting C&I waste from landfill	-38,647	0	0	-38,647
Avoided emissions by diverting C&D waste from landfill	-2,645	0	0	-2,645
Total	-48,404	66,226	22,486	40,307

Greenhouse gas emissions were estimated to be approximately 40,307 t CO₂-e greater (i.e. an increase in greenhouse gas emissions) than the baseline over a 20 year life (approximately 2,015 t CO₂-e per annum on average). Therefore it is unlikely that the proposal would have any substantial net impact on greenhouse gas emissions associated with waste treatment at the facility.

The difference between the baseline emissions and the proposal is inconsequential compared with Australia's and New South Wales total GHG emissions. In 2013 Australia's greenhouse gas emissions were estimated as 548.6 Mt CO₂-e and New South Wales' greenhouse gas emissions were 141.8 Mt CO₂-e. The small increase in emissions per annum would be approximately 0.028% of New South Wales' total greenhouse gas emissions and 0.007% of Australia's total GHG emissions in 2013.

10.4 Mitigation measures

The following mitigation measures are proposed to reduce potential greenhouse gas emissions from the proposal:

- optimisation of operational activities and logistics to minimise diesel consumption
- use of efficient plant and vehicles
- use of compost and recovered C&D material at the landfill or close to the site where possible to minimise transport of materials

11. Noise

The information presented in this chapter is based on the noise assessment undertaken for the proposal by GHD. The full report is included in Appendix E in volume 2 of this EIS.

11.1 Method

The noise assessment involved the following tasks:

- Identification of noise sensitive receivers
- Background noise monitoring undertaken for one week between 25 January 2013 and 3 February 2014 at two locations considered to be representative of the existing ambient noise environment
- Attended noise monitoring to supplement background noise monitoring and assess existing noise levels
- Establishment of operational and construction noise criteria based on EPA guidelines and the results of noise monitoring
- Assessment of potential construction, operation and traffic noise impacts, by:
 - noise modelling to predict the potential for impacts at sensitive receivers
 - assessing predicted impacts against noise criteria
 - considering relevant EPA guidelines including the 'Interim Construction Noise Guideline' (2009), 'Industrial Noise Policy' (2000), and 'Environmental Criteria for Road Traffic Noise' (1999).
- Development of mitigation and management measures to reduce potential impacts.

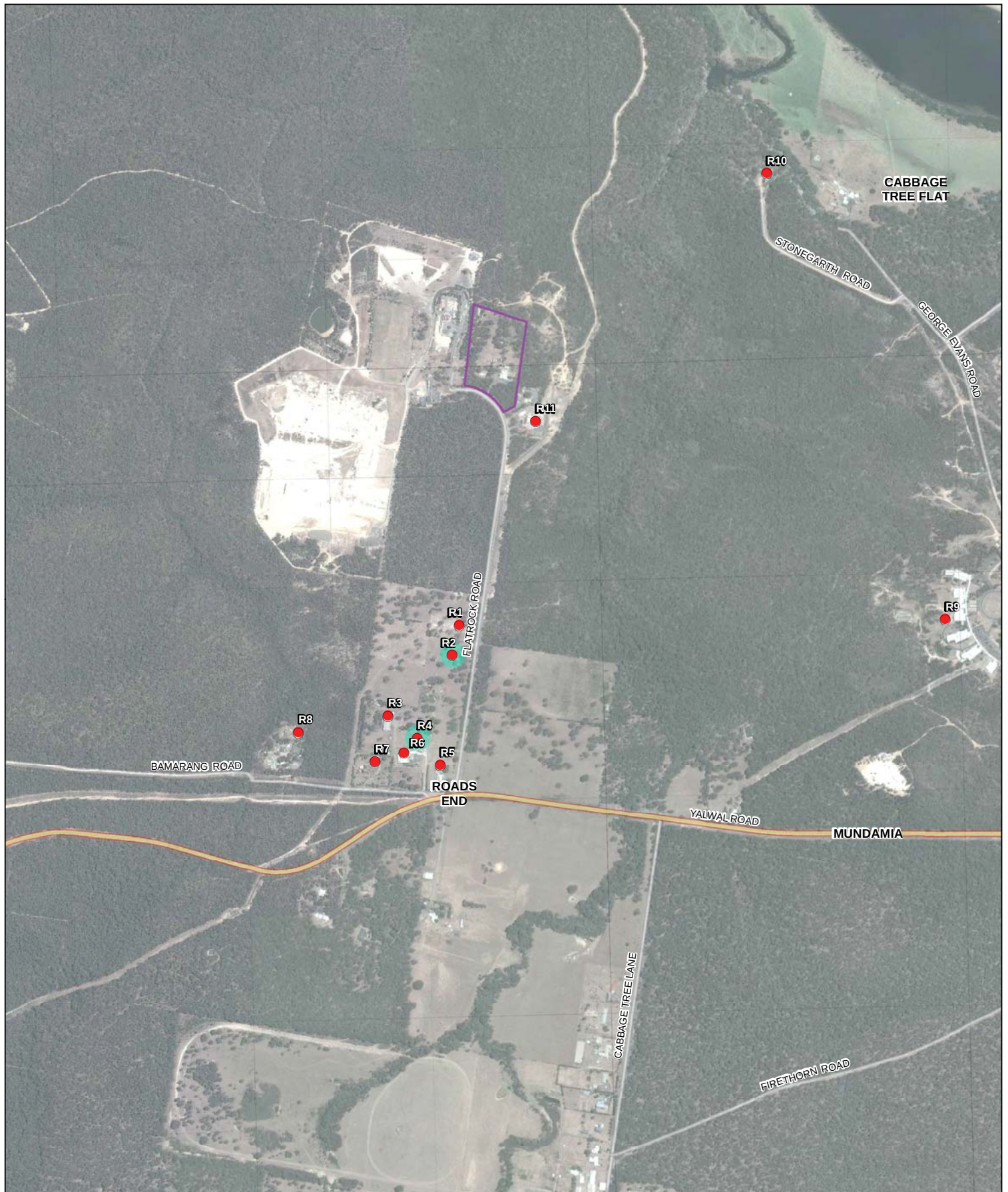
11.2 Existing environment

11.2.1 Noise sensitive receivers

Noise and vibration sensitive receivers are defined based on the type of occupancy and the activities performed in the land use. Sensitive noise and vibration receivers could include both existing and proposed:

- Residences
- Educational institutes
- Hospitals and medical facilities
- Places of worship
- Passive and active recreational areas such as parks, sporting fields and golf courses. Note that these recreational areas are only considered sensitive when they are in use or occupied
- Commercial or industrial premises

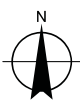
The noise sensitive receivers and land uses near the proposal site are identified in Table 11.1 and shown in Figure 11.1.



LEGEND

- Site boundary
- Noise monitoring location
- Sensitive receivers

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Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



Shoalhaven City Council
West Nowra Resource Recovery Park
noise assessment
Noise monitoring locations
and sensitive receivers

Job Number	21-22855
Revision	0
Date	05 Nov 2015

Figure 11.1

Table 11.1 Sensitive receivers and land uses

Receiver type	Receiver ID	Receiver address
Residential	R1	43 Flatrock Road, Mundamia
	R2	41 Flatrock Road, Mundamia
	R3 to R6	3 Flatrock Road, Mundamia
	R7	18 Bamarang Road, Mundamia
	R8	Jim Da Silva Farm, 38A Old Bamarang Road, Mundamia
	R9	56 Stonegarth Road, Mundamia
Educational	R10	University of Wollongong Shoalhaven Campus

11.2.2 Background noise monitoring results

A summary of calculated background L_{A90} and ambient L_{Aeq} (day, evening and night) noise levels for the monitoring periods are provided in Table 11.2 for each monitoring location.

Table 11.2 Unattended noise monitoring results, dB(A)

Location	Rating background level 90 th percentile $L_{A90(15min)}$			Ambient noise levels, $L_{Aeq(period)}$		
	Day	Evening	Night	Day	Evening	Night
18 Bamarang Road	36.0	36.4	36.8	51.6	56.8	54.3
41 Flatrock Road	38.4	30.9	25.8	49.6	48.9	42.4

The results of noise monitoring indicated the following:

- Noise levels at 18 Bamarang Road were observed to consist of natural ambient noise sources (wind and birds) and noise from the existing landfill. Cicada noise dominated the noise environment in the last two minutes of the measurement. Cicada noise is proposed to explain the higher overall evening and night rating background levels at 18 Bamarang Road.
- Noise levels at 41 Flatrock Road were observed to consist of natural ambient noise sources (wind and birds) and noise from the existing landfill. A bulldozer or compactor from the landfill was clearly audible with occasional reversing beeper sounds.
- Overall, both locations were typical of a rural area dominated by natural noise sources, with relatively constant noise from the landfill facility.

11.2.3 Noise criteria

The *Interim Construction Noise Guideline* provides guidance for assessing and controlling the noise impact from construction sites. This guideline involves the following:

Recommended hours of construction

The recommended standard construction hours are:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- Sundays and public holidays: no work permitted

Construction outside the recommended standard hours

The five categories of works that might be undertaken outside the recommended standard construction hours are:

- Delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- Public infrastructure works that shorten the length of the project and are supported by the affected community
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Noise management goals

People's reaction to noise from construction will depend on the time of day that works are undertaken. Residents are usually most annoyed by work at night-time as it has the potential to disturb sleep.

The management levels for noise at residences are listed below and described in Table 11.3. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level. The rating background level (RBL) is used when determining the management level. The RBL is the overall background noise level measured in each relevant assessment period. The term RBL is described in detail in the 'NSW Industrial Noise Policy' (INP) (DECCW 2000).

Table 11.3 Noise at residences using quantitative assessment, Interim Construction Noise Guideline

Time of day	Management level $L_{Aeq(15min)}$	Explanation and approach
Recommended standard construction hours	Noise affected - RBL plus 10 dB(A)	The noise affected level represents the level above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq(15min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected - 75 dB(A)	The highly noise affected level represents the level above which there may be strong community reaction to noise. Where noise is above this level, the relevant consent, determining or regulatory authority may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) 2. if the community is prepared to accept a longer period of construction in exchange for restrictions

		on construction times.
Outside recommended hours	Noise affected - RBL plus 5 dB(A)	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.

Proposal-specific construction noise goals

Table 11.4 provides proposal-specific noise goals at the surrounding residential receivers during recommended standard hours and outside of the recommended standard hours.

Table 11.4 Proposal-specific construction noise criteria

Receiver	Construction noise management level, $L_{Aeq(15min)}$ dB(A)				
	During standard recommended hours		Outside of standard recommended hours ^{1,2}		
	7 am to 6 pm Monday to Friday, 8 am to 1 pm Saturday, no work on Sunday or public holidays		Day 7 am to 8 am and 1 pm to 6 pm Saturday, 8 am to 6 pm Sunday & Public Holidays	Evening 6 pm to 10 pm Monday to Sunday & Public Holidays	Night 10 pm to 7 am, Monday to Saturday; 10 pm to 8 am Sunday & Public Holidays
	Noise affected	Highly noise affected			
R1 and R2	48	75	43	36	31
R3 to R9	46	75	41	41	41
R10 ³	55	-	55	55	-
R11	70	-	-	-	-

Note 1: When night and evening Rating Background Levels (RBLs) are greater than daytime RBLs, the INP recommends that the daytime RBL be used for assessment purposes.

Note 2: Where RBLs are less than 30 dB(A), the INP recommends that 30 dB(A) be used for assessment purposes.

Note 3: Assuming open windows provide a 10 dB(A) reduction in noise from outside the building to inside the classroom.

Operational noise criteria

The operational noise criteria at the residential receivers surrounding the proposal site are provided in Table 11.5.

Table 11.5 Proposal-specific operational noise criteria

Receiver	Time period	Amenity criteria (acceptable noise level) ^{1,2} $L_{Aeq(period)}$	RBL, $L_{Aeq(15min)}$	Intrusive criteria ⁴ , $L_{Aeq(15min)}$	Proposal specific noise criteria (external)	Sleep disturbance criteria L_{Amax} (external)
R1 and R2	Day	50	38	43	43	45
	Evening	45	31	36	36	45
	Night	40	30 ³	35	35	45
R3 to R9	Day	50	36	41	41	51
	Evening	45	36	41	41	51

Receiver	Time period	Amenity criteria (acceptable noise level) ^{1,2} L _{Aeq(period)}	RBL, L _{Aeq(15min)}	Intrusive criteria ⁴ , L _{Aeq(15min)}	Proposal specific noise criteria (external)	Sleep disturbance criteria L _{Amax} (external)
	Night	40	37	41	40	51
R10 ⁵	Day	45 L _{Aeq(1hr)} (when in use)	-	-	45 L _{Aeq(1hr)} (when in use)	-
R11	Day	65 (when in use)	-	-	65 (when in use)	-

Note 1: With consideration to the INP 'noise amenity area' classification, the residential receivers surrounding the site have been classified as 'rural'.

Note 2: Attended observations during the site visit noted that there were no significant industrial noise sources in the area therefore no adjustments have been applied for the proposal.

Note 3: Where RBLs are less than 30 dB(A), the INP recommends that 30 dB(A) be used for assessment purposes.

Note 4: When night and evening RBLs are greater than daytime RBLs, the INP recommends that the daytime RBL be used for assessment purposes.

Note 5: Assuming open windows provide a 10 dB(A) reduction in noise from outside the building to inside the classroom.

Traffic noise criteria

The 'Environmental Criteria for Road Traffic Noise' (DECCW 1999) provides recommended road traffic noise criteria for various types of road and land use developments.

Roads adjacent to noise sensitive receivers which have daily traffic counts of less than 2000 vehicles per day are classified as local roads. The road traffic noise target levels for local roads are presented in Table 11.6. The target levels would apply to both construction traffic and post-construction operational traffic.

Table 11.6 Proposal-specific traffic noise criteria

Type of development	Day 7 am to 10 pm	Night 10 pm to 7 am
Existing residence affected by additional traffic on local roads generated by land use developments	55 L _{eq(1hr)}	50 L _{eq(1hr)}
School classrooms	Internal noise level 40 L _{Aeq(1hr)} dB(A) (When in use)	-

11.3 Construction impact assessment

11.3.1 Concept Proposal

Noise modelling

Noise modelling was undertaken using CadnaA v4.3 which calculates environmental noise propagation according to 'ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors'.

Noise activities associated with construction are expected to include earth compaction and grading, road works and general construction works. Construction would be limited to standard construction hours.

The typical construction equipment likely to be the main noise sources are shown in Table 11.7 with the corresponding noise level.

Table 11.7 Typical construction equipment noise levels

Construction equipment	Sound power level (dB(A))	Source
Dump truck	117	AS2436 Table A1
Dozer (Liebherr PR754)	113	Manufacturers specification
Excavator	107	AS2436 Table A1
Front end loader	113	AS2436 Table A1
Grader	110	AS2436 Table A1
Roller / compactors	113	AS2436 Table A1
Asphalt Machines	108	AS2436 Table A1
Crane	105	AS2436 Table A1
Forklift	106	AS2436 Table A1

Summary of construction noise modelling results

Predicted construction noise levels at sensitive receivers during standard construction hours are provided in Table 11.8. Differences in the construction noise management levels are indicated in brackets. The results indicate that no residential receiver is predicted to exceed the construction noise management levels.

The noise mitigation measures detailed in Section 11.5 would be implemented where feasible and reasonable and all potentially impacted residents would be informed of the nature of the works, expected noise levels, duration of works and a method of contact to raise noise complaints.

Table 11.8 Predicted construction noise levels, dB(A)

Receiver	Criteria	Predicted level
R1	48	47 (-1)
R2	48	46 (-2)
R3	46	41 (-5)
R4	46	41 (-5)
R5	46	40 (-6)
R6	46	40 (-6)
R7	46	40 (-6)
R8	46	40 (-6)
R9	46	43 (-3)
R10	55	37 (-18)
R11	70	59 (-11)

11.3.2 Stage 1 project

Some of the construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts which showed that no residential receiver is predicted to exceed the construction noise management levels.

11.4 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

11.4.1 Concept Proposal

Acoustic noise modelling of operation noise was undertaken to predict noise emissions as a result of the proposal. Noise modelling assumptions are detailed in Appendix E.

The predicted noise levels for site operations during the day-time and night-time periods are shown in Table 11.9 and

Table 11.10. It is noted that noise sources from the RRP during the night time would be limited to building ventilation and filtration systems. The difference from the operational noise criteria are indicated in brackets. The noise contour plots are shown in Figure 11.2 and Figure 11.3.

Table 11.9 Predicted existing and future day time operational noise levels, dB(A)

Receiver	Noise criteria $L_{Aeq(15min)}$	Predicted existing noise level, general operations $L_{Aeq(15min)}$	Predicted future noise level, general operations $L_{Aeq(15min)}$	Predicted future noise level , concrete crushing machine $L_{Aeq(15min)}$
R1	43	43	43 (0)	43 (0)
R2	43	42	42 (-1)	42 (-1)
R3	41	41	40 (-1)	40 (-1)
R4	41	39	39 (-2)	39 (-2)
R5	41	38	38 (-3)	38 (-3)
R6	41	39	39 (-2)	39 (-2)
R7	41	39	39 (-2)	39 (-2)
R8	41	40	40 (-1)	40 (-1)
R9	41	35	35 (-6)	35 (-6)
R10	45	31	32 (-13)	32 (-13)
R11	70	48	50 (-20)	50 (-20)

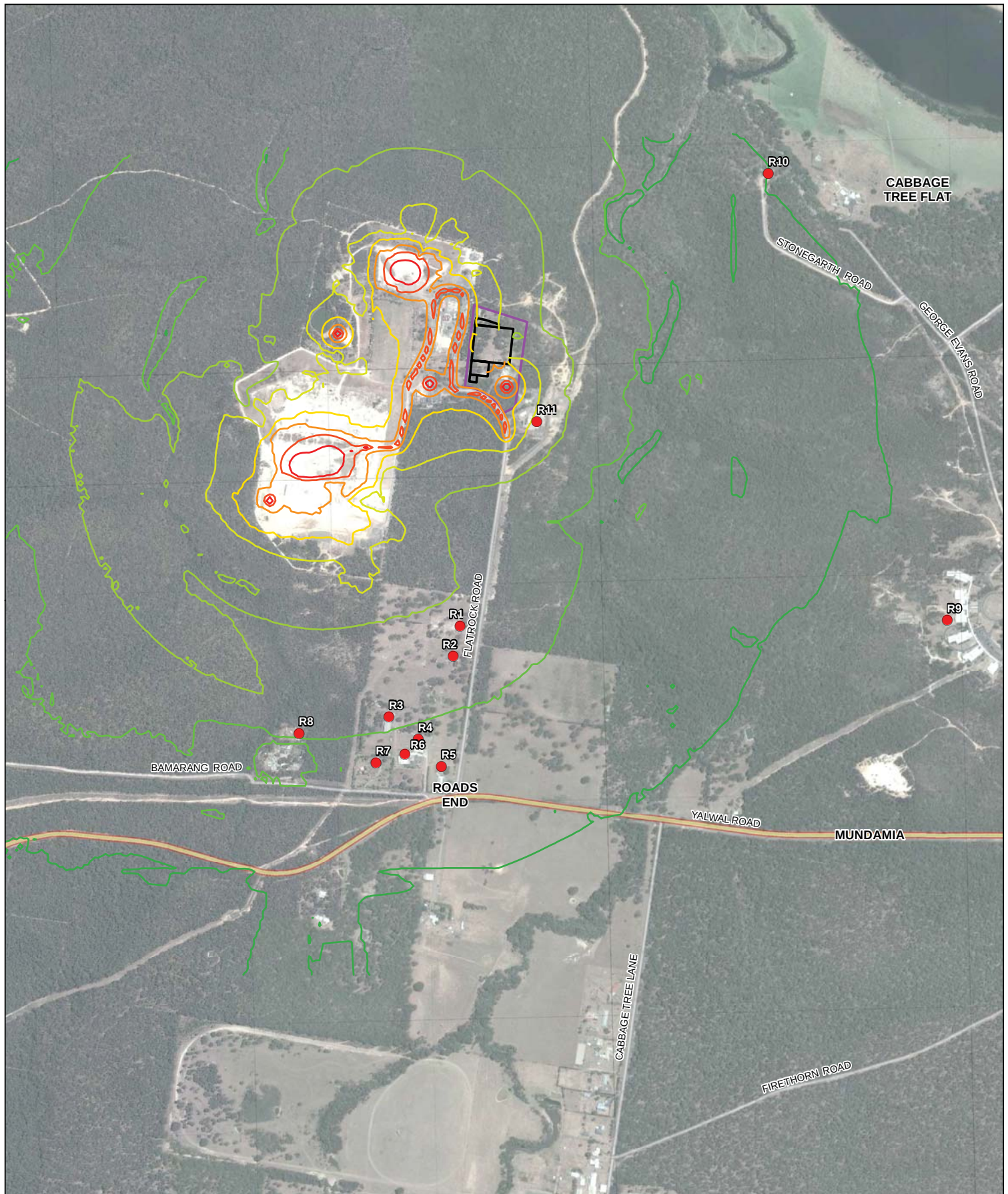
Table 11.10 Predicted existing and future night time operational noise levels. dB(A)

Receiver	Noise criteria $L_{Aeq(15min)}$	Predicted existing noise level, general operations $L_{Aeq(15min)}$	Predicted future noise level, general operations $L_{Aeq(15min)}$
R1	35	26	26 (-9)
R2	35	25	25 (-10)
R3	40	22	23 (-17)
R4	40	22	22 (-18)
R5	40	21	21 (-19)
R6	40	21	21 (-19)
R7	40	21	21 (-19)
R8	40	21	21 (-19)
R9	40	20	16 (-24)
R10	-	-	-
R11	-	-	-

The predicted existing day time noise levels at receiver R2 and receiver R4 are 42 dB(A) and 39 dB(A) respectively. The predicted daytime levels are 4 dB(A) higher than the measured level at receiver R2 and 3 dB(A) higher than the measured level at receiver R4. However, it should be noted that the operational model predicts noise levels assuming worst case 15 minutes of operation where all equipment is running at full power. In reality, equipment is likely to switch on and off according to time of the day and move around the site. In lieu of this, the model results are considered conservative. The results of the noise modelling show that noise levels are predicted to increase by 1 dB(A) at R10 and 2 dB(A) at R11 and would comply with the criteria. Noise levels are not predicted to increase at any other receiver.

The existing night time noise levels at receiver R2 and receiver R4 are 25 dB(A) and 22 dB(A) respectively. The predicted levels at receiver R2 are consistent with the measured overall night time background level of 26 dB(A), indicating that the AGL power generator is the dominant existing night time background noise source in the area. At receiver R4, cicadas and other residential background noise sources are proposed to explain the higher measured night time background noise levels.

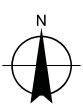
The results show that the increase in operational noise levels associated with the proposal is minimal. The predicted operational noise levels do not exceed the day time or night time operational noise criteria. Sleep disturbance impacts from operational noise are not expected. Hence, specific operational noise mitigation measures would not be required at the RRP.



LEGEND

	Site boundary	Noise Contours (dB(A))		45		60
	Buildings			35		50
	Sensitive receivers			40		65
				55		70

Paper Size A4
0 50 100 200 300 400
Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

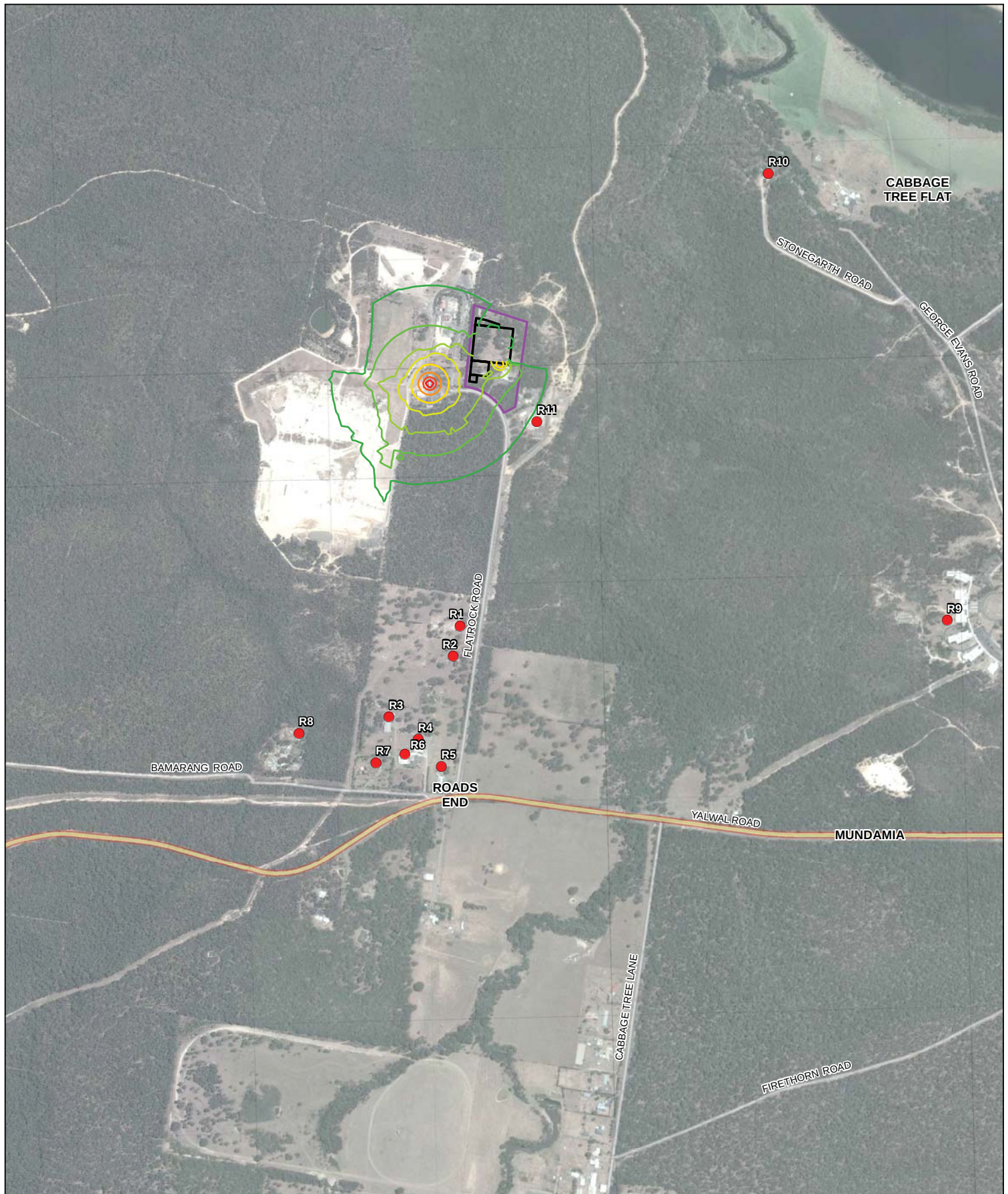


Shoalhaven City Council
West Nowra Resource Recovery Park
noise assessment

LAeq(15min) day time operational
noise contours

Job Number | 21-22855
Revision | 0
Date | 07 Oct 2015

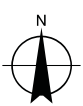
Figure 11.2



LEGEND

	Site boundary	Noise Contours (dB(A))			45		60
	Buildings		35		50		65
	Sensitive receivers		40		55		70

Paper Size A4
0 50 100 200 300 400
Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



Shoalhaven City Council
West Nowra Resource Recovery Park
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Figure 11.3

Operation traffic noise

The growth in traffic due to the proposal (refer Section 12) would not be significant compared with the daily existing vehicle numbers in the area. A significant increase in traffic volumes would be needed in order to increase road traffic noise by 2 dB(A) (a doubling in traffic corresponds to an approximate 3 dB(A) increase). Therefore, road traffic noise due to the proposal is not anticipated to be perceptible in relation to ambient traffic noise.

11.5 Mitigation measures

The following general noise mitigation measures would be implemented to minimise construction noise impacts:

- Engine covers, where fitted, would be kept closed while equipment is operating
- As far as possible, materials dropping heights into or out of trucks would be minimised
- Vehicles would be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes would be eliminated, where practicable.
- Machines found to produce excessive noise compared to industry best practice would be removed from the site or stood down until repairs or modifications can be made
- To reduce the annoyance associated with reversing alarms, broadband reversing alarms (audible movement alarms) would be used for all site equipment. Satisfactory compliance with occupational health and safety requirements would need to be achieved and a safety risk assessment may need to be undertaken to determine that safety is not compromised. Refer to Appendix C of the ICNG (2009) for more information.
- All equipment would be selected to minimise noise emissions. Equipment would be fitted with appropriate silencers and be in good working order. Machines found to produce excessive noise compared to normal industry expectations would be removed from the site or stood down until repairs or modifications can be made.
- Noise monitors would be used along the site boundaries.
- Temporary hardstand areas would be used.

Work ethics

All construction site workers would be sensitised to the potential for noise impacts on local residents and encouraged to take practical and reasonable measures to minimise the impact during the course of their activities. This would include:

- Avoiding the use of loud radios
- Avoiding shouting and slamming doors
- Where practical, machines would be operated at low speed or power and switched off when not being used rather than left idling for prolonged periods
- Keeping truck drivers informed of designated vehicle routes, parking locations and delivery hours
- Minimising reversing
- Avoiding dropping materials from height and avoid metal to metal contact on material
- Engine covers, where fitted, would be kept closed while equipment is operating.

Community relations

The following community relation measures would be implemented:

- The contractor would establish contact with residents affected by construction noise and communicate the construction program and progress on a regular basis, particularly when noisy or vibration generating activities are planned. Communication with the local community would be maintained throughout the construction period.
- The construction contractor would provide a community liaison phone number and permanent site contact so that noise complaints can be received and addressed in a timely manner
- Upon receipt of a noise complaint, monitoring would be undertaken and reported as soon as possible. If exceedances are detected, the situation would be reviewed in order to identify means to attempt to reduce the impact to acceptable levels.

12. Traffic and transport

The information presented in this chapter is based on the traffic impact assessment undertaken for the proposal by GHD. The full report is included in Appendix F in volume 2 of this EIS.

12.1 Method

The assessment of potential traffic and transport impacts included:

- Review of existing road features, adjacent developments, traffic volumes, sight distances and crash data
- Review of additional traffic generated as a result of the proposal
- An assessment of the performance of the existing intersections (queues, delays, level of service, safety).

12.2 Existing environment

12.2.1 Existing road network conditions

Flatrock Road, Mundamia (West Nowra)

Flatrock Road, West Nowra functions as a local road. It is a 'no through road' approximately 1 km in length that runs north from Yalwah Road, approximately 500 m to the west of Cabbage Tree Lane. Flatrock Road has the following characteristics:

- two-way sealed carriageway approximately 6.5 m wide
- no road marking or sealed shoulders
- signposted speed limit of 80 km/h
- carries approximately 645 vehicles per day (based on tube counts undertaken for Council in 2009).

Yalwah Road, Nowra

Yalwah Road functions as a collector road and connects West Nowra to Danjera Dam which is located 25 km to the west of West Nowra. In the vicinity of Flatrock Road, Yalwah Road has the following characteristics:

- sign-posted speed limit of 100 km/h (west of George Evans Road)
- two-way sealed road approximately 8 metres wide, with one lane in each direction
- road marked centreline
- carries approximately 5,720 vehicles per day near Albatross Road reducing to 1,330 vehicles per day east of Flatrock Road (based on tube counts undertaken for Council in 2009).

Albatross Road, Nowra

Albatross Road functions as a collector road which connects Nowra from Kalandar Street through to the Nowra Airport which is located 8 km south-west of Nowra.

Between Kalandar Street and Yalwal Road, Albatross Road has the following characteristics:

- sign-posted speed limit of 60 km/h

- two-way sealed road approximately 11 m wide with one lane in each direction
- unrestricted on street parking between Maclean Street and Kalandar Street
- footpaths on the western side between Yalwal Road and Kalandar Street
- Albatross Road in the vicinity of Kalandar Street carries approximately 9,410 vehicles per day (based on tube counts undertaken for Council in 2009).

Kalandar Street

Kalandar Street functions as a collector road that provides a connection between the Princes Highway and Albatross Road.

Kalandar Street has the following characteristics:

- two-way sealed road, approximately 10 metres wide with one lane in each direction;
- the signposted speed limit on Kalandar Street is 60 km/h;
- carries approximately 6,950 vehicles per day (based on tube counts undertaken for Council in 2009).

Princes Highway, Nowra

The Princes Highway is a major arterial road with regional significance, extending from Sydney to Port Augusta, South Australia generally following the coastline through the states of New South Wales, Victoria and South Australia. As the Princes Highway passes through Nowra it is also known as East Street to the north and Hollands Road to the south of Kalandar Street.

In the vicinity of Kalandar Street, the Princes Highway has the following characteristics:

- carriageway width of approximately 14 metres with two lanes in each direction
- sign-posted speed limit of 70 km/h
- footpaths on the eastern side
- carries approximately 30,000 vehicles per day (based on tube counts undertaken for Council in 2009).

12.2.2 Existing daily and peak hour traffic

Council provided GHD with intersection turning movement counts undertaken on 16 October 2008 and tube surveys carried out in March 2009. In 2013, an EIS was prepared for a similar development but of smaller throughput, on an adjacent site (which did not proceed). Traffic studies undertaken for this project have been updated for the current proposal.

In 2013 when the initial traffic study was being undertaken Council advised that extensive road works were being undertaken along the Princes Highway. As such it was not appropriate to have traffic surveys undertaken. In discussion with Council's Transport Engineer in a telephone conversation on 24 September 2013 it was agreed that it would be appropriate to apply a 2% annual growth rate to the 2008 and 2009 traffic data in order to derive 2014 traffic volumes.

GHD discussed with Council the possibility of obtaining new traffic surveys now that road works in the area have been completed. Council advised to make the same assumptions used for the previous assessment.

Table 12.1 provides the estimated 2014 traffic volumes derived from the 2% annual growth rate.

Table 12.1 Estimated 2014 traffic volumes (adjusted for natural traffic growth)

Location	AM Peak Hour (8 am -9 am) (vph)**	PM Peak Hour (4 pm – 5 pm) (vph)**	Daily (vpd)***
Flatrock Road	52	80	712
Yalwah Road (near Albatross)	649	630	6,315
Albatross Road	841	1,060	10,060*
Kalandar Street	757	893	7,673
Princes Highway	3,102	3,469	34,690*

Notes:

1. * the daily traffic volume for these roads has been estimated based on the assumption that the peak hour traffic flow is approximately 10% of the daily traffic volume.

2. 2014 traffic volumes pro-rated from measured 2008/2009 data using a 2% annual growth factor

3. (vph)** = vehicles per hour.

4. (vpd)*** = vehicles per day.

In November 2014 Council requested an intersection traffic survey be undertaken for the intersection of Flatrock Road and Yalwah Road. Table 12.3 provides a summary of the volumes from this traffic survey.

Table 12.2 Actual traffic volumes – 2014 – surveyed November 2014

Location	AM Peak Hour (8 am - 9 am) (vph)	PM Peak Hour (4 pm – 5 pm) (vph)
Flatrock Road	46	59
Yalwah Road (east of Flatrock)	110	113

This more recently obtained traffic survey has been used for the intersection modelling of Flatrock Road / Yalwah Road.

Table 12.3 provides an understanding of the heavy vehicle ratio for the surveyed intersections.

Table 12.3 Heavy vehicles – volumes and proportion – 2014

Location	Vehicles per hour (vph)	HCV* (vph)	HCV* %
Flatrock Road	59	5	8 %
Yalwah Road	649	19	3 %
Albatross Road	1,060	27	3 %
Kalandar Street	893	25	3 %
Princes Highway	3,469	276	8 %

Note: * HCV – heavy commercial vehicles

12.2.3 Existing intersection performance

The performance of the existing road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network.

The 2014 traffic flows were analysed using SIDRA to obtain the current operation of this key intersection. The results of the 2014 SIDRA assessment is summarised in Table 12.4. This indicates that the intersections of Flatrock Road/Yalwah Road, Yalwah Road/Albatross Road and Albatross Road /Kalandar Street currently operate satisfactorily in both the AM and PM peaks in 2014 under existing traffic conditions. The intersection of Kalandar Street and Princes

Highway currently operates over capacity at LoS F in both the AM and PM peaks under existing operating conditions.

Table 12.4 Existing intersection performance (2014)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.02	9	A	Stop Control	0.03
Yalwah Road / Albatross Rd	17	B	Give Way Control	0.35	38	C	Give Way Control	0.6
Albatross Rd / Kalandar Street	33	C	Roundabout	0.83	20	B	Roundabout	0.82
Kalandar St / Princes Highway	92	F	Signals	1.07	151	F	Signals	1.22

Notes:

1. * Average delay is given in seconds per vehicle.

2. ** LoS = Level of Service

12.2.4 Traffic growth

Council's SLEP 2014 indicates that there are two planned urban release areas proposed within the study area, which would both be accessed via Yalwah Road. In order to account for the potential traffic generation associated with these future developments, a growth rate of 2% (as discussed with Council's Transport Engineer on 24 September 2013) has been applied to the 2014 traffic volumes to calculate the opening year and the horizon year traffic volumes for the 2017 and 2027 'base' traffic conditions.

2016

The intersections have been analysed for the year 2016 to provide a comparison for the construction impact. Table 12.5 provides an understanding of the operation of the intersections in 2016 without the construction traffic.

Table 12.5 Intersection performance with background growth (2016)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.02	9	A	Stop Control	0.03
Yalwah Road / Albatross Rd	18	B	Give Way Control	0.37	45	D	Give Way Control	0.68
Albatross Rd / Kalandar Street	47	D	Roundabout	0.91	24	B	Roundabout	0.87
Kalandar St / Princes Highway	85	F	Signals	0.99	175	F	Signals	1.20

Note:

1.* Average delay is given in seconds per vehicle.

2.**LoS (Level of Service)

2017

Table 12.6 provides an understanding of the intersection capacities for the horizon year 2017 without the RRP, but including the 2% background growth rate.

Table 12.6 Intersection performance with background growth (2017)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.04	9	A	Stop Control	0.06
Yalwah Road / Albatross Rd	12	A	Give Way Control	0.4	25	B	Give Way Control	0.7
Albatross Rd / Kalandar Street	59	E	Roundabout	0.99	28	B	Roundabout	0.9
Kalandar St / Princes Highway	87	F	Signals	0.99	165	F	Signals	1.2

Note: * Average delay is given in seconds per vehicle.

Table 12.6 indicates that Flatrock Road / Yalwah Road and Yalwah Road / Albatross Road intersections continue to operate satisfactorily in 2017 under the current intersection control arrangements, without the proposal. Albatross Road / Kalandar Street intersection operates satisfactorily in the PM peak but is near to capacity in the AM peak. The intersection of Kalandar Street / Princes Highway would be operating over capacity under the 2017 'base' traffic conditions.

2027

Table 12.7 provides an understanding of the intersection capacities for the horizon year 2027 without the RRP, but including the 2% background growth rate.

Table 12.7 Intersection performance with background growth (2027)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.05	9	A	Stop Control	0.08
Yalwah Road / Albatross Rd	14	A	Give Way Control	0.5	876	F	Give Way Control	1.9
Albatross Rd / Kalandar Street	414	F	Roundabout	1.43	240	F	Roundabout	1.24

Kalandar St / Princes Highway	211	F	Signals	1.20	335	F	Signals	1.50
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Note: * Average delay is given in seconds per vehicle.

Table 12.7 indicates that the only intersection to continue to operate satisfactorily in 2027 under the current intersection control arrangements, without the proposal, is Flatrock Road / Yalwah Road. The remaining intersections would all be operating over capacity under the 2027 'base' traffic conditions. This indicates that upgrading of these intersections would be required as part of any future planned urban release areas within the study area in order to maintain satisfactory conditions.

12.2.5 Road safety

Review of the crash history for the surrounding roads indicated that generally crashes were spread along the route and not concentrated in one particular area with exception to the intersection of Kalandar Street / Princes Highway. Concentrated recorded crashes at this intersection could be a result of high traffic volumes and an intersection operating at and over capacity.

12.3 Construction impact assessment

12.3.1 Concept Proposal

Projected traffic generation during construction

The construction workforce is likely to range from about five to 10 workers during the demolition/site clearance and earthworks phase (Stage 1) and peak at 25 workers, when major concrete pours are occurring (part of Stage 2). There is expected to be 10 to 15 workers on site on average for the duration of construction works.

The largest construction activity would be the pouring of the concrete slabs for the buildings (part of Stage 2). There is 11,000 m² of floor slab area (about 100 m by 110 m), therefore it is estimated that a maximum of around 20 concrete trucks would be required on the busiest days when three sections are being poured. This would most likely occur on the same days that there would be up to 25 workers on site.

Table 12.8 provides the expected number of light and heavy vehicles per day during construction. For this assessment it has been assumed that each worker would arrive at the site by private car.

Table 12.8 Traffic generation during construction

Activity	In (vpd)*	Out (vpd)*
Material transportation to site		
Heavy vehicles	20	20
Construction workers		
Light vehicles	25	25
TOTAL vehicles (vpd)	45	45

*(vpd) = vehicles per day

It is assumed that construction workers would arrive and depart based on the construction hours. It is also assumed that vehicles associated with the transportation of materials would be spread throughout the day. To assess the peak hour trips, it has been assumed for a worst case scenario that 20 percent of the trucks transporting materials would arrive and depart in the peak hour and that construction workers would arrive in the AM peak and depart in the PM peak. A

summary of the expected peak hour and daily traffic movements to/from the site is shown in Table 12.9.

Table 12.9 Proposed additional vehicle movements

Vehicles	AM Peak (vtph)**		PM Peak (vtph)**		Daily (vtpd)*	
	In	Out	In	Out	In	Out
Construction workers	25	0	0	25	25	25
Transportation of construction materials	4	4	4	4	20	20
TOTAL	29	4	4	29	45	45

*(vtpd) = vehicle trips per day

** (vtph) = vehicle trips per hour

Intersection performance

Proposed traffic flows at the existing intersections were analysed using SIDRA to identify the performance of key intersections. Table 12.10 provides an understanding of the intersection operation during the peak construction stage.

Detailed outputs from the SIDRA intersection modelling are provided in Appendix F.

Table 12.10 Proposed intersection operations – construction stage - 2016

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	10	A	Stop Control	0.02	9	A	Stop Control	0.05
Yalwah Road / Albatross Rd	19	B	Give Way Control	0.38	48	D	Give Way Control	0.725
Albatross Rd / Kalendar Street	61	E	Round-about	0.991	28	B	Round-about	0.91
Kalendar St / Princes Highway	140	F	Signals	1.17	180	F	Signals	1.20

Note:

1.* Average delay is given in seconds per vehicle.

2.**LoS (Level of Service)

Table 12.10 indicates that during construction of the proposal the intersections of Flatrock Road / Yalwah Road and Yalwah Road / Albatross Road would continue to operate satisfactorily. The intersection of Albatross Road / Kalendar Street would operate satisfactorily in the PM peak but would be near to capacity in the AM peak. The intersection of Kalendar Street / Princes Highway would operate over capacity with or without construction vehicles (refer Table 12.5).

12.3.2 Stage 1 project

Some of construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts.

12.4 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

12.4.1 Concept Proposal

Projected traffic generation

The projected traffic generation for the proposal for a ten year horizon is outlined in Table 12.11.

It is assumed that staff would arrive and depart based on the proposed operating hours (8 am to 5 pm, 7 days a week). It is assumed that vehicles associated with incoming waste and outgoing product would spread throughout the day. To assess the peak hour trips a worst case scenario was assumed for the incoming waste and outgoing product that 20% may arrive and depart in the peak hour as shown in Table 12.11.

Table 12.11 Proposed additional vehicle movements (2017)

Vehicles	AM Peak (vtph)**		PM Peak (vtph)**		Daily (vtpd)*	
	In	Out	In	Out	In	Out
Staff (light vehicles)	30	0	0	30	30	30
Incoming Waste / Outgoing Product (light vehicles)	3	3	3	3	14	14
Incoming Waste / Outgoing Product (heavy vehicles)	3	3	3	3	13	13
TOTAL	36	6	6	36	57	57

(vtpd)* = vehicle trips per day

(vtph)** = vehicle trips per hour

Table 12.12 outlines the expected increase in vehicles associated with incoming waste and outgoing product for the horizon year 2027.

Table 12.12 Proposed additional vehicle movements (2027)

Vehicles	AM Peak (vtph)**		PM Peak (vtph)**		Daily (vtpd)*	
	In	Out	In	Out	In	Out
Staff (light vehicles)	30	0	0	30	30	30
Incoming Waste / Outgoing Product (light vehicles)	10	10	10	10	51	51
Incoming Waste / Outgoing Product (heavy vehicles)	4	4	4	4	21	21
TOTAL	44	14	14	44	102	102

(vtpd)* = vehicle trips per day

(vtph)** = vehicle trips per hour

In 2017 it is expected that the proposal would generate an additional 57 vehicles per day as shown in Table 12.11. To provide an understanding of the impact this has on the existing roads, Table 12.13 shows the percentage increase on each road as a result of the proposal.

Table 12.13 Proposed traffic increase (2017)

Location	Existing (vpd)	Existing + the proposal	% Increase
Flatrock Road	741	855	15
Yalwah Road (east of Flatrock)	1,557	1,671	7
Yalwah Road (near Albatross)	6,570	6,684	2
Albatross Road	10,466	10,580	1
Kalandar Street	7,983	8,097	1.4
Princes Highway	36,091	36,205	0.3

Intersection performance

Proposed traffic flows at the existing intersections were analysed using SIDRA to obtain the proposed operation of key intersections.

Table 12.14 provides an understanding of the intersection operation in 2017 when the proposal is operational.

Table 12.14 Proposed intersection operations (2017)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.02	11	A	Stop Control	0.06
Yalwah Road / Albatross Rd	19	B	Give Way Control	0.40	52	D	Give Way Control	0.8
Albatross Rd / Kalandar Street	85	F	Roundabout	1.04	34	C	Roundabout	0.94
Kalandar St / Princes Highway	88	F	Signals	1.02	192	F	Signals	1.23

Notes:

1.* Average delay is given in seconds per vehicle.

2.**LoS (Level of Service)

Table 12.14 indicates that including traffic associated with the RRP, the intersections of Flatrock Road / Yalwah Road and Yalwah Road / Albatross Road would continue to operate satisfactorily.

The intersection of Albatross Road / Kalandar Street is operating at LoS F in the AM peak, this intersection was operating near to capacity under 2017 'base' traffic conditions therefore any additional traffic has placed it at capacity. The intersection of Kalandar Street and Princes Highway would continue to operate with an unacceptable LoS F during both the AM and PM peak hours as it does currently under 2017 'base' traffic conditions.

Table 12.15 provides an understanding of how the surrounding intersections would operate under the ten year horizon (2027).

Table 12.15 Proposed Intersection Operations (2027)

Intersection	AM Peak				PM Peak			
	Average Delay*	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Flatrock Road / Yalwah Road	9	A	Stop Control	0.04	9	A	Stop Control	0.07
Yalwah Road / Albatross Rd	20	B	Give Way Control	0.17	114	F	Give Way Control	0.8
Albatross Rd / Kalandar Street	505	F	Roundabout	1.51	505	F	Roundabout	1.29
Kalandar St / Princes Highway	243	F	Signals	1.23	347	F	Signals	1.51

Notes:

1.* Average delay is given in seconds per vehicle.

2.**LoS (Level of Service)

Table 12.15 indicates that with predicted background traffic growth and traffic associated with the RRP the intersection of Flatrock Road / Yalwah Road would continue to operate satisfactorily in 2027 under the current intersection control arrangements.

The remaining intersections would all be operating over capacity in 2027. Table 12.7 shows these intersections, except for Flatrock and Yalwah Roads, would be operating over capacity at LoS F, under 2027 'base' traffic conditions and not as a result of the proposal.

Council has confirmed that there are plans in the future to upgrade the intersection of Albatross Road and Yalwal Road, once the new land releases are approved.

Preliminary investigations indicate that the intersection of Albatross Road / Kalandar Street would operate satisfactorily if the roundabout was upgraded to accommodate additional lanes. These intersection arrangements would need to be investigated further as part of other studies of the land release projects.

A warrant assessment has been undertaken at the intersection of Flatrock Road/Yalwah Road. It was determined that a basic intersection treatment is suitable for the intersection of Flatrock Road and Yalwah Road. This intersection layout is currently a basic intersection layout. However it is noted that the existing intersection does not provide the required widened shoulder on Yalwah Road. This however is considered an existing condition that should be improved regardless of the proposal.

On its own, the proposal would not adversely impact on the current amenity, road safety and operating performance of the surrounding road network.

Parking and access

The existing access to the site would be retained as an access to car parking and the office. A new heavy vehicles site access would be provided to the south directly from Flatrock Road which provides access through the weighbridges as shown in Figure 12.1.

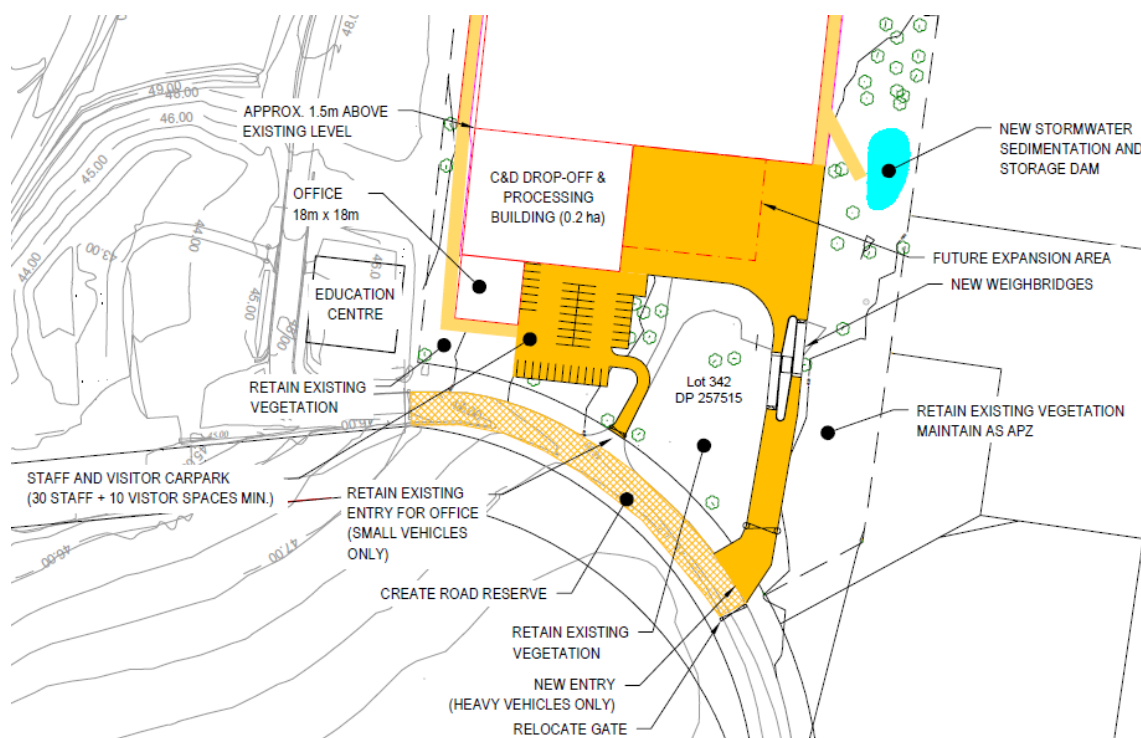


Figure 12.1 Site access and parking arrangements

A 40 space car park consisting of 30 staff and 10 visitor parking spaces is proposed to be provided on the western side of the site, the carpark would be designed in accordance with AS 2890.2 *Off street parking*.

12.5 Mitigation measures

12.5.1 Construction

A Construction Traffic Management Plan (CTMP) would be prepared to include the management and timing of heavy vehicles through West Nowra.

The CTMP would address the timing of trucks accessing the site to ensure there is sufficient room within the site to accommodate the vehicles.

12.5.2 Operation

Intersection improvements are required to accommodate predicted background traffic growth associated with the proposed land release areas accessed via Yalwah Road. It is noted that Council's Planning section has plans to upgrade the intersection of Yalwah Road / Albatross Road as part of future land release projects currently expected to occur in the next 5-10 years.

13. Flora and fauna

The information presented in this chapter is based on the flora and fauna assessment undertaken for the proposal by Council. The full report is included in Appendix G in volume 2 of this EIS.

13.1 Method

A biodiversity assessment was undertaken to identify the potential impacts of the proposal on the biodiversity values using the Framework for Biodiversity Assessment (FBA) (OEH 2014). This included:

- Desktop assessment to describe the existing environment and landscape features of the study area and to identify the suite of threatened biota potentially affected by the proposal.
- Field survey to describe the biodiversity values of the proposal footprint and surrounding study area and determine the likelihood of threatened biota and their habitats occurring in the proposal footprint or being affected by the proposal.
- FBA calculations using the credit calculator to quantify the biodiversity impacts of the proposal and to determine the biodiversity credits that would be required to offset these impacts.

13.2 Existing environment

The site is within the Sydney Basin bioregion and the Ettrema IBRA subregion. It is within the Mitchell landscape; Nowra – Durras Coastal Slopes.

There are no rivers or streams within or immediately adjoining the site. It is located within the catchment of and approximately 400 to 500 m from Cabbage Tree Creek which flows into the Shoalhaven River approximately 1.5 km to the north.

There are no SEPP14 Wetlands within 10 km of the site, nor are there any other important wetlands and local wetlands adjacent to or downstream of the site.

The site is a total of 3.58 ha in area of which 1.23 ha is currently cleared/developed. The site contains 2.35 ha of remnant native vegetation.

Only one plant community type (PCT) was identified within the site: Red Bloodwood – Hard-leaved Scribbly Gum – Silvertop Ash heathy open forest on sandstone plateaux of the lower Shoalhaven Valley, Sydney Basin Bioregion (Veg type Code SR594). This is not a vegetation community listed as an EEC (OEH 2013).

The vegetation class is identified as Dry Sclerophyll Forest (shrubby sub-formation) – Sydney Dry Sclerophyll Forests.

13.3 Construction impact assessment

13.3.1 Concept proposal

Vegetation removal

The proposal would remove up to 2.35 ha of native vegetation. This vegetation contains 15 identified hollow-bearing trees with a highly degraded and fragmented understory and ground cover layers.

Threatened species

A number of threatened species were identified as requiring survey or and assessment through:

- The Biobank calculator
- The SEARs
- Previous recent biodiversity surveys on the site.

The following table provides results of survey efforts and assessment for the identified threatened flora species including:

- *Pterostylis vernalis*
- Albatross Mallee (*Eucalyptus langleyi*)
- Bynoe's Wattle (*Acacia bynoeana*)
- Deane's paperbark (*Melaleuca deanei*)
- Ettrema malle (*Eucalyptus sturgissiana*)
- *Hibbertia puberula*
- *Hibbertia stricta* subsp. *furcatula*
- Tangled bedstraw (*Galium australe*)
- Nowra heath myrtle (*Triplarina nowraensis*)
- Bauer's Midge Orchid (*Genoplesium baueri*)
- Leafless Tongue Orchid (*Cryptostylis hunteriana*)
- *Pterostylis ventricosa*
- Pretty Beard Orchid (*Calochilus pulchellus*)

Table 13.1 Assessment of threatened flora species

Species	Assessment
<i>Pterostylis vernalis</i>	No <i>Pterostylis vernalis</i> were detected and no suitable habitat exists on the subject site. No direct or indirect impacts are likely.
Albatross Mallee (<i>Eucalyptus langleyi</i>)	Vegetation on the subject site is from the Dry Sclerophyll Forests class (Keith, 2004) as opposed to the mallee shrubland habitat required for the species. The 15 September 2015 targeted survey did not detect the species. No suitable habitat as described in the species profile was found on the subject site. The species would not be directly or indirectly impacted by the proposal.
Bynoe's Wattle (<i>Acacia bynoeana</i>)	Potential habitat is found on the subject site, although the site has been heavily disturbed and degraded. Based on the species not being detected during the 15 September 2015 survey, it is unlikely Bynoe's Wattle occurs on the site and viable local populations of the species would not be directly or indirectly impacted by the proposal.
Deane's paperbark (<i>Melaleuca deanei</i>)	No suitable habitat was observed and Deane's Paperbark was not detected during the survey. It is unlikely the species would be directly or indirectly impacted based on these findings.
Ettrema malle (<i>Eucalyptus sturgissiana</i>)	Vegetation on the subject site is from the Dry Sclerophyll Forests class (Keith, 2004) as opposed to low shrub-heath on sandy swampy soils recognised as habitat for the species. The 15 September 2015 targeted survey did not detect the species. With no suitable habitat found on the site, the species would not be directly or indirectly impacted by the proposal.
<i>Hibbertia puberula</i>	No <i>Hibbertia puberula</i> plants were detected despite targeted

Species	Assessment
	surveys during appropriate season.
<i>Hibbertia stricta</i> subsp. <i>furcatula</i>	No <i>Hibbertia stricta</i> subsp. <i>furcatula</i> plants were detected. Given the disturbance history of the subject site and its current condition, and the lack of <i>Hibbertia</i> species detected, it is unlikely the species and the local population would be directly impacted by the proposal. With impacts being contained within the site there are unlikely to be indirect impacts affecting the species.
Tangled bedstraw (<i>Galium australe</i>)	Tangled Bedstraw was not detected during the survey with no suitable habitat observed. In the absence of the species and habitat it is unlikely the species would be directly or indirectly impacted by the proposal.
Nowra heath myrtle (<i>Triplarina nowraensis</i>)	A depression with signs of recent standing water along the western boundary and the areas around the three dams was assessed on the site to provide potential but marginal habitat for <i>Triplarina nowraensis</i> . However given the species was not detected on the site, and the known population (approximately 300 m away), would not be directly or indirectly affected by the proposal then no impacts are likely.
Bauer's Midge Orchid (<i>Genoplesium baueri</i>)	The site did not appear to provide suitable habitat (no moss gardens over sandstone and the dry sclerophyll forest on the site is heavily disturbed and modified, particularly in the mid-storey and groundcover layers). No <i>Genoplesium baueri</i> plants were detected and in the absence of habitat or a local population on the site no direct or indirect impacts to the species are likely.
Leafless Tongue Orchid (<i>Cryptostylis hunteriana</i>)	Targeted surveys were conducted on site in December 2014. No <i>C. hunteriana</i> were detected at this site, although two other non-threatened species, <i>C. erecta</i> and <i>C. subulata</i> were recorded. Targeted surveys for <i>C. hunteriana</i> have previously (December 2013) been conducted on land (within 500 m) directly opposite and south of the site in land also assessed as potential habitat. Three species of non-threatened <i>Cryptostylis</i> (<i>C. erecta</i> , <i>C. leptochila</i> , and <i>C. subulata</i>) were identified during the surveys but no <i>C. hunteriana</i> were detected at this site either. Whilst the site contains what appears to be suitable habitat, given the species has not been detected on or near the site despite two successive years of surveys when known local reference sites contained flowering specimens, it is concluded the species does not occur on or near the subject land in areas surveyed. Based on these results there are unlikely to be direct or indirect impacts arising from the proposal.
<i>Pterostylis ventricosa</i>	The majority of the site appears unsuitable for the species with much of it highly modified with introduced grasses and subject to ongoing disturbances (such as grazing stock) or covered in thick leaf litter or heavily shaded. Barer areas along the edges of treed areas were carefully checked with no detections of the species. Based on this result it is unlikely <i>P. ventricosa</i> occurs on the site with no direct and indirect impacts likely.
Pretty Beard Orchid (<i>Calochilus pulchellus</i>)	The site was inspected by the recognised local orchid expert Mr Alan Stephenson on Sunday 13 September 2015 to assess the habitat potential for <i>Calochilus pulchellus</i> . Mr. Stephenson did not find any suitable habitat for the species on the site. In the absence of suitable habitat for the species there are no potential direct and indirect impacts likely from the proposal.

The biobank calculator predicted a number of threatened fauna species as occurring on the site including:

- Broad-headed Snake (*Hoplocephalus bungaroides*)

- Eastern Pygmy-possum (*Cercartetus nanus*)
- Giant Burrowing Frog (*Heleioporus australiacus*)
- Koala (*Phascolarctos cinereus*)
- Large-eared Pied Bat (*Chalinolobus dwyeri*)
- Regent Honeyeater (*Anthochaera phrygia*).

Fauna surveys were undertaken taking into account the disturbed nature of the site, current conditions including constant noise and disturbance from the operation of the animal shelter and adjoining landfill site. The results of the survey and assessment for threatened fauna species are provided in the following table.

Despite the limitations and available habitats, 4 threatened fauna species were detected during surveys (Yellow-bellied Glider, Glossy-black Cockatoo, Grey-headed Flying Fox and Eastern Bentwing-bat) and another (Squirrel Glider) was assumed to be present based on recent nearby observations.

Table 13.2 Assessment of threatened fauna species

Species	Assessment
Broad-headed Snake (<i>Hoplocephalus bungaroides</i>)	Whilst there are some small cliff lines along the lower reaches of Cabbage Tree Creek approximately 500 m to the east of the site, the closest escarpments are almost 1 km away to the north along the Shoalhaven River. Whilst some 14 hollow-bearing trees are found on the site no Broad-headed Snakes were detected during summer spotlighting surveys, a time when the species could potentially be found on the subject site. Given the distance from escarpments and the condition of habitat on the subject site, it is unlikely the species occurs there or would be impacted by the proposal.
Eastern Pygmy-possum (<i>Cercartetus nanus</i>)	This species has been detected (early 2014) on land immediately to the south and within 100m of the subject land. The land to the south contains significantly better quality habitat that is not fragmented as occurs on the subject site. Given the habitat present on the subject site, the potential for Eastern Pygmy-possum to occur on the site is low, particularly given the disturbance levels to the mid-storey and ground cover vegetation. No Eastern Pygmy-possums were detected and are unlikely to inhabit the site. Whilst potential habitat is to be removed, given its isolation, the proposal is unlikely to have any direct or indirect impacts.
Giant Burrowing Frog (<i>Heleioporus australiacus</i>)	Given the poor quality of the habitat (disturbed and degraded) and the distance from Cabbage Tree Creek, the closest potential breeding habitat approximately 400 m away, the site represents marginal habitat at best for the species. No Giant Burrowing Frogs were detected and it is unlikely the proposal will impact the species or potential habitat to the east.
Squirrel Glider (<i>Petaurus norfolcensis</i>)	Sugar gliders were observed on the site. Although no Squirrel Gliders were observed it is likely that this species uses the site on occasion given the habitat available and recent nearby records. The direct impact of the proposal on Squirrel Glider is the loss of the 2.35 ha of foraging habitat containing 15 identified hollow-bearing trees. The loss also reduces the options in terms of movement corridors throughout the local landscape. The loss of the 2.35 ha does not isolate the confirmed habitat for Squirrel Glider immediately to the south with the connectivity of that habitat not affected by the proposal
Koala (<i>Phascolarctos cinereus</i>)	No Koalas were detected on the site and if the species does occur in the locality, they are unlikely to be impacted beyond the loss of 2.35 ha of fragmented foraging habitat.

Species	Assessment
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	The subject site provides potential disturbed foraging habitat for Large-eared Pied Bats at best with potential roosting available along the escarpment cliffs along the Shoalhaven River and the lower reaches of Flatrock Creek to the north and east respectively. No Large-eared Pied Bats were detected on the subject site and are unlikely to be impacted by the proposal.
Eastern Bentwing-bat (<i>Miniopterus schreibersii subsp. oceanensis</i>)	Eastern Bentwing-bats were detected on the site as a result of Anabat microchiropteran bat surveys. Furthermore, based on the species profile and the survey results, the site provides occasional foraging habitat and potential roosting habitat in the existing buildings, although the level of disturbance on the site as a result of noise from impounded animals would suggest roosting is unlikely. The Eastern Bentwing-bat has been added to the biobank calculator as an ecosystem species.
Regent Honeyeater (<i>Anthochaera Phrygia</i>)	Habitat on site is not optimal. The subject site is not within one of the three known breeding areas or in preferred foraging areas. No Regent Honeyeaters were detected during a range of surveys including targeted bird surveys. It is unlikely the species occurs on the site or in the locality or would be impacted by the proposal.

Ecosystem and species credits

For the purpose of the FBA assessment, the proposal has been assessed based on the total loss of all vegetation on site.

Table 13.3 lists the ecosystem credits required. The PCT is not in benchmark condition, is not of a type that is over-cleared, an EEC or contains or directly buffers or protects riparian areas. Whilst the site survey confirmed that a number of “ecosystem credit” threatened fauna species utilise the site, the site is not considered critical to the life cycle of viable local populations of threatened fauna due to its location, small size, and condition. In the unlikely event that threatened fauna are utilising tree hollows on the site, mitigation measures have been proposed (refer section 13.2).

Table 13.3 Summary of ecosystem credits required

Plant community type	Area (ha)	Credits created
Red Bloodwood – Hard-leavened Scribbly Gum – Silvertop Ash heathy open forest on sandstone plateaux of the lower Shoalhaven Valley, Sydney Basin Bioregion	2.35	133.00
TOTAL	2.35	133

In terms of threatened species, one “species credit” species, the Squirrel Glider, is assumed to be present on the site on occasion based on nearby records, there being incised sap feeding and hollow-bearing trees on the site, and connectivity (for gliding possums) with the known habitat to the south (Table 13.4).

Table 13.4 Summary of species credits required

Common name	Scientific name	Extent of impact (ha or individuals)	Number of species credits created
Squirrel Glider	<i>Petaurus norfolcensis</i>	2.35	52

Biodiversity offsets are discussed in 13.2.

13.3.2 Stage 1 project

Some of construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts.

13.1 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

13.1.1 Concept Proposal

The proposal would lead to an increase in vehicle movements as processed material is transported off site to be reused/recycled. In addition, the growing population of the Shoalhaven would lead to an increase in vehicle numbers visiting the site and or adjoining landfill site. Therefore there is potential for some indirect impacts from vehicle movements – such as vehicle strike on fauna populations.

A number of mitigation measures would be implemented to prevent other indirect impacts such as spread of weed and sediment transport from the site.

13.2 Mitigation measures

13.2.1 Construction

The following mitigation measures are proposed during construction:

- All clearing works would be supervised by a suitably qualified environmental consultant.
- A suitably qualified and NSW National Parks and Wildlife Service licensed wildlife handler would be on site prior to, and during the removal of any trees or areas of potential habitat (vegetation and dams) on the property to rescue fauna.
- Prior to commencement of any clearing works, the extent of clearing would be accurately marked on the ground with temporary barrier fencing or similar visible material.
- Trees to be cleared would be felled into the proposal site carefully so as not to damage trees to retained in or beyond the proposal footprint.
- Hollow-bearing trees would be felled carefully in sections using a “cherry picker” or crane if necessary to allow the rescue of native fauna. Hollow-bearing sections would be carefully lowered to the ground so as not to injure native fauna.
- All clearing works and associated machinery and waste would be contained within the proposal site.
- Parking of machinery and vehicles and storing of building or landscaping materials, soil, spoil or waste outside of the site would be prohibited.
- Sediment erosion controls would be put in place immediately following clearing, and on the same day as clearing works commence.
- To protect native gliding and flying mammals in the locality, barbed-wire for fences would be prohibited.
- Planting of plant species listed on the Weeds Australia NSW weeds list would be prohibited.
- Native grasses would be used where grassing is required.
- Any landscaping would be undertaken with local native plant species only.

13.2.2 Operation

Offsets

Council is currently discussing with OEH and investigating offset options on a parcel of Council owned land at Huskisson, approximately 22 km to the south east of the site. The Huskisson site is 72.36 ha with approximately 55.2 ha available for an offset worth 732 ecosystem credits.

The 55.2 ha comprises:

- 1.97 ha of SR594 Red Bloodwood – Hard-leaved Scribbly Gum – Silvertop Ash heathy open forest with a credit value of 24 credits,
- 17.68 ha of SR648 Swamp Mahogany swamp sclerophyll forest on coastal lowlands with a credit value of 214 credits, and
- 35.56 ha of SR516 Blackbutt – Turpentine – Bangalay moist open forest on sheltered slopes and gullies with a credit value of 494 credits.

Finding Squirrel Glider credits are also the subject of negotiations.

SR594 is listed as an “offset option” in the Full Credit Report for the development (RRP) site.

Whilst not listed as “offset options”, both SR516 and SR648 are 50% cleared within the Southern Rivers Catchment Area compared to 20% cleared for SR594. With SR648 also classified as an Endangered Ecological Community (Swamp Sclerophyll Forest on coastal floodplains) both the non-optional vegetation community types are considered more valuable in terms of an offset.

Preliminary surveys of the proposed biobank site have also detected 4 threatened species; Yellow-bellied Glider, Glossy Black-cockatoo, Little Lorikeet and Eastern Pygmy-possum (EPP). Of the four species, EPP is listed as species credit species within the Southern Rivers Catchment Area.

Management actions proposed to “improve” the biobank site include:

- Fox baiting (the species has been detected on the offset site during fauna surveys),
- Weed control (weed species are growing around the perimeter of the existing Recycling and Waste Facility), and
- Close and rehabilitate unauthorised tracks and install vehicle exclusion fencing.

14. Soil and water

The information presented in this chapter is based on the soil and stormwater management plan developed for the proposal by GHD. The full report is included in Appendix H in volume 2 of this EIS.

14.1 Method

The assessment of potential soil and water impacts was undertaken by:

- Analysing the likely risks of the proposal in relation to soils and water to inform the assessment methodology
- Developing appropriate soil and water management measures
- Qualitative assessment of low risk impacts
- Developing a MUSIC model representing indicative change in water quality from existing conditions
- Developing a water balance to ensure that the site has sufficient water available and that flows are managed in such a way to minimise sedimentation
- Preparing a soil and water assessment report (Appendix H)

14.2 Existing environment

14.2.1 Topography and hydrology

The site is located between two creeks that flow northwards into the Shoalhaven River. Namely Sandy Creek which is 680 m west of the site and Cabbage Tree Creek which is 450 m east of the site. The site elevation varies from 46.5 m AHD in the south western corner to a high point in the north of the site at 49 m AHD. It includes grassed areas modified by development activity and natural bushland remnants in the southern end of the property. The topography of the site is generally even and sloping westwards towards the adjacent waste management facility.

14.2.2 Groundwater dependent ecosystems and riparian zones

There are no identified watercourses draining through the site. No groundwater dependent ecosystems have been identified in the vicinity of the site. The site is more than 450 metres from the nearest waterway (Cabbage Tree Creek) therefore no riparian areas would be impacted by the proposal.

14.2.3 Soils

Previous investigations conducted by Earth2Water (E2W 2008) report that the profile in the vicinity of the site consists predominately of silty-clay and sandy-clay sediments.

14.3 Proposed soil and water management

14.3.1 Construction

During the construction phase, the proposed soil and water management system (Figure 14.1) would include:

- Three permanent (Basins 1, 2 and 3) and one temporary sediment basin (Basin 4) which would be used to minimise sediment in site runoff. An existing basin in the north west of

the site would be used as a sediment basin, as well as three new ponds, in the north-east, east and south-west.

- During the construction phase, the majority of flows would be directed towards the south-west pond due to the site topography sloping towards the south-west corner of the site.

The sediment ponds would be sized in consideration of Managing Urban Stormwater: Soils and Construction (DECC, 2008) design criteria for sediment basin sizing. The sediment ponds would be designed to intercept sediment-laden runoff and retain sediment and other materials, thereby protecting downstream waterways from pollution.

14.3.2 Operation

The soil and water management system for the operational phase (Figure 14.2) would have the following characteristics:

- Basins 1, 2 and 3, which would act as sediment basins during construction, would be maintained and converted into permanent detention (Basins 1 and 2) or water quality (Basin 3) basins.
- Basin 4 would be removed once the building pad has been constructed.
- Runoff from the western side of the roof would be diverted into Basin 1.
- Runoff from the eastern side of the roofed area would be diverted into Basin 2
- Runoff from the parking area and access route would be diverted into Basin 3.
- Runoff from undisturbed areas within the property boundary would be diverted to ensure that they do not intercept the flows from the road and roof areas to avoid contamination. It is assumed that these flows from the undisturbed areas would not need to be contained in the site water system as the quality of these flows will represent existing conditions
- Roof water would be captured in Basins 1 and 2, which would be used to supply water for processing of waste materials/composting but would be designed to overflow during high rainfall periods
- Runoff from perimeter roads would be spread out and discharged directly from site, minimising concentration of flows
- Runoff from the carpark and outdoor site entrance area would be directed to a stormwater management system including a gross pollutant trap, grass buffer strip and Basin 3 which would act as a wetland.



SHOALHAVEN CITY COUNCIL
WEST NOWRA RRP
WATER MANAGEMENT SYSTEM
CONSTRUCTION PHASE

Job Number | 21-22855

Revision | A

Date | SEPT 2015

Figure 14.1

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Figure 14.2

14.4 Construction impact assessment

14.4.1 Concept Proposal

Surface water quality

During the construction phase there may be a significant area of exposed soils that could have a potential impact on downstream systems through sedimentation. Therefore erosion and sediment control measures are proposed based on the design principles outlined in Landcom (2005). Furthermore, it is proposed that the contractor prepare a detailed erosion and sediment control plan which is updated throughout the construction period.

Surface runoff would be managed to minimise the discharge of sediment laden water downstream; broadly, this would be achieved through the following:

- Minimisation of disturbed areas and minimising the period of disturbance
- Diversion of clean runoff around disturbed areas
- Collection and management of disturbed runoff in sediment ponds

Stockpiles of material would be located well away (minimum of 5 metres from concentrated flow paths) from areas of frequent inundation.

Permanent stockpiles would be aligned to water flow and temporarily stabilised with vegetation.

Access roads and disturbance activities would be managed with consideration to minimising off-site transport of sediment.

All earthworks, filling, building, driveways or other works, would be designed and constructed (including stormwater drainage if necessary) so that at no time, would any ponding of stormwater occur on adjoining land as a result of the proposal.

The sediment ponds would be designed to intercept any sediment-laden runoff and retain most sediment and other materials, thereby protecting downstream waterways from pollution. The retention would be provided by settling the suspended sediment from the stormwater flow, combined with the interception of bed-load material.

For the purpose of this assessment, sediment ponds have been sized in consideration of Managing Urban Stormwater: Soils and Construction (Landcom 2005) design criteria for sediment basin sizing. Type F or D basins would be used because the soil on the site has been identified as fine silty-clay and sandy-clay sediments (E2W 2008). A type F or D basin operates as a “dry basin”, where all runoff from a design storm event is captured, with management of sediment and subsequent controlled discharge of water to re-instate the required capture storage volume within a defined management period, adopted as 5 days. Type F basins rely on gravitational separation of sediment whereas Type D basins employ the use of a flocculent. Prior to beginning major works soil sampling would be undertaken in accordance with Landcom (2005) to determine if flocculent will be required to achieve sedimentation.

Table 14.1 Sediment pond volumes – construction phase

Sediment Pond	Required Volume (m ³) (Landcom 2005)	Volumetric Runoff Coefficient	Design Rainfall Percentile	Design Rainfall Duration (Days)	5-day Total Rainfall Depth (mm)
Basin 1	76.5	0.5	75	5	25.5
Basin 2	76.5	0.5	75	5	25.5
Basin 3	210.4	0.5	75	5	25.5
Basin 4	325.1	0.5	75	5	25.5

The residual impacts after implementation of the proposed mitigation measures is expected to be acceptable on the basis that the site would be operated in accordance with the requirements of 'Managing Urban Stormwater: Soils and Construction' (DECC 2008).

Contamination

There is no known history of contaminating activities having occurred on the site in the past. The site is known to have been vested in the Council on 20 April 1979. Since that time the only known use has been the current use as an animal shelter and pound. Therefore the potential for soil contamination is minimal.

Acid sulphate soils

According to the Australian Soil Resource Information System National Acid Sulphate Soils maps, the site is located in an area where there is an extreme low probability of occurrence of acid sulphate soils. The proposal is therefore unlikely to have any acid sulphate soils impacts.

14.4.2 Stage 1 project

The construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction.

14.5 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

14.5.1 Concept Proposal

Water quality

During the operational phase the primary potential risk to downstream surface water quality is runoff from sealed areas. Since neither incoming waste nor composting material would be stored outside, this significantly reduces the risk to downstream surface waters.

Runoff from perimeter roads is not expected to have a significant impact on downstream waters due to the fact that its road surface areas are minimal and spread throughout the site and vehicles carrying compost are not expected to travel in this area of the site.

It is considered that there is a greater risk arising from the carpark and site entrance area as this would be where vehicles movements most occur. The remainder of the roadways would be mainly used for maintenance purposes only. Therefore a stormwater treatment system involving a gross pollutant trap (also capable of capturing hydrocarbons) buffer strip and constructed wetland would be required to manage water quality in this area.

MUSIC modelling results show that for all indicator pollutants, the predicted loading from the carpark and entrance area post development is less than the predicted pollutant loading from the equivalent area in its current condition.

Water resourcing

Water balance

Based on the preliminary soil and water risk assessment, a water balance assessment was deemed necessary to determine whether harvesting of water collected onsite would be able to supply enough water to meet the expected reuse demand. The water balance took into consideration both water available for reuse and the demand for reuse.

The water balance considered the roof areas and the two basins collecting roof water (Basins 1 and 2) as these are the components of the water management system most relevant to water reuse. Basin 3 receives surface water and is a water quality basin, is not proposed for reuse and was therefore not included in the water balance.

Dam geometries were estimated based on the space available and the size indicated on the general layout plan. Reuse volumes were estimated based on data available on similar projects.

Figure 14.3 represents the mean annual flow volumes predicted by the water balance. This indicates that on average the site has an excess of water with water overflowing the basins in excess to the reuse demand.

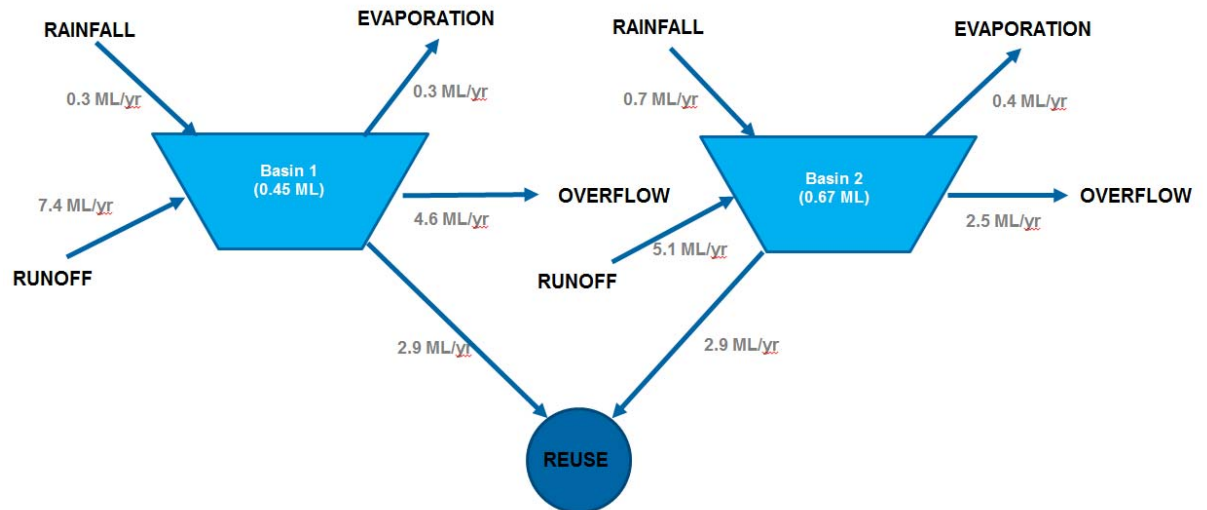


Figure 14.3 Expected site water balance volumes

The catchment areas are large compared to the demand for reuse at the site. A total of 7.1 ML is expected to overflow annually from the two basins.

Analysis of the time series results of the water balance indicates that the water available at the site would be able to meet the reuse demand for approximately 94% of the time. Operational refinements and optimisation measures would likely result in the reuse demand being satisfied closer to 100% of the time, by diverting water between the two basins.

The results of the assessment indicate that the roof runoff and proposed basins would be able to supply the majority of the reuse water demand. This would result in a major reduction in demand for potable water.

Water Sharing Plan

The site is located within the area covered by the Water Sharing Plan for the Greater Metropolitan Region Unregulated Water Sources and the Lower Shoalhaven River Management Zone of this plan. No extraction from waterways is proposed for the proposal.

Harvesting of surface and roof water runoff is proposed however the impact on other water users is expected to be minimal based on the following:

- No licenced water users are identified along the creek downstream of the site. Once flows reach the Shoalhaven River the scale of the site compared to the river catchment is minimal.

- Harvesting is from roof areas and a significant proportion of water harvested can be considered to have been water that would have been intercepted and lost from the system due to evaporation under existing conditions

The site is also covered by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources. No extraction from groundwater is proposed and no deep excavations likely to encounter significant volumes of groundwater area proposed. The addition of impervious areas is minimal compared to the overall recharge zone. Therefore no significant impact on groundwater resources is expected.

Flooding

Detailed and recent flood study reports do not exist for the upper Shoalhaven River as this part of the river is considered to have a generally low flood risk. There are several reports available exploring flooding regimes downstream of Nowra Bridge. A flood study of the Nowra Riverview Road area, completed as part of the Nowra Floodplain Management Plan (February 2002) described expected flood levels at Nowra Bridge, 5 km downstream of the site.

Nowra Bridge is expected to reach 6.3 m AHD during a 1% AEP flood and a maximum of 8.9 m AHD during an extreme flooding event. The study site is above the 40 m AHD contour line and thus twenty to thirty metres above the expected flood level. In this case, 100 year ARI flooding from the Shoalhaven Floodplain is not expected to pose any threat to the study site. As the site does not intersect or sit adjacent to local watercourses flooding from local watercourses is not expected.

No significant infrastructure has been identified downstream of the site between the site and the Shoalhaven River. Therefore no detailed detention assessment has been carried out as no significant impacts, in terms of the site changes affecting future flood conditions, is expected. However approximately 500 mm of detention storage will be provided in the site stormwater dams for the purpose of minimising peak flows to minimise risk to erosion downstream.

Groundwater quality

There are no existing groundwater extraction bores at the proposal site and no groundwater extraction would be required for the proposal. All leachate generating activities would take place on sealed concrete slabs so there is minimal potential for contaminated water to enter the water table.

Contamination

Operation of the proposal would not result in contamination of the proposal site. Any chemicals used on site (such as disinfectants) would be used in very small quantities within buildings. There is no possibility that soils beneath the site would become contaminated, as all buildings would be on concrete slabs and not in contact with the underlying soils. As all stormwater from the site that falls on roads and paved areas would be collected, and directed to the on-site stormwater management system, soils down gradient of the proposal site would be protected from potential contamination.

14.6 Mitigation measures

Site operators and contractors would be required to ensure that all surface water management works for both construction and operation are undertaken in accordance with the Soil and Stormwater Management Plan (Volume 2 - Appendix H) and constructed following the relevant guidelines set out in Landcom (2004) 'Managing Urban Stormwater: Soils and Construction'. This includes implementation of all proposed infrastructure and procedures/management as well as the required inspection, maintenance, staff training, monitoring and reporting.

15. Bushfire risks

The information presented in this chapter is based on the bushfire report prepared by GHD. The full report is included in Appendix I in volume 2 of this EIS.

15.1 Method

The bushfire assessment included a desktop assessment, analysis and consultation with the NSW Rural Fire service (RFS).

Desktop assessment

The desktop assessment included review of:

- The RRP Master Plan to determine the location of the development, new roads to be constructed and the suggested boundaries of the APZ
- Vegetation cover and flora and fauna habitat features using the results obtained from ecologist studies of the proposal site
- Fire history of the immediate area
- Site topography to indicate any potential constraints imposed by slope.

Field Investigation

An inspection of the site and its bordering vegetation was conducted on 3 December 2013. This was part of a previous EIS study for a similar facility on an adjacent site (which did not proceed). This was to identify fire and incident safety issues and determine any measures that would be required or are appropriate for mitigation of these risks.

The assessment was conducted in accordance with Planning for Bushfire Protection (NSWRFS, 2006) and recorded details of:

- Vegetation features (vegetation type, predominant canopy height, percentage cover, and understorey)
- Slope
- Overall fuel hazard.

Analysis

The proposal is classified an industrial development (Building Code of Australia – Building Class 8⁴) and the objectives, intent, performance criteria and solutions for bush fire protection measures detailed in *Planning for Bushfire Protection* (PBP) (NSW RFS 2006) were applied.

Consultation

GHD attended the Shoalhaven Fire Control Centre to obtain fire history information and consult with staff regarding the proposed planned mitigation measures. In addition, GHD contacted the Batemans Bay Customer Service Centre which handles all enquiries relating to development planning and assessment under PBP. GHD discussed the intended approach to manage bushfire risk at the proposal site, including the approximate APZ to be applied to the building structures, available water sources and access roads to surround the facilities.

⁴ Class 8: a laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale or gain.

15.2 Existing environment

Bushfire prone land

The site is zoned bushfire prone (Vegetation Category One) according to a Bushfire Prone Land map certified by the Commissioner of the NSW Rural Fire Service for the Shoalhaven City Council.

Vegetation

Bushland on or within 140 m of the site has been identified as dry sclerophyll forests: shrubby sub formation. This vegetation type is broadly described as containing the following features:

- Dominated by eucalypts 10-30 m with crowns that touch or overlap (foliage cover in many areas is 20-50%)
- Prominent layer of hard-leaved shrubs
- Occurring in areas where rainfall exceeds 500 mm
- Understorey dominated by shrubs including banksias, spider flowers, gum trees, tea-trees
- Sparse groundcover.

Effective slope

The proposal footprint is located on a slope class of 0-5 degrees. The adjoining land parcels to the east, north, west and south are predominantly located also on a slope class of 0-5 degrees. To the west of the proposal site (within the existing West Nowra Recycling and Waste Facility) slope classes range from 10-20 degrees. This is due to site modification undertaken to cater for the existing waste landfill operations.

Effective slope influences fire behaviour for the site, and is used to guide development of asset protection zones.

Fire weather

The subject land is located within the Illawarra/Shoalhaven NSW Fire Area and has a corresponding Fire Danger Index rating of 100 (NSW RFS 2006). The following bushfire protection measures are proposed with consideration of this level of Fire Danger Index (which stipulates various requirements).

15.3 Construction impact assessment

15.3.1 Concept Proposal

The proposal is subject to an elevated bushfire risk given its proximity to large tracts of native forest. A number of bushfire protection measures would be incorporated into the proposal construction in accordance with the *Aims and Objectives*, and the *Acceptable Solutions* of the performance criteria, identified in *Planning for Bush Fire Protection* (NSW RFS 2006a and 2010).

These measures seek to minimise the impact associated with a fire event and provide protection for the proposal and include the following during construction:

Emergency planning

To minimise the potential for ignition sources during construction, Shoalhaven Fire Control Centre (SFCC) would be notified of the construction dates. This is particularly important for any

dates during which 'hot works' are to be conducted and will enable personnel from the SFCC to advise where weather conditions are not appropriate to carry out the works proposed.

Landscaping and vegetation management

During the landscaping phase, mulch based landscaping would be avoided.

Hot works

All hot works (such as welding, grinding etc) during construction would be managed through hot works permits or equivalent which include escalating provisions to reduce or eliminate the risk of accidental ignitions with elevated fire danger (very high, severe, extreme to catastrophic fire danger).

15.3.2 Stage 1 impact assessment

The Stage 1 project would not include any 'hot works' or construction/occupation of any buildings on the site. Preparation of the site would take into account the required APZs for Stage 2. The construction environmental management plan (CEMP) for Stage 1 would include appropriate emergency procedures to be followed in the event of a bushfire. These measures would minimise the potential for bushfire impact during Stage 1.

15.4 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

15.4.1 Concept Proposal

Development of land classified as bushfire prone land is subject to a number of bushfire related planning controls under the EP&A Act and the *NSW Rural Fires Act 1997*. The specific planning controls are detailed in Planning for Bushfire Protection (NSW RFS 2006) and *Addendum: Appendix 3 of Planning for Bushfire Protection (NSW RFS 2010)*.

Planning for Bushfire Protection outlines the bushfire planning matters that need to be considered at various stages of the planning and development approval process. It applies to development on land that is classified as 'bush fire prone' on a bush fire prone land map.

The following bushfire protection measures have been developed from the bushfire assessment to assist in minimising potential impacts from bushfire. The proposed measures go beyond the requirements for a non-residential building due to the establishment of an APZ to the east, south and north of the proposed buildings.

Asset protection zones (APZ)

An APZ is an area of land, adjacent to a building, in which the bushfire fuel load is managed and maintained to minimise the impact of fire on that asset. The asset protection zone acts as a buffer between an asset and the bushfire hazard.

In order to protect the building asset, an APZ width of 30 m has been applied to the northern, southern and eastern portions to offer protection for the AWT/MRF building. Security fences surrounding the proposal would be constructed at the boundary of the APZ.

Access routes

A new main heavy vehicles access road and perimeter road would be constructed as part of the proposal. This new main access road would be constructed to facilitate all weather access.

Flatrock Road (Public Access) and the new two-way main access roads would fulfil site access and property access requirements and as such there is no requirement for the additional development of fire trails.

In addition to road access, the proposal includes construction of a 40 car park. The current location as outlined in the master plan to the south of the AWT/MRF building is suitable as it allows for the establishment of a defensible space for fire-fighting purposes and hardstand surfaces within the APZ which would reduce the level of combustible materials in proximity to the asset.

Landscaping and vegetation management

Mulch based landscaping would be avoided. Landscaping would also avoid planting shrubs and laying woodchips within 10 m of an exposed window or door.

Hot works

All hot works (such as welding, grinding etc) during operation would be managed through hot works permits or equivalent which include escalating provisions to reduce or eliminate the risk of accidental ignitions with elevated fire danger (very high, severe, extreme to catastrophic fire danger).

Emergency planning

A site management plan would be developed to identify bushfire prevention measures to be implemented in the event of a bushfire or fire incident on site, formal bushfire warning being issued or escalating fire danger.

Emergency procedures would be made available to all personnel located on site, with information such as evacuation points provided to all visitors as part of the induction process.

15.5 Mitigation measures

The following provides a summary of the proposed bushfire protection measures for the proposal:

- Asset protection zones would be provided as described in Section **Error! Reference source not found.** and maintained
- Safe access and egress via a new all-weather main access road
- A site management plan detailing bushfire prevention measures that would be implemented during construction and operation, including the following measures:
 - Actions to be taken where a formal bush fire alert is issued
 - Emergency and operational protocols to be taken in response to escalation of fire weather conditions
 - Bushfire suppression equipment available on site and their location
 - Appropriate storage and maintenance of fuels and other flammable materials on site
 - Notification of the Local Rural Fire Service Control Centre of the dates of construction and any dates during which 'hot works' would to be conducted.
- Management of retained vegetation (outside the identified APZ) in accordance with the draft *Bush Fire Risk Management Plan* (SBFMC 2010)

16. Hazard and risk

The information presented in this chapter is based on the findings of the hazard analysis undertaken by GHD. The full report is included in Appendix J in volume 2 of this EIS. Bushfire risks are assessed in Chapter 15.

16.1 Methodology

The hazard analysis was prepared consistent with the requirements of SEPP 33 and the publications Hazardous Industry Planning Advisory Paper No. 6 'Guidelines for Hazard Analysis' (HIPAP 6) and HIPAP No. 4 'Risk Criteria for land Use Safety Planning'.

The analysis was prepared to show that any residual risk levels are acceptable in relation to the surrounding land use, and that potential risks would be appropriately managed. This has been done by:

- Identifying intrinsic hazards and abnormal operating conditions that could give rise to hazards
- Identifying the range of safeguards
- Assessing the risks by determining the probability (likelihood) and consequence (effects) of hazardous events for people, the surrounding land uses and environment
- Identifying approaches to reduce the risks by elimination, minimisation and/or incorporation of additional protective measures.

16.2 Preliminary risk screening

In accordance with the requirements of SEPP 33, a preliminary risk screening of the proposal was undertaken. The need for a preliminary hazard analysis (PHA) is determined by the results of the preliminary risk screening. The methodology for risk screening is outlined in the Department of Planning (1994) guideline *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines*. The guidelines provide a risk-screening procedure based on the quantity of dangerous goods to be used by a project and the distance these materials are stored from a site's boundary.

According to SEPP 33, if any of the screening thresholds are exceeded then the proposed development should be considered potentially hazardous and a PHA is required. Also, if the quantities are close to the screening threshold values and the development site is near a sensitive receiver then the proposed development is also considered to be potentially hazardous and a PHA is required.

The results of the preliminary risk screening indicated that a PHA is not required, as all materials, including transportation frequencies, do not exceed the respective thresholds, and the project is not considered potentially hazardous. However, to demonstrate that potential hazards have been considered and control measures put in place, a hazard identification process was completed (refer section 16.3).

16.3 Hazard identification

Hazard identification represents a Level 1 or qualitative risk assessment and involves documenting all possible events that could lead to a hazardous incident. It is a systematic process listing potential causes and consequences (in qualitative terms). Reference is also made to proposed operational and organisational safeguards that would prevent such hazardous events from occurring, or should they occur, that would mitigate the impact on the

plant, its equipment, people and the surrounding environment. This process enables the establishment, at least in principle, of the adequacy and relevancy of proposed safeguards.

The aim of the hazard identification study process is to highlight any residual risks associated with the interaction of the proposal with the surrounding environment. A range of possible hazard scenarios was developed but a consequence and likelihood assessment was not completed as none of the hazardous scenarios were considered credible for offsite impact. The results of this hazard identification process are provided in Table 16.1.

Table 16.1 Hazard identification

Hazard scenario	Causes	Consequences	Proposed safeguards
Exposure to dust	Dry windy conditions Compost dust generated during the screening process Generated during turning of mature compost	Health risk	• Use water truck to dampen down roads, dry outer layers of stockpiled compost and all working surfaces • Avoid screening under windy conditions • Loader driver to keep cab shut • Other workers on site to avoid standing close, stay upwind and/or to use respiratory protection • Dust control procedure • Safety glasses
Release of bio-aerosols	Moving or turning actively composting material (visible as clouds of steamy vapour)	Health risk	• Operator to keep cab closed. • Other workers avoid standing close by and to use respiratory protection
Contact with incoming bio-hazardous material	Incoming material contains bio-hazardous material (contains miscellaneous infectious material from animal faeces, used tissues, spoiled food, etc.)	Health risk	• Staff to always wear full overalls, boots, disposable and puncture resistant gloves and respiratory protection • Wash hands frequently during course of the day • Safety glasses
Contact with hazardous incoming material	Incoming material contains hazardous material (contains batteries, asbestos etc.)	Health Risk	• Staff to always wear full overalls, boots, disposable and puncture resistant gloves and respiratory protection • Safety glasses
Handling of finished compost if skin is injured, irritated or infected	Contact with bio-hazardous material	Health risk	• Wear disposable gloves (and protective gloves over them if work is likely to damage disposables) • Safety glasses
Ponding of stagnant water	Release of aerosols from stagnant water	Health risk	• Site to be adequately drained so water is not able to accumulate and become stagnant.
Vehicle interactions	Vehicle/loader movements in vicinity of personnel	Personal injury	• Traffic management plan including standard traffic rules, signage etc. • Site speed limits to be imposed and monitored • Site layout to minimize vehicle

Hazard scenario	Causes	Consequences	Proposed safeguards
			reversing - Designated pedestrian areas - Driver competency (appropriately licensed) - Workplace Health and Safety plan - Safe Work Method Statements - Machine inductions
Natural hazards	Flooding, earthquake, lightning	Personal injury Possible fire Property damage	- Buildings designed to appropriate codes - Housekeeping standards - Site drainage - Maintaining APZ
Warehouse / storage fire	Nearby bushfire Diesel fire Arson Electrical fault Incompatible materials	Asset damage Personal injury	- Self bunded purpose designed diesel storage tank - Fire protection systems - Housekeeping standards - Fire break surrounding site (APZ) - Inspection and maintenance regime
Fire (spontaneous combustion)	Spontaneous combustion of compost material	Asset damage Personal injury	- Controlled aeration - Moisture management - Temperature monitoring - Fire protection systems - Inspections
Fire (bushfire)	Nearby bushfire	Asset damage Personal injury	- Buildings designed to appropriate codes - Fire protection systems - Housekeeping standards - Fire break surrounding site
Fire (diesel tank fire)	Nearby fire / ignition source	Asset damage Personal injury	- Self bunded purpose designed storage tank - Fire protection systems - Housekeeping standards - Fire break surrounding site
Loss of containment of diesel	Damage to tank (external impact) Corrosion Wear & tear Misalignment of valves during filling	Environmental damage Personal injury	- Self bunded purpose designed storage tank - Inspection and maintenance regime - Procedure for filling diesel tank - Safety barricades around tank
Entanglement	Caught in rotating or moving equipment	Personal injury / fatality	- Isolation procedures - Guarding i.e. guardrails - Interlocks - Emergency stop system
Fall from heights	Working at height, working adjacent to drops	Personal injury / fatality	- Working at heights procedures - Working at heights training - Fall prevention equipment - Guarding
Contact with electricity	Contact with live electrical source	Personal injury / fatality	- Isolation procedures - Fit for purpose electrical systems - Competent electricians
Struck by flying/falling object	Catastrophic failure of aeration fan Incorrect use of	Personal injury / fatality	- Inspection and maintenance of fan - Procedure for use of heavy

Hazard scenario	Causes	Consequences	Proposed safeguards
	processing equipment		equipment
Spills / overflow	Oils in sediment dam	Asset damage Personal injury	• Bunding • Housekeeping / maintenance of dam level • Inspections

The hazard identification process did not identify any significant hazards with the potential for offsite impact that would not be suitably controlled.

16.4 Mitigation measures

Adequate safeguards are required to ensure the risk scenarios that were identified are contained or at least controlled to an acceptable level. All safeguards identified in the hazard identification (Table 16.1) process would be implemented through the development and implementation of a comprehensive safety management system for the operation of the proposal or via an update of the existing safety management procedures for the existing site, taking into account any new requirements specific to the proposal.

17. Heritage

The information presented in this chapter is based on the Aboriginal heritage assessment and non-Aboriginal heritage assessment undertaken for the proposal by Artefact Heritage. The full reports are included in Appendix D in volume 2 of this EIS

17.1 Aboriginal heritage

17.1.1 Method

The Aboriginal heritage assessment was prepared in accordance with the requirements of the relevant authorities and included:

- Consultation with the local Aboriginal community
- Search of the OEH Aboriginal Heritage Information Management System (AHIMS) database, to determine the location and nature of any Aboriginal heritage sites recorded within or in the vicinity of the proposal site
- Review of relevant previous archaeological reports specific to the proposal site and in the broader region, to determine the extent of past archaeological research in the region
- Review of contextual environmental information and previous land use history
- Field survey undertaken on 31 July 2015, to allow identification and assessment of any archaeological material
- Preparation of the Aboriginal Archaeological Survey report

17.1.2 Existing environment

Aboriginal heritage searches

A search of the AHIMS was undertaken on 27 July 2015 for an area that included the entire proposal site and a one kilometre radius. The search identified a total of 21 items. Open artefact sites were also common in the search area. None of the items were located within the proposal site.

Landscape features

The proposal site is currently used by an animal shelter and contains a number of buildings and animal holding structures and paddocks. Other portions of the site feature open grass paddocks or varying densities of vegetation cover.

The entire site is flat, located on a broad crest landform, with the terrain sloping down outside the proposal site to waterlines further to the east and west. Some dense grass coverage and vegetation exists in the south portion of the site.

The closest waterlines are represented by Cabbage Tree Creek, Sandy Creek which are located approximately 450 m and 680 m from the study area respectively. Both of these Creeks are ephemeral. The study area is approximately 1.2 km from permanent freshwater sources (Shoalhaven River) and located outside both Primary and Secondary Zones outlined within the Shoalhaven Aboriginal Predictive Model.

17.1.3 Construction impact assessment

Concept Proposal

Site inspection

A site inspection was carried out by Artefact Heritage on 31 July 2015 in accordance with the OEH 'Code of Practice for Archaeological Investigations of Aboriginal Objects in New South Wales' (2010). A representative from NLALC was invited to attend the survey, but no one was available at the time of the survey.

No Aboriginal objects or areas of archaeological potential were identified within the study area.

The overall visibility across the study area was limited, but adequate for assessment considering the open woodland environment with patches of dense undergrowth and frequency of leaf litter. Very few large, old growth trees remained. All old growth trees were inspected for scarring. The majority of vegetation appeared to be fairly recent regrowth interspersed with shrubbery, grasses, litter and rubbish.

Aboriginal heritage values and significance assessment

Previous studies and the current assessment have confirmed that the study area is a significant distance from freshwater resources and is located outside the Primary and Secondary Zones identified within the Shoalhaven Predictive Model. The study area is located within an area that has been assessed as having low representative and rarity values for Aboriginal archaeological material and / or sites. Aboriginal objects may be present in areas of low archaeological significance, but are likely to be in disturbed contexts and / or associated with transient Aboriginal occupation and identified as low density background scatters. The study area is assessed as having low levels of both scientific and research potential and as demonstrating overall low archaeological significance.

Stage 1 project

The construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts.

17.1.4 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

Concept Proposal

Operation of the proposal would not require disturbance of additional areas of the site. Therefore no Aboriginal heritage impacts are expected during operation of the proposal.

17.2 Non-Aboriginal heritage

17.2.1 Existing environment

Non-Aboriginal heritage searches

A search of the following heritage databases or lists was undertaken on 27 July 2015:

- Register of National Estate (non-statutory)
- National Heritage List
- Commonwealth Heritage List

- State Heritage Register
- Section 170 Register
- Shoalhaven LEP 2014

No items were listed near the study area on any of the above heritage databases or lists.

17.2.2 Construction impact assessment

Concept Proposal

Site inspection

A site inspection was undertaken by Artefact Heritage on 31 July 2015. The inspection was necessary to determine the extent of the current occupation of the proposal site and potentially identify and assess any areas of disturbance across the site. No listed or unlisted heritage items were identified within the study area.

Non-Aboriginal heritage potential

The preliminary heritage assessment (background research and site inspection) found that there are no heritage listed items, no unlisted heritage items or areas of archaeological potential located within or adjacent to the study area. Therefore there are unlikely to be impacts to items of state or local heritage significance.

Stage 1 project

The construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts.

17.2.3 Operation impact assessment

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

Concept Proposal

Operation of the proposal would not require disturbance of additional areas of the site. Therefore no non-Aboriginal heritage impacts are expected during operation of the proposal.

17.3 Mitigation measures

The following mitigation measures are proposed:

- If Aboriginal objects are uncovered during works an archaeologist, the NALC and OEH would be notified.
- If unexpected archaeological material is encountered during works, all work would be stopped in the vicinity of the identified deposits. The NSW Heritage Council would be notified and a suitably qualified archaeologist would be engaged to assess the significance of the material and recommend whether further action is required.

18. Socio-economic

18.1 Existing environment

The proposal would be located within the Shoalhaven local government area. The Shoalhaven is located on the south coast of New South Wales, about 160 km south of Sydney. The local government area is bounded by the Wingecarribee Shire and the Municipality of Kiama in the north, the Tasman Sea and Jervis Bay Territory in the east, the Eurobodalla Shire in the south and the Palerang and Goulburn Mulwaree Council areas in the west.

It covers a land area of around 4,500 km² and comprises large areas of national park, state forest, bushland and beaches/lakes. The area is regional with major population centres along the coastal fringe: Nowra-Bomaderry, Milton-Ulladulla, Huskisson-Vincentia, St Georges Basin and Culburra beach and Sussex Inlet. Rural areas are mostly used for farming and agricultural activities. There are some light manufacturing industrial areas, with other main employment sectors being Government (including Defence), Retail and Tourism.

The estimated resident population was 99,016 in 2014 (ABS, 2015).

In 2011 there were 51,379 private dwellings, of which 89% were separate houses, 9% were medium density dwellings and the remainder were caravans, cabins, houseboat or other/not stated.

Analysis of individual income levels in the Shoalhaven compared to Regional NSW shows that there was a lower proportion of persons earning high income (those earning \$1,500 per week or more) and a higher proportion of low income (those earning less than \$400 per week) persons.

In 2011 the Shoalhaven's labour force was 36,650 persons. 92.4% of the labour force was employed and 7.6% unemployed. This is compared with 93.9% and 6.1% respectively for Regional NSW.

Furthermore, in 2011 overall 17.7% of the population was aged between 0 and 15, and 23.3% were aged 65 years and over. Compared to Regional NSW the Shoalhaven had a lower proportion of younger age groups and a higher proportion of older age groups.

Key economic characteristics of the Shoalhaven local government area are as follows:

- Gross Regional product was \$3.29 billion in 2012, which was 0.8% of the Gross State Product.
- Gross Regional product per capita in 2012 was \$33,943
- Health care and social assistance was the largest industry by employment in 2011, employing 4,502 people
- There were 7,359 registered businesses in 2012.

18.2 Construction impacts

18.2.1 Concept Proposal

The key potential social impacts that may result from construction of the proposal include:

- Change in community use of land – development of infrastructure can result in a change in land use that may affect how the community uses the land, or limit future community use of land

- Employment – there is the potential for employment to be generated during construction (temporary)
- Amenity – construction of the proposal has potential to result in impacts to local amenity unless appropriate design and mitigation measures are adopted. In particular, there is the potential for air quality (dust), noise, traffic and visual impacts during the construction phase

The construction of the proposal would require the current operations of the site as an animal shelter to cease. The animal shelter activities would have to be relocated to another site within the local government area (a DA has been submitted for the animal shelter development at 19 BTU Road, Nowra Hill). However the proposal would not impact on community use of the land in the surrounding area. There are no community facilities near the proposal site such as schools, churches, child care centres, open space or recreational facilities.

The proposal would complement existing waste related land uses at the adjacent site, and improve opportunities for resource recovery.

The proposal would also have a positive employment impact during construction. As the technology has not been selected the size of the workforce during construction is not known – but there is likely to be at least 40 to 50 positions.

The proposed new facilities are well located with few residential dwelling in close proximity to the site. The potential for negative amenity impacts would also be significantly reduced by the implementation of appropriate environmental management controls guided by the construction environmental management plan.

18.2.2 Stage 1 project

Some of construction activities identified for the Concept Proposal are applicable to construction of the Stage 1 project. Therefore the construction impact assessment provided for the Concept Proposal is considered to be wholly relevant to the Stage 1 construction impacts.

18.3 Operation impacts

The following section applies to the Concept Proposal operation. The Stage 1 project comprises construction activities only.

18.3.1 Concept Proposal

The key potential social impacts that may result from operation of the proposal include:

- Employment – there is the potential for employment to be generated and operation (long term positions)
- Amenity – operation of the proposal has potential to result in impacts to local amenity unless appropriate design and mitigation measures are adopted. In particular, there is the potential for air quality (dust, odour), noise, traffic and visual impacts
- Community capacity development – providing opportunities for education and community involvement in the areas of waste reduction, recycling and sustainability.

The proposal would have a positive employment impact during operation. Approximately 30 permanent positions are expected to be generated during operation.

The proposed new facilities are well located with few residential dwellings in close proximity to the site. The potential for negative amenity impacts would also be significantly reduced by the implementation of appropriate design features and environmental management controls guided by the operational environmental management plan.

Council is proposing to develop a future community education centre (separate proposal) to allow the local community to visit the site and learn about the resource recovery and waste management activities of the proposal and the adjacent landfill.

The proposal would play a key role in moving the general community beyond the traditional approach of disposing waste to landfill. It would assist the community to become more aware of waste as a resource and the importance of their role in resource recovery. This would increase resource recovery and engender a sense of ownership by the community, particularly when it is recognised that the region's wastes are being managed within the region by new processes to maximise recovery and landfill life.

The increased diversion of waste from landfill would assist Council in reducing future financial liabilities associated with the waste and environment levy. This is because the proposal would reduce the volume of waste being disposed of to landfill and therefore reduce future waste levy payments made by users of the facility. The cost of the waste and environment levy now exceeds the underlying cost of landfill disposal, and is likely to rise again in the future.

In addition, the proposal would extend the life of the West Nowra landfill and delay the need for a new landfill disposal site and/or the need to transport waste outside of the Shoalhaven. Thus it has a positive impact.

The final cost of the proposal would be determined by the technology selected and the availability of markets for products such as composts or compost-like products, C&D material and recyclables.

18.4 Mitigation measures

Implementation of measures to reduce the potential for amenity impacts during construction and operation, as identified in the relevant chapters of the EIS and compilation of mitigation measures (Section 21).

Ongoing engagement would occur with the local community and other key stakeholders during construction and operation.

19. Visual amenity

19.1 Approach and methodology

This assessment draws on the 'Guidelines for Landscape and Visual Impact Assessment, Third Edition' (The Landscape Institute for Environmental Management and Assessment 2013). The visual impact assessment included:

- Review of the various aspects of the proposal, primarily in terms of scale, design and landscaping
- Analysis of the site, particularly with regard to visual qualities, visual exposure, landscape values and characteristics
- Identification of a theoretical visual catchment and potential receptors, and the subsequent identification of key sensitive receptor groups
- Rating of sensitivity of representative receptor groups
- Identification of potential impacts on identified key receptor groups and ratings of magnitude of impacts for each receptor group
- Rating of impact significance on each receptor group. The significance of impacts has been evaluated as a product of:
 - the sensitivity or value of the receptor being affected; and
 - the magnitude of impacts on the identified receptor.
- Identification of potential mitigation measures for any impacts seen to exceed community expectations or planning intents for the proposal site and for this type of development.

The assessment included desktop analysis as well as photographs at and from various viewpoints to the site.

19.2 Potential impacts

19.2.1 Assessment magnitude and significance

Impact magnitude

Impact magnitude was evaluated based on variables such as: the extent of the proposal that would be visible, the proportion of the visible parts of the proposal to the entire view, the nature and intensity of the impacts, whether key features were obscured or affected, the geographic extent of the impacts, the duration and reversibility of particular impacts, and the likelihood of occurrence of impacts.

As for receptor sensitivity, the nature and the magnitude of impacts were rated. Table 19.1 below describes impacts that constitute each rating.

Table 19.1 Visual impact magnitude description

Rating	Descriptor
High	Severe consequences, significant at a regional level, likely to be unacceptable at a regional level. Large number of people measurably affected. Substantial / obvious changes due to total loss of, or change to, elements, features or characteristics of the landscape which are regionally significant.

Rating	Descriptor
Moderate	Moderate consequences, significant at a local level and likely to be unsatisfactory at a local level. Discernible changes due to partial loss of, or change to the several elements, features or characteristics of the landscape which are locally significant.
Low	Low consequences, significant at a local level, likely to a satisfactory at a local level providing appropriate mitigation measures are implemented. Minor change in the landscape due to loss or change to one or two elements, features, or characteristics of the landscape which are locally significant.
Negligible	No consequences or significance. Almost imperceptible or no change to the landscape as there is little or no loss of / or change to the elements, features or characteristics of the landscape.

Impact significance

The significance of impacts was evaluated as a product of:

- the sensitivity or value of the environment or receptor being affected; and
- the magnitude of impact on that environment or receptor.

Again a rating is assigned, based on the matrix presented at Table 19.2. The ratings themselves are not a determination of the acceptability of the proposal, they are simply a means of comparing impacts on different receptors, and with consideration of different impacts.

The process of assessment and the use of ratings tables reflects typical outcomes for visual impacts, particularly:

- Impacts on receptors that are particularly sensitive to changes in views and visual amenity are more likely to be significant.
- Impacts on receptors at scenic routes or lookouts are more likely to be significant.
- Impacts that constitute a substantial change to the visual environment a likely to be more significant than impacts that do not cause substantial change.

Table 19.2 Visual impact significance rating

Receptor Sensitivity	Impact magnitude			
	High	Moderate	Low	Negligible
High	High	Moderate-High	Moderate	Low
Moderate	Moderate-High	Moderate	Moderate-Low	Negligible
Low	Moderate	Moderate-Low	Low	Negligible
Negligible	Low	Negligible	Negligible	Negligible

Typically, impacts with a significance rating of moderate or higher pose some concern and flag the need for mitigation measures. However, no rating is intended to indicate the acceptability or unacceptability of the proposal.

19.3 Current visual environment

The main landscape features or types in which the proposal site is located are:

- Natural vegetation and trees/bushland – with varying densities of trees
- Open cleared and disturbed landscape of the existing West Nowra landfill associated with waste management activities
- Road – Flatrock Road and Yalwal Road
- Developed areas – rural residences

Sensitive visual receptors are defined as a person and/or viewer group that would experience a potential impact. They are considered in terms of viewing locations where the proposal may be visible to residents, or areas where visitors spend extended amounts of time. Sensitive receptors include houses as well as areas from which fixed or transient views would be possible, but where the time of stay is shorter, such as roads, lookouts, or recreational areas.

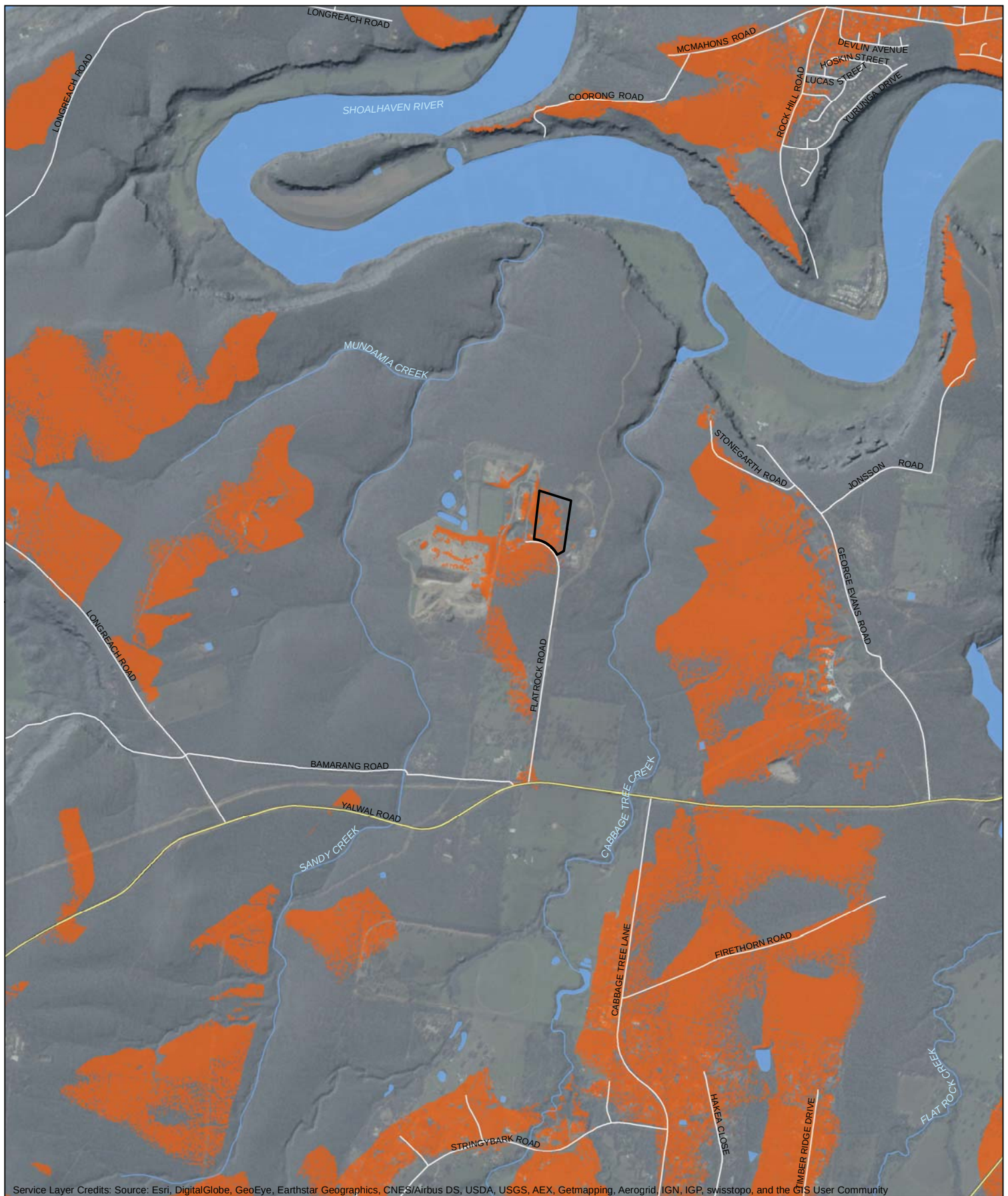
Potential visual receptors were initially identified through desktop assessment, including review of aerial photography and GIS datasets, as well as preparation of a visual catchment map for the proposal (Figure 19.1). The visual catchment map was defined based on a point representing the highest and visible point for the proposal at approximately 12 m above ground level. It is important to note that visual catchment mapping only takes into account the terrain of the area. It does not take account of buildings or vegetation and hence reflects a 'bare-earth landscape', which for the visual impact assessment process represents the "worst case scenario".

In this instance further desktop analysis and site surveys revealed that there is also a significant difference between the theoretical visual catchment (based solely on terrain) and the actual catchment, which is significantly limited by extensive vegetation throughout the catchment.

Four representative visual receptors were identified to provide a representative range of views based on the visual catchment map. The selected viewpoints are described below and shown on Figure 19.2.

- VR01 – Travellers along Flatrock Road
- VR02 and VR03 – Rural residences on Flatrock Road
- VR04 – University of Wollongong – Shoalhaven Campus

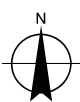
For VR02 and VR03 consideration was given to the residences both in the mid-block and near Yalwal Road.



LEGEND

-  Site boundary
-  Areas from which the site may potentially be visible

Paper Size A4
0 85 170 340 510 680
Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



Shoalhaven City Council
West Nowra Resource Recovery
Park EIS and Masterplan

Job Number	21-22855
Revision	A
Date	17 Jul 2015

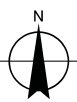
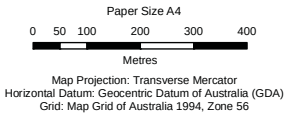
Potential Visibility

Figure 19.1



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

- LEGEND
-  Photo locations
 -  Site boundary



Shoalhaven City Council
West Nowra Resource Recovery
Park EIS and Masterplan

Job Number | 21-22855
Revision | A
Date | 02 Oct 2015

Locations of visual receptors

Figure 19.2

19.4 Construction and operation impact assessment

The following section considers the potential visual impact for both construction and operation of the proposal.

19.4.1 Concept proposal

The main potential impact generator is considered to be the visibility of the proposed RRP buildings.

VR01 – Travellers along Flatrock Road



Flatrock Road is relatively flat through out with a remote and relatively natural landscape character, with vegetated extents on both sides of the road. There is minimal residential or commercial/industrial development evident, other than the West Nowra Recycling and Waste Facility and the OEH office to the south of the site and a few rural residences along the southern most portion of Flatrock Road.

Where views beyond the immediate road corridor are achieved, the extended view is generally of vegetation (grass, shrubs and trees).

For road users approaching the site from the south there would be little visual sign of the RRP until approaching close to the entrance.

Table 19.3 VR01 Impact assessment

Consideration	Rating and comment
Sensitivity	Low The sensitivity of the road users to change on the subject site would be low. Although the overall landscape character south of the area could be described as attractive natural landscape, road users are not subject to any existing significant views of regional or even local significance due to the constraints of existing roadside vegetation.
Magnitude	Low The elements of the proposal which are likely to be visible during construction are machinery operating, construction of buildings and other associated infrastructure. The elements of the proposal which are likely to be visible during operation are the buildings, biofilter stack, entrance/weighbridge and signage. The proposal is unlikely to be visible from the majority of the road corridor due to the existing roadside vegetation. It would only be visible when approaching the site entrance. The majority of road users that would travel to this portion of Flatrock Road are users of the site, the adjacent landfill or the OEH offices.
Impact Significance	Low

VR02 and VR03 – Rural residences on Flatrock Road





The rural residences on the southern portion of Flatrock Road are surrounded by an expansive relatively natural landscape character views with grassed fields, shrubs and trees. The rural residences front onto Flatrock Road although many are set back significantly. The nearest rural residences are approximately 700 m south of the site with limited views to the site due to existing vegetation.

Table 19.4 VR02 and VR03 Impact assessment

Consideration	Rating and comment
Sensitivity	Moderate The sensitivity of the nearby rural residences on Flatrock Road is moderate depending on the physical proximity and existing viewpoints of the residence. Most residences enjoy views over rural, vegetated surroundings. The nearest residence is approximately 700 m south of the site with limited views to the site due to existing vegetation.
Magnitude	Negligible The elements of the proposal which are likely to be visible during construction are machinery operating, construction of buildings and other associated infrastructure. The elements of the proposal which have potential to be visible during operation are the buildings and biofilter stack. The site is currently not visible from the residences due to existing vegetation. Given the distance to the site and the current vegetation it is not expected that views of the proposal elements would be significant, if at all visible. Any potential views would be from a distance and the building colour scheme would be selected to blend with the natural environment.
Impact Significance	Negligible

VR04 – University of Wollongong – Shoalhaven Campus



The Shoalhaven Campus of the University of Wollongong is located approximately 1.3 km to the south east of the proposal site. This viewpoint is elevated in comparison to the proposal site, which is why there is potential for the proposal site to be visible. However while the views in the direction of the proposal site are expansive they are also densely vegetated which limits the potential for actual visibility.

Table 19.5 VR04 Impact assessment

Consideration	Rating and comment
Sensitivity	Low The sensitivity of the university campus will be low with most activities being carried out indoors. The overall importance of the visual environmental for outdoor activity such as study or recreation/exercises would depend on the specific activities being carried out. However the surrounding landscape would have only a small contribution to most users experiences associated with university activities.
Magnitude	Negligible The elements of the proposal which are likely to be visible during construction are machinery operating, construction of buildings and other associated infrastructure. The elements of the proposal which have potential to be visible are the buildings and biofilter stack. The magnitude of any change associated with construction and operation of this infrastructure would be minimal. Particularly as the building colour scheme would be selected to blend with the natural environment. In addition, the distance to the site and the presence of extensive vegetation would screen views to the site.
Impact Significance	Negligible

Impact assessment summary

The assessment considered impacts on four groups of receptors, including residential receptors, travellers on Flatrock Road and users of the Shoalhaven Campus of the University of Wollongong. All of the receptors were determined to have a sensitivity of moderate or less. This

was largely due to existing vegetation and limited interest in views towards the proposal site, or distance to the site, reducing the prominence of the views.

The magnitude of impacts on each of the identified receptor group was also determined to be low or negligible, largely due to vegetation which limits visual accessibility of the proposal elements. Significant distance from receptors also reduces the visibility of the proposal.

The consequent assessment of impact significance found that all the identified receptors would be exposed to impacts of low to negligible significance. By ensuring building designs and colour schemes were selected to blend with the natural environment, the proposal would not have any significant visual impacts on the community.

19.5 Mitigation and management measures

The buildings and associated infrastructure would be designed and the colour schemes selected to blend with the natural environment.

20. Cumulative impacts

Cumulative impact assessment for the proposal has been provided in the relevant environmental impact assessment sections. This included consideration of the cumulative impact with other activities/developments in the area and the existing landfill operations.

The following sections provide a summary of findings for key issues which requires consideration of cumulative impacts. Details are provided in individual chapters and technical studies.

20.1 Traffic

Significant development (land releases) are proposed in the local government area. Should the land releases be approved, these developments are expected to generate additional traffic on roads in the vicinity of the proposal site. The cumulative impact of the additional traffic associated with the potential land release has been considered in the traffic impact assessment (Chapter 12). This shows that some intersections would be operating over capacity due to the additional traffic associated with the land releases. However Council has confirmed that there are plans in the future to upgrade the intersections of Albatross Road and Yalawal Road once the new land releases are approved – expected to be in 5 to 10 years.

20.2 Air quality

The air quality assessment considered the cumulative impacts associated with existing landfill operations for both dust and odour. A worst case dust modelling scenario was undertaken for the proposal site and adjacent landfill. This considered the cumulative effects of both operation and construction activities.

The assessment demonstrated that the combined operation of the RRP and existing landfill operations would not result in a significant impact on air quality, considering both dust and odour.

20.3 Noise

The noise assessment considered the cumulative impacts associated with existing landfill operations. In addition, the noise model assessed the typical worst case where all equipment is running at full power. It is more likely that machinery would produce lower noise levels while carrying out activities not requiring full power. It is also unlikely that all equipment would be operating at maximum power levels at any one time. For these reasons, the noise predictions are considered to be conservative.

Two operational scenarios were modelled: operations excluding concrete crushing and operations including the concrete crushing machine.

The assessment demonstrated that the combined operation of the existing landfill and the RRP would result in minimal increase in noise, with all noise criteria being met for both construction and operation under both operational scenarios.

21. Management and mitigation measures

This chapter outlines the proposed environmental management plans and proposed mitigation measures that would be part of the construction and operational phases of the proposal. A summary of the proposed environmental monitoring requirements is also provided.

21.1 Compilation of mitigation measures

The following table provides a summary of proposed mitigation measures. This table also indicates the stage(s) to which each mitigation applies.

Table 21.1 **Compilation of mitigation measures**

Issue	Mitigation measure	Stage(s)
Waste management	- Waste management sub-plan as part of CEMP - OEMP to include waste handling procedures, waste processing procedures, quality control procedures and protocols including sampling and testing and finished product storage and handling requirements - Sampling and testing in accordance with the requirements of relevant resource recovery orders	Stage 1 and 2 Stage 2
Air quality	Monitoring and review of the odour control system	Stage 2
	Equipment maintenance and inspection routines	Stage 2
	Periodical air emissions testing	Stage 2
	Supply/storage of critical spare parts for ventilation and odour control system	Stage 2
	Traffic management procedure to avoid queuing of trucks for extended periods of time	Stage 2
	Spill management procedures	Stage 2
	Maintenance of odour complaint logbook and investigation in the event of a complaint, together with appropriate actions	Stage 2
	No stockpiling of raw materials for more than a day under normal operating conditions	Stage 2
	Management of stockpiles to facilitate natural ventilation in order to prevent the development of anaerobic zones	Stage 2
	Incorporation of construction dust management controls per Table 9.9 into the CEMP	Stage 1 and 2
	Dust suppression if required	Stage 2
	Regular sweeping of sealed surfaces	Stage 2
	Water spray/water mist spray for the shredder for excessively dry conditions	Stage 1 and 2
Greenhouse gas	Optimisation of operational activities and logistics to minimise diesel consumption	Stage 2
	Use of efficient plant and vehicles	Stage 2
	Use of compost and recovered C&D material at the landfill or close to the site where possible to minimise transport of materials	Stage 2
Noise	Engine covers to be kept closed while equipment is operating	Stage 1 and 2
	As far possible, minimise materials dropping heights into or out of trucks	Stage 1 and 2

	Vehicles kept properly serviced and fitted with appropriate mufflers. Use of exhaust brakes eliminated where practicable.	Stage 1 and 2
	Machines and equipment found to produce excessive noise compared to industry best practice would be removed from site or stood down until repairs or modifications can be made	Stage 1 and 2
	Use of broadband reversing alarms	Stage 1 and 2
	Selection of equipment to minimise noise emissions, equipment to be fitted with appropriate silencers and be in good working order	Stage 1 and 2
	All construction workers to be sensitised to potential noise impact on local residents and encouraged to take practical and reasonable measures to minimise the impact during the course of their activities	Stage 1 and 2
	Communication with nearby residents potentially affected by construction noise, including provision of community liaison number and site contact	Stage 1 and 2
	Monitoring and reporting in the event of a noise complaint	Stage 1 and 2
Traffic and transport	- Preparation of CTMP including timing of heavy vehicles - Design of the carpark and internal roadways in accordance with relevant standards	Stage 1 and 2
Flora and fauna	All clearing works would be supervised by a suitably qualified environmental consultant.	Stage 1
	A suitably qualified and NSW National Parks and Wildlife Service licensed wildlife handler would be on site prior to, and during the removal of any trees or areas of potential habitat (vegetation and dams) on the property to rescue fauna.	Stage 1
	Prior to commencement of any clearing works, the extent of clearing would be accurately marked on the ground with temporary barrier fencing or similar visible material.	Stage 1
	Trees to be cleared would be felled into the proposal site carefully so as not to damage trees to retained in or beyond the proposal footprint.	Stage 1
	Hollow-bearing trees would be felled carefully in sections using a "cherry picker" or crane if necessary to allow the rescue of native fauna. Hollow-bearing sections would be carefully lowered to the ground so as not to injure native fauna.	Stage 1
	All clearing works and associated machinery and waste would be contained within the proposal site.	Stage 1
	Parking of machinery and vehicles and storing of building or landscaping materials, soil, spoil or waste outside of the site would be prohibited.	Stage 1
	Sediment erosion controls would be put in place immediately following clearing, and on the same day as clearing works commence.	Stage 1
	To protect native gliding and flying mammals in the locality, barbed-wire for fences would be prohibited.	Stage 1
	Planting of plant species listed on the Weeds Australia NSW weeds list would be prohibited.	Stage 1
	Native grasses would be used where grassing is required.	Stage 1

	Any landscaping would be undertaken with local native plant species only.	Stage 1
	Biodiversity offset strategy	Stage 1 and 2
Soil and water	Surface water management works for both construction and operation in accordance with the Soil and Stormwater Management Plan	Stage 1 and 2
	Construction following relevant guidelines as set out in Managing Urban Stormwater: Soils and Construction	Stage 1 and 2
	Implementation of all proposed infrastructure and procedures/management as well as the required inspection, maintenance, staff training, monitoring and reporting	Stage 1 and 2
Fire and incident management	Establishment and maintenance of APZs	Stage 1 and 2
	Safe access and egress via a new all-weather main access road	Stage 1
	Site management plan detailing bushfire prevention measures that would be implemented during construction and operation	Stage 1 and 2
	Management of retained vegetation (outside the identified APZ) in accordance with the draft <i>Bushfire Risk Management Plan</i> (SBFMC 2010)	Stage 1 and 2
Hazard and risk	Development and implementation of a safety management system for operation of the RRP – including safeguards as outlined in the hazard identification (Table 16.1)	Stage 2
Heritage	Notification of an archaeologist, the NLALC and OEH if Aboriginal objects are uncovered during works	Stage 1 and 2
	If previously unidentified Aboriginal or European heritage/archaeological items are uncovered during the works, all works must cease in the vicinity of the material/find and Council and NPWS (for Aboriginal relics) or OEH (for European heritage items) is to be contacted immediately. Works in the vicinity of the find must not re-commence until clearance has been received from these parties. Ceasing of all works should human skeletal remains be encountered during construction and/or operation and immediate NSW Police contact	Stage 1 and 2
Other issues	Ongoing consultation with the community	Stage 1 and 2

21.2 Proposed environmental management plans

21.2.1 General structure and contents

The proponent would prepare environmental management plans (EMPs) for the proposal, one covering the construction phase of each Stage of the proposal, and one covering the operational phase. Each would include:

- Environmental goals and objectives
- Commonwealth and state statutory requirements including licences and approvals
- Environmental management procedures including:
 - Safeguards to be implemented
 - List of actions, timing and responsibilities
 - Reporting requirements

- Specifications incorporating environmental safeguards
- Training of personnel (both proponent and contractors) in environmental awareness
- Environmental accident and incident reporting requirements
- Process surveillance and auditing procedures
- Environmental complaint handling procedures
- Site management and control procedures.
- Monitoring requirements including a monitoring plan which details location, duration and frequency of monitoring and procedures and conditions to be followed
- Emergency response including an emergency response plan, consistent with the existing plan for the West Nowra landfill, incorporating procedures for fire, pollution incidents and accidents. The plan would detail procedures to be followed, responsibilities, equipment and contact details for responsible site staff and emergency authorities
- Review and auditing procedures.

21.2.2 Construction environmental management plans (CEMPs)

A CEMP for the construction phase of each stage of the proposal would be prepared by Council (or nominated contractor) and implemented in consultation with relevant agencies. A suitably qualified environmental management representative would be appointed to oversee environmental performance during construction of the proposal. The CEMPs would include, but not limited to, measures from the following sub management plans:

- Air quality plan, including:
 - Dust suppression measures
 - Covering of loads during transportation.
- Waste management plan, including:
 - Wastes generated by the proposal would be classified in accordance with the NSW EPA (2015) *Waste Classification Guidelines*
 - Waste management to be in accordance with the principles embodied in the WARR Act.
- Hazards and risks plan, including:
 - Safe work practices
 - Emergency contact numbers
 - Site first aid contact
 - Incident reporting procedures.
- Biodiversity management plan
- Soil and water management plan
- Traffic management plan.

21.2.3 Operation environmental management plan (OEMP)

An OEMP would be prepared by the proponent and implemented in consultation with relevant agencies, including the Department of Planning and Environment and the EPA. The OEMP would be prepared by a suitably qualified environmental management representative and would include, but not limited to, measures from the same sub management plans listed for the CEMP (Section 21.2.2).

The OEMP would also include a long-term environmental monitoring program. The monitoring program is summarised below.

21.3 Proposed environmental monitoring

Environmental monitoring procedures that would be implemented during construction and operation are outlined in Table 21.2 and Table 21.3 respectively.

Table 21.2 Monitoring requirements during construction

Issue	Monitoring
Noise	Measure noise levels at the boundary prior to construction, at commencement of construction and monthly during construction.
Biodiversity	Monitor the extent of clearing to ensure it is confined to areas in the EIS.
Air quality	Continually monitor dust generation from site (visually) to ensure excessive dust is not being produced and that dust suppression activities are effective.
	Monitor dust generation from site by checking readings from existing dust gauges on site - on a monthly basis.
Waste	Inspect waste receptacles to ensure they are not overfilled and are being collected regularly.
	Monitor waste recycling and disposal procedures to ensure they are being complied with.
Water	Review results from surface water sampling undertaken as part of the West Nowra landfill environmental management.
Erosion and sediment control	Prior to commencement of each stage of construction, inspect site to ensure that sediment and control devices are in place.
	Inspect sediment control devices to ensure they are installed and operating correctly. Inspect devices particularly during wet weather events to monitor water flows and drainage lines and install new devices as required.
Traffic	Inspect trucks to ensure they are not overloaded, adhere to speed limits, cover their loads, correctly licensed and undertake regular inspections and safety checks.
	Inspect signs and hazards markers to ensure they are used appropriately, are in place and clearly visible.

Table 21.3 Monitoring requirements during operation

Issue	Monitoring
Water	Monitor water in sedimentation dams and receiving waterways on a quarterly basis. Monitor surface water during wet weather events.
Air quality	Monitor dust generation from site by checking readings from existing dust gauges.
	Monitor odour levels once plant is operating and undertake regular odour patrols in the area.
Noise	Conduct noise monitoring at plant during plant commissioning stage and normal operation.
Traffic	Ensure vehicles are adhering to speed limits, and weights limits and using defined access roads. Provide signage denoting traffic rules (i.e. speed limits).

21.4 Proposed environmental reporting

An annual return would be prepared for submission to the EPA. The return would include:

- A statement of compliance with licence conditions
- Monitoring and complaints summary

- Any shortcomings or non-compliances in site activities or environmental controls identified in the return would be identified and EMP amended accordingly
- In addition, incidents causing or threatening material harm to the environment would be reported to the EPA, in accordance with environmental protection licence conditions.

The reporting requirements are outlined in Table 21.4.

Table 21.4 Reporting requirements

Item	Frequency
Annual return	Annual
Statement of compliance signed by designated representative of operating licensee	Annual
Record of complaints	Within 48 hours of receipt of complaint.
Notification of Incident of environmental Harm	Immediate notification through EPA pollution line; Written report required within reasonable time frame of the event occurring.
Fire or explosion Incident	Immediate notification through EPA pollution line; Written report as soon as practicable.
Fire report	Immediate notification through EPA pollution line; Written report within 7 days of occurrence.

22. Justification and conclusion

The justification for the proposal is based on a number of factors:

- The proposal is consistent with the objects of the EP&A Act
- The proposal is consistent with the strategic direction for waste management in NSW and Australia
- The proposal meets a need for alternative waste technologies
- The site is suitable for the proposed RRP
- The proposal is in the community's interest

22.1 Consistency with the objects of the EP&A Act

22.1.1 The principles of ecologically sustainable development

Clause 6 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* lists the principles of ecologically sustainable development as:

- The precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*
 - Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
 - An assessment of the risk-weighted consequences of various options.*
- Inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*
- Conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*
- Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services.*

An assessment of the project against these principles is provided below.

22.1.2 Precautionary principle

A range of environmental studies have been undertaken as part of development of the proposal and the environmental assessment process, to ensure that the potential impacts are fully understood. The assessment of the potential impacts of the proposal is considered to be consistent with the precautionary principle. It is considered that the assessments that have been undertaken are consistent with accepted scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements.

The proposal has evolved to avoid impacts where possible and to reflect the findings of the studies undertaken. For example, the footprint of the proposal and the layout has been developed to avoid potential biodiversity impacts where possible (some vegetation may be retained and maintained as APZs), while maintaining sufficient space for engineering and operational requirements.

Similarly, there has been consideration of air quality, noise and water quality impacts in locating the various components of the facility. The project incorporates design features to reduce the potential for air quality (mainly dust and odour), also including noise and visual impacts.

A number of safeguards have also been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation of the project. No safeguards have been postponed as a result of lack of scientific certainty. The selected construction contractor(s) would be required to prepare construction and operational environment management plans prior to commencing construction and operation. These requirements would ensure that the project achieves a high-level environmental performance.

22.1.3 Principle of intergenerational equity

It is recognised that the construction of the proposal has the potential to lead to some environmental impacts. This includes some temporary disturbance during construction activities. However, the potential for environmental disturbance as a result of construction has to be balanced against the long-term benefits of providing essential waste management infrastructure for the region and improving resource recovery.

The proposal would facilitate improved diversion of waste from landfill into a potential use with a higher resource value (value adding). This would be achieved through a combination of improved recycling and processing of organics. Recovering recyclable materials from a waste stream, that would otherwise have gone to landfill conserves raw material resource such as iron ore, bauxite and fossil fuels (used for production of steel, aluminium and plastics), and saves trees due to recovery of paper and cardboard. This is a direct benefit to future generations.

Diversion of waste from landfill through the RRP would also delay the need for a new site for landfilling/disposal and the associated costs and potential impacts.

Recycling also captures the embodied energy contained within the recyclables – significantly reducing the energy demand that would be required to manufacture using virgin materials.

Production of marketable compost has potential to reduce the need for chemical fertilisers, which improves water quality in rivers and streams. Its use may also improve the water retention ability of soils which reduces the need to water plants/crops. This preserves water resources for future generations.

In addition, the new RRP would improve local employment potential and contribute to economic growth in the local area.

22.1.4 Conservation of biological diversity and ecological integrity

The site has been selected to minimise potential direct and indirect impacts on the biodiversity of the locality, especially in relation to threatened species.

Council has also committed to develop an offset strategy to offset the impacts of vegetation removal as a result of the proposal. The full ecological assessment prepared for the EIS concluded that significant impacts on the biodiversity of the area are unlikely and no Species Impact Statement is required.

22.1.5 Improved valuation and pricing of environmental resources

The assessment has identified the environmental and other consequences of the proposal and identified mitigation measures where appropriate to manage adverse impacts. The construction and operation of the proposal would be in accordance with relevant legislation and the construction and operation environmental management plans. Requirements imposed in terms of implementation of these measures would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of

the proposal. This signifies that environmental resources have been given appropriate valuation.

The preliminary master plan/concept for the proposal has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the design for the proposal has been developed with an environmental objective in mind.

The economic costs of the proposal, including environmental works and management, would be reflected in gate fees and pricing of products (such as compost and recyclables).

22.2 Consistency with the strategic direction for waste management

The proposal would deliver outcomes consistent with national and state legislation and strategies for sustainable waste management. These include the National Waste Policy, the NSW Waste Avoidance and Resource Recovery Strategy 2014-21, and NSW 2021.

The proposal aligns with the philosophy of viewing waste as a resource – and recovering resources in their highest net resource value state. The recovery of resources in this manner creates value from the waste stream.

The proposal forms part of an overall strategy for the Council to become a leader in the recovery of recyclable materials from the waste stream, and minimise the quantities of waste disposed to landfill by re-using and processing waste types that would normally end up in landfill. It would provide capacity for processing of mixed waste from the Shoalhaven region and provide capacity to cope with expected increases in waste generation associated with population growth in the region.

22.3 Meeting the need for alternative waste technologies

The NSW Government has set targets for increasing recycling rates by 2021 from municipal solid waste from 52% (in 2010-11) to 70%.

However, the total amount of diversion by recovering paper and recyclable containers alone has leveled out. The only way local government can achieve the 70% diversion target is to recover organic components of the waste stream (e.g. food) through an alternative waste management system. This proposal includes a resource recovery facility/AWT to recover organics from the waste stream.

The NSW Waste Avoidance and Resource Recovery Strategy 2014-21 also includes targets for increasing recycling from commercial and industrial waste from 57% (in 2010-11) to 70% and from construction and demolition waste from 75% (in 2010-11) to 80%. The proposal includes facilities to process both dry commercial waste and construction and demolition waste – to sort and extract recoverable materials.

The proposal is expected to have an overall system diversion rate of between 40% to 80% depending on the process adopted and the waste stream (specific technologies for resource recovery and composting are still to be determined through a tendering process).

By virtue of the diversion from landfill, the proposal would also extend the life of the West Nowra landfill. There are currently only two landfills in the local government area and the West Nowra landfill is the only landfill that is licenced to accept general solid waste (putrescible). The landfill is projected to reach full capacity in 2025. There is a need for additional capacity to manage and dispose of putrescible waste from the Shoalhaven beyond 2025.

22.4 The suitability of the site

The site is considered to be suitable for the proposal for the following reasons:

- It is located adjacent to a licensed solid waste landfill facility, which also provides for disposal of residuals and a potential area for maturation of composted material
- It is central to the main population and growth centre of Nowra
- It is close to major transport routes (Princes Highway)
- It is owned by the proponent

22.5 The proposal is in the public interest

The proposal provides for the continued provision of essential waste management and resource recovery services for the local government area. The proposal would help extend the life of the existing West Nowra landfill that services the local government area. In addition, the footprint and preliminary master plan has been designed keeping in mind the sensitivity of its surrounding environment. The proposal also creates employment opportunities. Therefore the proposal is considered to be in the public and community's interest.

22.6 Conclusion

This EIS has considered the potential impacts of the proposal. It has been prepared in accordance with the provisions of Part 4 of the EP&A Act and the requirements of the Secretary of the NSW Department of Planning and Environment. The EIS has documented the benefits and potential environmental impacts associated with the proposal and recommended management and mitigation measures for each stage of the proposal to protect the environment where required.

Environmental investigations were undertaken during the preparation of the environmental assessment to assess the potential environmental impacts of both stages of the proposal. These included specialist assessment on issues involving air quality and odour, traffic, noise, greenhouse gas emissions, biodiversity, and heritage.

Overall the proposal would:

- Divert valuable resources from landfill and remit recovery and recycling of resources from the waste stream
- Extend the life of the West Nowra landfill to allow it to continue to serve the local community's waste disposal needs further into the future
- Contribute to the achievement of the targets for increased recycling and landfill diversion in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021
- Provide benefits through development of a new industry and new employment opportunities in the Shoalhaven

To achieve these benefits and if the proposal were approved, a range of environmental impacts would also result which would be managed in accordance with the CEMPs. Principal to these would be:

- Air quality and odour – temporary dust emissions during construction
- Soil and water – erosion and sedimentation during construction (controlled using appropriate diversion, sediment fences and basins)
- Flora and fauna – removal of native vegetation and minor indirect impacts

The proposal incorporates layout and design features which reduce environmental impacts and protect the environment. These include:

- Locating the proposal adjacent to the existing landfill

- Designing the layout / footprint to minimise potential vegetation losses and biodiversity impacts
- Enclosing processing activities with potential odour and litter

The EIS concludes that many of the potential issues identified would be effectively managed through proposal design features. To manage other issues, and in some cases eliminate them completely, a number of mitigation measures and management measures would be undertaken as outlined in Chapter 21.

Commitments made by the Council include the preparation of construction environmental management plans and an operational environmental management plan to ensure that the mitigation and management measures are developed, implemented and monitored. These plans would also ensure compliance with relevant legislation and any conditions of approval.

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24. Glossary of terms

Term	Definition
Alternative waste technology	Technology that diverts waste away from landfill, recovers more resources from the waste stream and minimises the impact on the environment. Provides a more sustainable solution and can include mechanical separation, biological processes, thermal technologies and mechanical biological treatment.
Catchment	The area drained by a stream, lake or other body of water.
Cumulative impact	A significant impact created by accumulation or successive additions of individual impacts, which may not in themselves be significant.
Ecologically sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Effluent	Liquid industrial waste or wastewater, which may or may not have been passed through a type of purification process.
Emission	The release of material into the atmosphere (e.g. gas, noise).
Environmental management plan	A document setting out the management, control and monitoring measures to be implemented during construction (a construction environmental management plan) and /or operation (operational environmental management plan) of a development, to avoid or minimise the potential environmental impacts identified during an environmental assessment process.
Flora and fauna	Plants and animals.
Greenhouse gases	Gases that accumulate within the earth's atmosphere (primarily water vapour, carbon dioxide and methane) and contribute to global climatic change/global warming (the 'greenhouse effect').
Greenhouse gases (Scope 1, 2 and 3)	Scope 1: Direct greenhouse gas emissions from sources falling within the operational boundary of the assessment, from sources that are owned and/or operated by the organisation in question. Scope 1 emissions include direct carbon dioxide emissions from the combustion of stationary or transportation fuels (natural gas, coal, petrol and diesel) in boilers, furnaces, vehicles etc, and fugitive emissions of greenhouse gases from chemical processes, such as wastewater treatment and some product manufacturing. Scope 2: Indirect greenhouse gas emissions associated with purchased electricity, heat or steam. These emissions physically occur at the facility where the electricity, heat or steam is generated. Scope 3: All other indirect greenhouse gas emissions associated with the activities considered in the assessment. These emissions occur from sources not owned or controlled by the company. Scope 3 emissions include those associated with production of purchased materials, transport and contractor owned vehicles, waste disposal, product usage and the extraction and processing of fuels
Hydrology	The science dealing with water on the land or under the surface, its properties and distribution.
LAeq	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.

Material recovery facility	A place where recyclables are sorted into various streams.
Material separation	Separation of a combined waste stream into different materials.
Particulate	Small particles, usually occurring in suspension.
pH	Measure of acidity (or alkalinity).
Putrescible	Capable of biological decomposition.
Rating background level	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
Sewer	A conduit for carrying of wastewater (sewage).
The proposal	West Nowra Resource Recovery Park
The proponent	Shoalhaven City Council
Threatened species	Species of animals or plants that are at risk of extinction (also known as 'endangered species') or becoming endangered within the next 25 years ('vulnerable species'), defined by the Threatened Species Conservation Act 1995.

25. Abbreviations

Abbreviation	Name
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
ARI	Average Recurrence Interval
AWT	Alternative Waste Technology
BCA	Building Code of Australia
C&I	Commercial and Industrial
C&D	Construction and Demolition
CO2-e	Carbon dioxide equivalents
CPI	Consumer Price Index
CSIRO	Commonwealth Science and Industry Research Organisation
DA	Development Application
dB	Decibel – unit of sound measurement
dB(A)	Unit used to measure ‘A-weighted’ sound pressure levels
DCCEE	Department of Climate Change and Energy Efficiency (Federal)
DCP	Development Control Plan
DECC	NSW Department of Environment and Climate Change (now OEH)
DECCW	NSW Department of Environment and Climate Change and Water (now OEH or EPA)
DP	Deposited Plan
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities (Federal)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
EOI	Expression of interest
g	Grams
GHD	GHD Pty Ltd
GP	Gross Pollutants
ha	Hectares
HCV	Heavy commercial vehicles
HDPE	High Density Polyethylene
HIPAP 6	Hazardous Industry Planning Advisory Paper No. 6
h	Hours
ha	Hectares
Hz	Hertz – unit used to measure frequency
IREP	Illawarra Regional Environmental Plan
kg	Kilogram
km	Kilometres
kL	Kilolitres
L	Litres
LEP	Local Environmental Plan

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LEMP	Landfill Environmental Management Plan
L_N	Noise exceedance level (N = percentage of sampling period)
LOS	Level of Service
m	Metres
m^2	Square metres
m^3	Cubic metres
mm	Millimetres
MRF	Materials Recovery Facility
NLALC	Nowra Local Aboriginal Land Council
NES	National Environmental Significance
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting
NHMRC	National Health and Medical Research Council
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NV Act	<i>Native Vegetation Act 2003</i>
OEMP	Operational Environmental Management Plan
OU	Odour units
PBP	Planning for Bushfire Protection
pH	Measure of acidity or alkalinity
PHA	Preliminary Hazard Analysis
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RBL	Rating Background Levels
REPs	Regional Planning Policies
RFS	Rural Fire Service
RL	Reduced Level
RMS	Roads and Maritime Services
ROTAP	Rare or Threatened Australian Plants
RRP	Resource recovery park
s	Seconds
SEPP	State Environmental Planning Policy
t	Tonnes
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TN	Total Nitrogen
TP	Total Phosphorus
TSC Act	<i>Threatened Species Conservation Act 1995</i>
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
VENM	Virgin Excavated Natural Materials
vpd	Vehicles per day
vph	Vehicles per hour
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
WMA	<i>Water Management Act 2000</i>
yr	Years
\$	Australian dollars
@	At
°C	Degrees Celsius
°	Degree (angle between slope and horizontal)

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