

Environmental Impact Statement-Part A

**Kembla Grange Resource Recovery Facility
Building Material Storage and
Resource Recovery Facility Exceeding 30,000 Tonnes per Annum and
Redesign and Expansion of Approved Facility**

**Lot 10 DP 878167
50 Wyllie Road, Kembla Grange
Application No. SSD-5300**



**Prepared for Bicorp Pty Ltd
17 September 2014**

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I declare that:

- (i) The statement has been prepared in accordance with this Schedule, and
- (ii) The statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and
- (iii) That the information contained in the statement is neither false nor misleading.

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Contents

1	Executive Summary	7
2	Introduction.....	15
2.1	Purpose of the Environmental Impact Statement	15
2.2	Overview of Development.....	15
2.3	Cost of Development	16
2.4	Director General's Requirements.....	16
2.5	Project Team.....	22
2.6	Consultation.....	23
2.7	Accompanying Documentation.....	24
3	Site Context.....	25
3.1	Subject Site.....	25
3.2	Section 149(5) Certificates	29
3.3	Surrounding Development	29
4	Project Description	32
4.1	Development History.....	32
4.1.1	Summary of Approvals.....	32
4.1.2	Modification DA-2009/1153/A.....	33
4.1.3	Modification DA-2009/1153/B	33
4.1.4	Modification DA-2009/1153/C	34
4.1.5	Modification DA-2009/1153/D.....	34
4.1.6	DA-2013/435.....	34
4.1.7	DA-2014/793.....	34
4.1.8	DA-2014/1073.....	34
4.1.9	Conversion to Single Development Consent	34
4.2	Project Justification	35
4.3	Project Description	35
4.3.1	Development Capacity	36
4.3.2	Development Summary.....	37
4.3.3	Composting Capacity.....	42
4.3.4	Development Staging.....	42
4.3.5	Development Outline	43
4.3.6	Outdoor Open Storage Bins.....	44
4.3.7	Waste Management Plan	45
4.3.8	Building Materials Storage.....	45
4.3.9	Operational Hours	45
4.3.10	Employee Numbers.....	46
4.3.11	Plant and Equipment	46
4.3.12	Customers	47
4.3.13	Waste Materials and Processing.....	48
4.3.14	Organics Processing and Composting	52
4.3.15	Stockpile Heights	57
4.3.16	Leachate Control.....	57
5	Project Need and Alternatives.....	58
5.1	Need for the Proposed Development	58
5.1.1	Social and Economic Impacts.....	58
5.1.2	Competitors	58
5.2	Project Alternatives	59
6	Statutory Planning Framework	61
6.1	State Legislation	61
6.1.1	Environmental Planning and Assessment Act 1979	61
6.1.2	Section 89C Development that is State Significant Development	62
6.1.3	Section 89E Consent for State significant development.....	62
6.1.4	Environmental Planning and Assessment Regulation, 2000.....	62
6.1.5	Water Management Act, 2000.....	63
6.1.6	Water Act, 1912.....	65
6.1.7	Threatened Species Conservation Act 1995	65
6.1.8	Protection of the Environment Operations Act 1997.....	65

6.1.9	Contaminated Land Management Act 1997	67
6.1.10	Dangerous Goods (Road and Rail Transport) Act 2008	67
6.1.11	Roads Act 1993.....	67
6.2	State Environmental Planning Policies	68
6.2.1	State Environmental Planning Policy (State and Regional Development) 2011	68
6.2.2	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)	69
6.2.3	State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)	69
6.2.4	State Environmental Planning Policy (Infrastructure) 2007.....	70
6.3	State and Regional Planning Strategies and Policies.....	71
6.3.1	NSW Waste Avoidance and Resource Recovery Strategy 2007;.....	71
6.3.2	Water Sharing Plans (Office of Water)	72
6.3.3	NSW State Rivers and Estuary Policy 1993.....	73
6.3.4	NSW State Groundwater Policy Framework Document, 1997	73
6.3.5	NSW State Groundwater Quality Protection Policy, 1998	74
6.3.6	NSW State Groundwater Dependent Ecosystems Policy, 2002.....	74
6.3.7	Office of Water Guidelines for Controlled Activities, 2010/2011	74
6.3.8	Illawarra Regional Plan No. 1	75
6.3.9	Illawarra Regional Strategy	75
7	Local Planning Framework	77
7.1	Wollongong Local Environmental Plan 2010 (West Dapto)	77
7.1.1	Site Zoning.....	77
7.1.2	Zone Objectives	78
7.1.3	Land Use Permissibility.....	79
7.1.4	Other LEP Provisions.....	80
7.2	Other Local Plans and Policies.....	83
7.2.1	The West Dapto Release Area 94A Development Contributions Plan (2011).....	83
7.3	Wollongong Development Control Plan 2009.....	83
7.3.1	Chapter D16 West Dapto Release Area.....	84
7.3.2	Chapter B5 Industrial Development	87
7.3.3	Chapter E2 Crime Prevention Through Environmental Design	90
7.3.4	Chapter E3 Car Parking, Access, Servicing and Loading Facilities.....	92
7.3.5	Chapter E6: Landscaping	94
7.3.6	Chapter E7: Waste Management	94
7.3.7	Chapter E14: Stormwater Management	95
7.3.8	Chapter E16: Bush Fire Management	95
7.3.9	Chapter E18: Threatened Species.....	95
7.3.10	Chapter E19: Earthworks.....	95
7.3.11	Chapter E20: Contaminated Land Management.....	95
7.3.12	Chapter E22 Soil Erosion and Sediment Control	96
7.3.13	Chapter E23 Riparian Land Management	96
7.3.14	Chapter D8: On Site Sewage Management System.....	97
7.3.15	Chapter E13: Floodplain Management	97
7.3.16	Wollongong City Council Recycling Strategy	98
8	Consultation	101
8.1	Consultation with Wollongong City Council.....	101
8.2	Agency Consultation	106
8.3	Community Consultation.....	107
9	Environmental Risk Analysis	108
9.1	Description of the Existing Environment	108
9.2	Identification of key Issues.....	108
9.2.1	Potential Hazardous Materials Risks.....	108
9.2.2	Waste Disposal Outcomes	109
9.2.3	Potential Greenhouse Gas Impacts.....	109
9.2.4	Potential Air Quality Risk	109
9.2.5	Potential Acoustic Impacts	109
9.2.6	Geotechnical Considerations.....	110
9.2.7	Salinity Impacts.....	110
9.2.8	Acid Sulphate Soil Impacts.....	110
9.2.9	Potential Impact on Groundwater.....	111
9.2.10	Potential Impacts of Floodwaters.....	111
9.2.11	Potential Water Quality Impacts.....	111

9.2.12	Potential Biodiversity Impacts	111
9.2.13	Riparian Corridor Revegetation.....	111
9.2.14	Bushfire Threat.....	112
9.2.15	Traffic Impact Assessment.....	112
9.2.16	Potential Visual Impacts	112
9.2.17	Potential Heritage Impacts	112
9.2.18	Potential Impact on Mineral Resources.....	112
10	Environmental Assessment	113
10.1	Preliminary Hazard Analysis	113
10.2	Waste Disposal Impacts.....	119
10.3	Greenhouse Gas Impacts	125
10.4	Air Emissions Impacts.....	128
10.5	Acoustic Impacts	152
10.6	Geotechnical Considerations.....	164
10.7	Salinity Impacts.....	169
10.8	Acid Sulphate Soil Impacts.....	173
10.9	Groundwater and Contamination Impacts.....	177
10.10	Analysis of Flood Impacts update	180
10.11	Water Quality Impacts.....	185
10.12	Water Balance.....	191
10.13	Biodiversity Assessment	193
10.14	Riparian Corridor Management	205
10.15	Bush Fire Protection Assessment	207
10.16	Vehicle Movements	209
10.17	Sediment and Erosion Control	217
10.18	Visual Impact.....	219
10.19	Heritage Impacts.....	225
10.20	Landscaping and Tree Protection.....	230
10.21	Impact on Mineral Resources	231
11	Socio Economic Impacts.....	232
11.1	Economic Benefits of the Recovery Facility	232
11.2	Recovery and Recycling Benefits.....	233
11.3	Job Creation.....	233
12	Statement of Commitments.....	236
12.1	Geotechnical Design Solutions, Works and Investigations.....	236
12.2	Hazards.....	237
12.3	Groundwater	237
12.4	Biodiversity.....	238
12.5	Vegetation.....	238
12.6	Bushfire	239
12.7	Acoustic Measures	240
12.8	Environmental and Amenity Impacts.....	241
12.9	Dust and Odour Management.....	241
12.10	Energy Efficiency	242
12.11	Waste Management.....	242
12.12	Heritage Conservation	243
13	Conclusion	244
Appendix 1: Director General's Requirement's		
Appendix 2: Development Plans		
Appendix 3: Architectural Plans		
Appendix 4: Landscape Plans		
Appendix 5: Preliminary Hazard Analysis		
Appendix 6: Waste Management Plan		
Appendix 7: Greenhouse Gas Assessment		
Appendix 8: Air Quality Assessment		
Appendix 9: Noise Assessment		
Appendix 10: Geotechnical Investigation Report		
Appendix 11: Salinity Assessment		
Appendix 12: Acid Sulphate Soil Assessment		
Appendix 13: Groundwater Assessment		

Appendix 14: Flood Analysis Review
Appendix 15: Mineral Review Assessment
Appendix 16: Biodiversity Assessment Report
Appendix 17: Vegetation Management Plan
Appendix 18: Bushfire Protection Assessment
Appendix 19: Traffic Impact Statement
Appendix 20: Visual Analysis
Appendix 21: Arborist Report
Appendix 22: Preliminary Heritage Assessment

1 Executive Summary

This Environmental Impact Statement has been prepared for Bicorp Pty Ltd in relation to the increase in operational capacity and the redesign and expansion of footprint of storage areas of the Kembla Grange Waste Recovery Facility. The expanded facility will process up to 230,000 tonnes of waste per annum.

The land is currently utilised for the purpose of a building material storage and recycling facility, which was approved on 29 April 2010 pursuant to Development Consent 2009/1153. Modification was granted to this consent on 17 July 2012 (DA-2009/1153/A) to increase the annual tonnage to 29,999 tonnes per year. The proposed site of the Waste Recovery Facility is located at No. 50 Wyllie Rd, Kembla Grange, also identifiable as Lot 10 DP 878167. The subject site is irregular in shape and comprises a total area of 21.72 hectares. The proposed development site has an area of approximately 49,425m². A description of the subject site and surrounding lands is contained in **Section 3** of this EIS.

The application seeks approval for the Kembla Grange Waste Recovery Facility which includes:

- The processing of up to 230,000 tonnes per annum of building and demolition waste, including brick, concrete, soils, timber, general/solid waste, and non putrescible organic waste;
- Building material storage, waste storage, and processing/stockpiling areas; and
- Ancillary infrastructure including plant and equipment such as crushers, screens and front-end loaders.
- The redesign and expansion of the footprint of storage areas on site, thereby providing a more functional operational arrangement. In addition to an expansion of the footprint of the operations this development application seeks consent for the provision of an upgraded stormwater management system; the provision of the additional buildings on the site including office/amenities, OHS training room and workshop; a weighbridge; the provision of additional and/or relocated car parking spaces; provision of a truck parking area, skip bin storage area and an additional equipment storage area.

A comprehensive description of the proposal is contained in **Section 4** of this EIS.

This Environmental Impact Statement has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act, 1979 and the Environmental Planning and Assessment Regulation, 2000 together with the Director General's Requirements which were issued on 30 May 2012 by Chris Wilson, the Executive Director of Major Projects Assessment, as a delegate for the Director General.

Section 5 of this EIS evaluates the need for the facility and project alternative and concludes that there are limited facilities available within the Illawarra which accept and recycle the range of materials which will be accepted at the Kembla Grange facility. **Section 11** examines the economic and social benefits of the development, demonstrating how it will have a net benefit for the community. The project will provide sustainable jobs with up to 40 positions; will divert waste from landfill; and will recover valuable resources and produce a range of recycled materials to be sold back to the Illawarra and surrounding markets adding value to the local economy. Under the federal government's current waste policy and the NSW Waste and Resource Recovery Act the recovery and reuse of resources is preferable to landfill, particularly where local positive economic benefits and job opportunities cannot be realised. The processing of mixed construction and demolition waste will produce a range of construction, building and landscaping supply products which can be readily sold into available recycling markets.

Sections 6 and 7 of this EIS details the statutory framework that relates to the proposal. The proposal has identified as State Significant development that is captured under Section 78A (8A) of the Environmental Planning and Assessment Act. The statement also references Section 6 of the Environmental Planning and Assessment Act 1979; Section 89C Development that is State Significant development; Section 89E Consent for State Significant Development; Environmental Planning and Assessment Regulation, 2000; Water Management Act 2000; Water Act 1912; Threatened Species Conservation Act 1995; Protection of the Environmental Operations Act 1997; Contaminated Land Management Act 1997; Dangerous Goods (Roads and Rail Transport) Act 2008; and the Roads Act 1993.

This section also references State Environmental Planning Policies such as State Environmental Planning Policy (State and Regional Development) 2011; State Environmental Planning Policy No.33 - Hazardous and Offensive Development (SEPP33); State Environmental Planning Policy No.55 - Remediation of Land (SEPP55); and State Environmental Planning Policy (Infrastructure) 2007.

State and regional planning strategies are also addressed including the NSW Waste Avoidance and Resource Recovery Strategy 2007; Water Sharing Plan for the Greater Metropolitan Region – Unregulated River Water Sources; Water Sharing Plan for the Greater Metropolitan Region- Groundwater Sources; NSW State Rivers and Estuary Policy 1993; NSW State Groundwater Policy Framework documents 1997; NSW State Groundwater Quality Protection Policy 1998; NSW State Groundwater Dependent Ecosystems Policy 2002; Office of Water Guidelines of Controlled Activities 2010/2011; Illawarra Regional Plan No.1; and the Illawarra Regional Strategy.

Wollongong Local Environmental Plan 2009 is planning instrument for West Dapto, within the Wollongong Local Government Area. The land is currently zoned IN2 Light Industrial and RE2 Private Recreation under this plan. The proposal is defined as a "Resource Recovery Facility" being " *a building or place used for the recovery of resources from waste, including works or activities such as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from gases and water treatment, but not including re-manufacture or disposal of the material by landfill or incineration.*" The development is contained within the IN2 zone and is a permissible use with consent within this zone. Section 6 also addresses other relevant provisions of WLEP 2009.

A range of consultant's reports have been prepared in accordance with the Director General's requirements. The consultant reports have considered any changes which would be required to ensure minimal amenity and environmental impacts as a result of the proposed operations at Kembla Grange.

Section 8 of this EIS discusses the outcomes of consultation which has been held including a prelodgement meeting with Wollongong City Council, discussions with government agencies and a public meeting which was held on 10 September 2013. Issues raised by Council and agencies have been addressed within the EIS. Despite newspaper notification, there were no attendees at the public meeting.

Sections 9 and 10 of this EIS outline the key issues and environmental considerations that relate to the proposal, with the key outcomes summarised as follows:

Acoustic

A revised Noise Assessment was conducted by GHD in July 2014. This report was prepared to assess potential noise impacts associated with construction and operation of the Kembla Grange Waste Recovery Facility. Baseline noise levels were measured at two sensitive receiver locations within the study area. The results of baseline noise measurements, combined with construction and operational information were used to predict potential impacts on key sensitive receivers.

GHD conclude that *"construction activities during recommended standard hours are not predicted to exceed the noise affected construction noise management levels at nearby sensitive receivers. Recommended noise mitigation measures would be implemented where feasible and reasonable. Operational noise from the facility is predicted to comply with the NSW Industrial Noise Policy at the surrounding sensitive receivers during daytime and night time operations"*.

Once the facility is operational, a review should be undertaken to check that noise levels do not exceed the assumed levels in the Noise Assessment. GHD conclude the proposal *"would be acceptable from an acoustic perspective assuming the recommended mitigation measures are implemented"*.

Traffic Impacts

The Traffic Impact Statement prepared by KF Williams and Associated in September 2014 considers the existing and proposed traffic and parking conditions and the impact that the proposed development is likely to have on not only the existing conditions of the surrounding road network but also the future conditions.

This Traffic Impact Assessment addressed the following points:

- The existing site conditions and traffic generation rates;
- The existing local traffic infrastructure;
- Site conditions and upgrading of facilities to cater for the proposed increase in production from the approved 29,999 tonnes per annum to 230,000 tonnes per annum;.
- The predicted traffic generation rates and future traffic routes;
- Council's future road network strategy and access impacts which the traffic generation may have on this infrastructure; and
- Potential impacts associated with construction traffic.

It is anticipated that the development including the expansion and increased capacity will occur over the course of the next 5 years. Future upgrading of the adjacent road system, including extension of Wyllie Road to Northcliffe Drive is not anticipated to occur within this timeframe as Council anticipate the extension to be in place by 2036 and hence the impact of the existing road system was investigated for the assessment conducted by KFW. The investigation revealed that the predicted traffic generation *"will have little effect on the existing road system. Minor vegetation clearing of the verges is recommended to upgrade the existing safety of the present road system."*

Greenhouse Gas

The Greenhouse Gas assessment prepared by Pacific Environment Limited on 15 October 2013 considered the potential impacts of these emissions on the environment and included a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient. The report confirmed that the greenhouse gas emissions for this project, in terms of per tonne of waste processed is five times greater than the greenhouse gas emissions intensity for other facilities in the NSW Greater Metropolitan region.

However, the report notes that not all of these facilities have on site composting and it is likely that many other similar facilities would not have on-site electricity generation. When taking this difference into account the emissions associated with this project would be more than comparable with other facilities. The following energy efficient measures were identified for the proposed development:

- Diesel usage in on site generator during construction and operation to provide all power to the site.
- Diesel usage in on site vehicles.
- Diesel usage to transport construction materials, operation raw materials and waste to the site and to transport site outputs to end- use/disposal location.

Bushfire

A Bushfire Protection Assessment was prepared by Eco Logical Australia Pty Ltd in July 2014. The report provided recommendations in relation to bush fire protection requirements to provide an adequate standard that is consistent with 'Planning for Bush Fire Protection' (RF 2006). Bushfire prone vegetation influencing the development is riparian corridor and forest vegetation, and categorised as low hazard. An additional APZ can be established by some clearing and offsetting of vegetation in the riparian corridor to the proposed site buildings.

Geotechnical

A revised Geotechnical Investigation Report was prepared by Benviron Group in June 2014. The purpose of this investigation was to assess the existing site and subsurface conditions in order to provide recommendations from a geotechnical viewpoint on the proposed scheme comprising buildings, roads and storage areas in the proposed Resource Recovery facility. Benviron Group determined that the proposed development is feasible, subject to recommendations presented within the report to be implemented during detailed design and construction.

Acid Sulphate Soils

An Acid Sulphate Soil Assessment was prepared by Benviron Group in March 2014. The purpose of this report was to determine the presence or absence of acid sulphate soils at the site.

The results of the Suspended Peroxide Oxidation Combined Acidity and Sulphate (SPOCAS) testing indicated that the existing acid trail is greater than the relevant action criteria. However, the observed soil profile, local geology and topography and the results of samples (chromium test suite) indicates the potential for naturally occurring acidity. Therefore Benviron Group determined that the site is not impacted by acid sulphate soils in samples taken from the maximum depths tested.

Air Quality

GHD was engaged to undertake an "Air Quality Assessment" in accordance with the approved methods for the modelling and assessment of pollutants in NSW (DEC, 2005). The revised assessment, which was undertaken in July 2014, examines the construction and operational impacts, including dust generation from the transport of materials and stockpiles and potential odour impacts and provides details of the proposed management and monitoring measures. The results of the air quality impact assessment confirm that *"predicted odour levels from proposed green waste composting without mitigation will not comply with the 2 OU criteria at all nearby sensitive receivers"*. However, *"predicted odour levels from the proposed green waste composting will comply with the criteria if the building is kept at negative pressure and all air is released into the atmosphere via a stack"*. Further, *"based on the assumptions made in the assessment, 24-hour PM10*

concentration levels (without mitigation) from site operations are not expected to comply with the adopted criteria at Private Receiver R1. Annual average PM₁₀ and TSP concentration levels, as well as monthly deposition rates are expected to readily comply with the adopted dust criteria". GHD advise that "dust mitigation measures in the form of Level 2 water sprays on the access roads and truck turning and backing areas are predicted to reduce dust emissions resulting in compliance with the adopted criterion at all private receivers".

The report also identifies that the weather conditions that cause maximum dust impact are generally consistent winds in the direction of the nearest sensitive receivers throughout the daytime period outside of rain events. Further, trucks on unsealed surfaces were identified as the most significant source of dust emissions on the site and provide the greatest contribution to off-site dust impact. Accordingly, GHD recommend that during times of consistent adverse weather conditions (dry and winds), operations of these items should be reduced, or water sprays should be used in order to minimise potential impacts.

Biodiversity

A Biodiversity Assessment Report was prepared by Conacher Environmental Group in March 2014. This report was prepared to address the biodiversity matters identified in the Director- Generals Environmental Assessment Requirements (DGR's) from the NSW Government Department of Planning and Infrastructure and issues raised by government agencies. This report provided details on impacts on critical habitats (including riparian habitat and groundwater dependent ecosystems), threatened species, populations, ecological communities and native vegetation.

Based on the detailed field survey results and the information within the report, it was concluded that:

- No threatened flora species, listed within the Threatened Species Conservation (TSC) Act (1995) or the Environment Protection and Biodiversity Conservation (EPBC) Act (1999), were observed within the subject site;
- The Threatened fauna species, Grey-headed Flying-fox, as listed within the EPBC Act (1999) and the TSC Act (1995) was observed within the subject site during surveys.
- No endangered populations listed within the TSC Act or the FM Act (1994) were observed within the subject site;
- The EPBC Act (1999) listed migratory species, Black-faced Monarch, was observed within the subject site;
- The endangered ecological community, Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion as listed within the TSC Act (1995) was observed within the subject site;
- The endangered ecological community, Illawarra Subtropical Rainforest in the Sydney Basin Bioregion as listed within the TSC Act (1995) was observed within the subject site;
- No threatened ecological communities listed within the FM Act (1994) or the EPBC Act (1999) were observed within the subject site;
- The proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats;
- A Species Impact Statement is not required for the proposed development;
- A referral to the Australian Government Department of the Environment is considered unnecessary;
- The proposed development would maintain or improve biodiversity values within the site and locality through the avoidance of impacts to areas of high biodiversity value, the retention and management

of the riparian corridor which intersects the site and the implementation of the amelioration measures proposed.

Preliminary Hazard Analysis

A Preliminary Hazard Analysis was prepared by Benviron Group in September 2014. The objective of this analysis was to identify the risk posed by the people, property and environment and assess the identified risks using applicable qualitative criteria. The assessment considers the offsite risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The assessment does not consider risks to Bicorp employees or property.

The main hazards identified included diesel, petrol, hydrocarbons, bush fire risks and vehicle collision and roll over. The hazard treatment measures were proposed to produce a low level of risk in accordance with the risk acceptance criteria.

Waste Management

A Waste Management Plan was prepared by Benviron Group in May 2014. This waste management plan was designed in accordance with the relevant waste regulatory criteria including the NSW DECC "Waste Avoidance and Resource Recovery Strategy" (2007), and the NSW DECC "Waste Classification Guidelines" (2009). The report identified, classified and quantified the likely waste streams that would be handled and concludes that less than 20% of material would be unable to be recycled. Overall, the facility will facilitate the secondary use of materials, encouraging the prevention and avoidance of waste.

Groundwater

A Groundwater Assessment was prepared by Benviron Group in June 2014. This report was prepared to assess the existing groundwater conditions and any potential for contamination to migrate from the site. The results of the investigation considered that the risks to human health and the environment associated with soil and groundwater contamination to be low in the context of the proposed use of the site. This was subject to the following recommendations:

- Development of a Soil and Water Management Plan to minimise the amount of surface runoff and potential migration of contamination.
- Engineering of the development working platform to minimise the infiltration of any contaminants into the underlying soils.
- Quarterly testing of the groundwater on site to identify any future trends and characterise the groundwater within the local area.

Soil and Water Management

A Soil and Water Management Plan (Project No. KF110816, Dwg No. C13 & C14) dated July 2014 was prepared by KF Williams and Associates Pty Ltd. This plan indicated methods to minimise dust control through the utilisation of sprinklers, table drain located at the top of the batter to be directed to water quality and recycling pond; landscaped earth wall to assist in visual and environmental impacts; 2 x 100,000 litre rainwater tanks to harvest rainwater and a water quality / recycling pond located on the southern boundary of the site.

A Leachate Control Plan has also been prepared by KFW (Project No. KF110816, Dwg No. C32) to detail the measures which will be implemented to prevent waste leachate and contamination of underlying soils. Such

measures include treatment/construction measures of working surfaces, the provision of a leachate barrier system and a leachate storage system and also the implementation of surface water controls.

Flooding

A Flood Analysis Review (incorporating a Water Sensitive Urban Design Report) was undertaken by KFW & Associates in June 2014 to determine the flooding extent during a 100 year ARI flood event; review the effects of climate change by increasing the intensity of rainfall in the hydrological analysis; review the 100 year ARI flood level; model flooding in the Probable Maximum Flood (PMF); and create flood inundation maps for the 100 year (with climate change) and PMF flood events in both the blocked and unblocked scenario.

The results of the review confirm that the 2D analysis supports the flood levels utilised in the 1D approach and that climate change has been determined to have insignificant effects on the overall peak after surface elevation during the 100 year ARI flood. The site has safe access during the 100 year ARI flood in both the blocked and unblocked scenarios and provides safe refuge for employees during the PMF. KFW conclude that the proposed development is not affected by flooding up to and including the 100 year ARI as flooding is contained within the existing watercourse in the culvert unblocked condition. Minor overtopping occurs during the culvert blocked condition however KFW confirm that flood waters are within safe limits for pedestrians and vehicles in accordance with the NSW Floodplain Development Manual.

Further, KFW confirm that flood inundation maps for the 100 year ARI and PMF "*indicate that the stockpile areas are not inundated during the 100 year ARI flood*". A restricted stockpiling area, which will store a minimum 75mm particle size is delineated on the site plans to prevent materials being washed from the site during the PMF.

Visual Impact

The Visual Analysis prepared by TCG Planning in July 2014 confirms that the visual impact will be minimal due to the siting of the development in a location surrounded by vegetated ridgelines and batters. Whilst short distance views will be available from adjacent industrial properties to the west and south-west the development is currently situated on disturbed land within a visual catchment containing similar industrial uses. The visibility from residences in Farmborough Heights will also be limited due to the existence of separating vegetation; the siting of the railway line; and the setback of dwellings from the edge of the ridgeline.

Heritage Impacts

The Preliminary Heritage Assessment undertaken by Artefact in March 2014 concludes that there were no registered Aboriginal objects or listed heritage items within the study area, or in the immediate vicinity of the study area. A portion of the study area has been impacted by previous development associated with the establishment of the waste recovery facility. The northern and eastern sections of the study area, which would not be impacted by the current proposal, were less disturbed. The northern and eastern section of the study area, which would not be impacted by the proposal, have been assessed as having low-moderate Aboriginal archaeological potential. The remainder of the study area, including the area of proposed impacts was found to have a low Aboriginal archaeological potential. The entire study area was found to have a low non-Aboriginal archaeological potential. Hence, Artefact conclude that there are no heritage constraints on the current proposal. If impacts are proposed outside the current development footprint in areas of low-moderate Aboriginal archaeological potential further investigations would be required.

Impact on Resources

A Minerals Review Assessment was undertaken by Benviron in April 2014. This assessment concludes that based on the scale of the proposed development, the minor impact to the soils (<2m BGL) on site and the fact that the site will remain mostly open and accessible it is not expected that this will impact any mineral/petroleum resources that may be present within the site and impede any future potential for extraction should it arise.

Conclusion

The investigations which have been conducted as part of this Environmental Impact Assessment conclude that the proposed Kembla Grange Waste Recovery Facility, which is proposed to process up to 230,000 tonnes per annum, will have minimal environmental impacts. Where potential impacts have been identified within this EIS, mitigation measures have been recommended to reduce potential risks and impacts to an acceptable level. The Statement of Commitments contained in **Section 12** of this EIS confirms the measures to be implemented by Bicorp during operation of the facility to avoid, minimise, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the project. On this basis it is concluded that the site is suitable for the proposed development and the facility will result in positive social and economic outcomes, with minimal environmental impact.

2 Introduction

This section describes the background to the proposal, the nature of the proposed development, the basis of the designated development application and the structure of this Environmental Impact Statement.

2.1 Purpose of the Environmental Impact Statement

This Environmental Impact Statement ('EIS') has been prepared by TCG Planning on behalf of Bicorp Pty Ltd. It presents the findings of an environmental evaluation which has been undertaken to establish potential impacts associated with a resource recovery facility proposed to process up to 230,000 tonnes per annum on a site located at 50 Wyllie Rd, Kembla Grange.

The 'Environmental Impact Statement' process is the mechanism by which development proposals are appraised in terms of environmental and socioeconomic criteria, in addition to technical considerations. The Environmental Impact Statement defines the context of the proposed development and examines those issues considered to be relevant. This EIS considers the potential significant environmental effects of the proposal during operation and proposes mitigation measures to prevent reduce and offset significant adverse impacts on the environment. The aims of this Environmental Impact Assessment are to:

- Identify all constraints affecting future development on the subject site;
- Consider the economic, social and environmental impacts of the proposed development; and
- Assess the capability of the subject site to support the proposed development.

This Environmental Impact Statement has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act, 1979 and the Environmental Planning and Assessment Regulation, 2000 together with the Director General's Requirements which were issued on 30 May 2012 by Chris Wilson, the Executive Director of Major Projects Assessment, as a delegate for the Director General (refer Appendix 1)

2.2 Overview of Development

The application seeks approval for the Kembla Grange Waste Recovery Facility which includes:

- The processing of up to 230,000 tonnes per annum of building and demolition waste, including brick, concrete, soils, timber, general/solid waste, and non putrescible organic waste;
- Building material storage, waste storage, and processing/stockpiling areas; and
- Ancillary infrastructure including plant and equipment such as crushers, screens and front-end loaders.
- The redesign and expansion of the footprint of storage areas on site, thereby providing a more functional operational arrangement. In addition to an expansion of the footprint of the operations this development application seeks consent for the provision of an upgraded stormwater management system; the relocation and/or provision of the additional buildings on the site including office/amenities, OHS training room and workshop; a weighbridge; the provision of additional and/or relocated car parking spaces; provision of a truck parking area, skip bin storage area and an additional equipment storage area.

2.3 Cost of Development

The development will have a total cost of approximately \$775,676 which pertains to fees associated with construction, drainage and landscape works; the preparation of reports, plans and studies prepared by relevant sub consultants; and additional buildings, as detailed Table 1 below which has been provided by Bicorp.

Table 1: Development Cost Summary

Development Cost	Total Cost
Buildings - 2 x new demountable buildings and 1x smaller work shop <ul style="list-style-type: none"> ▪ Demolition and Alterations ▪ External walls, windows and doors ▪ Internal walls, screens and doors ▪ Wall Finishes ▪ Floor finishes ▪ Ceiling finishes 	\$ 90,000
Fittings and Equipment includes-new weigh bridge program, bumper markers, gates, fences	\$ 25,987
Hydraulic Services includes-engineer plans and inspections and drainage	\$ 42,000
Mechanical Services includes- shed for waste processing	\$160,000
Fire Service-watering service update pump and 2015 meters of poly pipe and sprinklers	\$ 27,689
Lift Services	N/A
External Works includes- earth works, hard surface roads, compaction of fill materials, cut and fill, processing of recyclable materials concrete/brick/spoil to build pad and roads, seal. Construction of dam, Rock retaining wall.	\$280,000
External Services includes-electrician, plumber, testing of compaction material to build up levels	\$ 12,000
Consultant Fees	\$138,000
Total Development Cost:	\$775,676

2.4 Director General's Requirements

The Director General's requirements were issued on 30 May 2012 to enable the Environmental Impact Statement (EIS) to commence, with consultation to occur with government agencies, Wollongong City Council and the local community and stakeholders.

The key project specific issues identified by the Director General for consideration and the relevant section within the Environmental Assessment are noted in Table 2 as follows:

Table 2: Summary of Director General's Requirements and Reference within the EIS

Director General's Requirements	EIS Reference
Clause 6 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 – Form of Environmental Impact Statement	
(a) Name, address and professional qualifications of the person by whom the statement is prepared.	Page 2
(b) the name and address of the responsible person,	Page 2
(c) the address of the land: <ul style="list-style-type: none"> (i) in respect of which the development application is to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out, 	Section 3

(d) a description of the development, activity or infrastructure to which the statement relates	Section 4
(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule,	Section 10
(f) a declaration by the person by whom the statement is prepared to the effect that: <ul style="list-style-type: none"> (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading. 	Page 2
Clause 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 – Content of Environmental Impact Statement	
(a) a summary of the environmental impact statement,	Section 1 (Executive Summary)
(b) a statement of the objectives of the development, activity or infrastructure,	Section 4 (Project Description)
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	Section 5 (Project Need and Alternatives)
(d) an analysis of the development, activity or infrastructure, including: <ul style="list-style-type: none"> (i) a full description of the development, activity or infrastructure, and (ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and (iii) the likely impact on the environment of the development, activity or infrastructure, and 	Section 4 (Project Description) Section 10 (Environmental Assessment)
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),	Section 10 (Environmental Assessment)
General Requirements	EIS Reference
The EIS must include: <ul style="list-style-type: none"> • Detailed description of the development including: <ul style="list-style-type: none"> - Need for the proposed development having particular regard to the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007; - Justification for the proposed development; - Likely staging of the development – including construction and operational stages - Likely interactions between the development and existing approved and proposed operations in the vicinity of the site. 	Section 4 (Project Description) Section 5 (Project Need and Alternatives)
<ul style="list-style-type: none"> • Consideration of all relevant environmental planning instruments, including identification and any inconsistencies with these instruments.; 	Section 6 (Statutory Planning Framework) Section 7 (Local Planning Framework)
<ul style="list-style-type: none"> • Risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment; • 	Section 9 (Environmental Risk Analysis)
<ul style="list-style-type: none"> • Detailed assessment of the key issues specified below and any other significant issues identified in the risk assessment, which includes: <ul style="list-style-type: none"> - A description of the existing environment, <u>using sufficient baseline data</u>; - An assessment of the potential impacts of all stages of the development including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and - A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment. 	Section 10 (Environmental Assessment)

<ul style="list-style-type: none"> Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. 	Section 11 (Statement of Commitments)
Key Issues	EIS Reference
Strategic Land use Planning – including <ul style="list-style-type: none"> Demonstration that the proposal is generally consistent with the aims and objectives of all relevant environmental planning instruments including but not limited to the Wollongong Local Environment Plan (West Dapto) 2012 (WLEP), the Illawarra Regional Strategy and relevant Development Control Plans (DCPs). Justification for any inconsistency between the proposed development and these environmental planning instruments. Details on the suitability of the site for the proposed development, and demonstration that the proposed development would be located on the portion of the site zoned IN2 Light Industrial under the WLEP. 	Section 7 (Local Planning Framework)
Waste Management – Including – <ul style="list-style-type: none"> Identify, classify and quantify the likely waste streams that would be handled/stored/disposed of at the facility. Describe how the waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and The measures that would be implemented to ensure that the development is consistent with the aims and objectives and guidance of in the NSW Waste Avoidance and Resource Recovery Strategy 2007. 	Section 10 (Environmental Assessment) Appendix 6 - Waste Management Plan – Benviron
Air Quality and Odour <ul style="list-style-type: none"> A quantitative assessment of the potential air quality and odour impacts of the development and the effectiveness of the proposed air quality/odour control measures. Construction and operational impacts including dust generation from the transport of materials and stockpiles; and Details of the proposed management and monitoring measures. 	Section 10 (Environmental Assessment) Appendix 8 – Air Quality Assessment - GHD
Noise Including a quantitative assessment of the potential impacts on nearby receivers; and details of the proposed noise management and monitoring measures.	Section 10 (Environmental Assessment) Appendix 9 - Noise Assessment - GHD
Key Issues	EIS Reference
Soil and Water <ul style="list-style-type: none"> A detailed water balance for the development outlining the measures that would be implemented to minimise the use of water on site and measures to ensure an adequate and secure supply of water is available for the proposal; Waste water predictions and the measures that would be implemented to treat, reuse and/or dispose of this water. The proposed erosion and sediment controls during construction. The proposed stormwater management system; and Consideration of the potential watercourse, riparian corridor, ground water, salinity, contamination, flooding and acid sulphate soil impacts of the development. 	Section 10 (Environmental Assessment) Appendix 2 - Development Plans - KFW Appendix 17 – Vegetation Management Plan – Southern Habitat Appendix 13 – Groundwater Assessment - Benviron Appendix 11- Salinity Assessment - Benviron Appendix 14 – Flood Analysis Review– KFW Appendix 12 - Acid Sulphate Soil Assessment – Benviron

Traffic and Transport <ul style="list-style-type: none"> ▪ Details of traffic types and volumes likely to be generated during construction and operation; ▪ An assessment of the predicted impacts of the traffic on the safety and capacity of the surrounding road network and description of the measures that would be implemented to upgrade or maintain this network over time. ▪ Details of key transport routes, site access, internal roadways infrastructure works and parking; and ▪ Detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian Standards. 	Section 10 (Environmental Assessment) Appendix 19 – Traffic Impact Statement - KFW
Biodiversity Including impacts on critical habitats (including riparian habitat and groundwater dependent ecosystems), threatened species, populations, ecological communities and native vegetation.	Section 10 (Environmental Assessment) Appendix 16 – Biodiversity Assessment Report – Conacher Environmental
Greenhouse Gas <ul style="list-style-type: none"> • A quantitative assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the development and a qualitative assessment of the potential impacts of these emissions on the environment; and • Detailed description of the measure that would be implemented on site to ensure that the development is energy efficient. 	Section 10 (Environmental Assessment) Appendix 7 - Greenhouse Gas Assessment – Pacific Environment
Hazards A Preliminary Hazard Analysis (PHA) of the development, and an assessment of the potential fire risks (including bushfire risks) of the development.	Section 10 (Environmental Assessment) Appendix 5 – Preliminary Hazard Analysis - Benviron
Visual <ul style="list-style-type: none"> ▪ An assessment of the potential visual impacts of the development on the amenity of the surrounding area; and ▪ A detailed description of the measures (eg landscaping) that would be implemented to minimise the visual impacts of the development. 	Section 10 (Environmental Assessment)
Socio economic Including a comprehensive assessment of the economic and social impacts of the development, demonstrating that it would have a net benefit for the community, paying particular attention to the potential impacts of the development on waste minimisation and resource recovery in the region.	Section 11 – Socio Economic Impacts
Plans and Documents	EIS Reference
A site analysis plan	Section 3 – Site Context and Appendix 2- KFW
Stormwater concept plan	Appendix 2 - Stormwater Plans- KFW
Soil and Water Management plan	Appendix 2 – Soil and Water Management Plans - KFW
An existing survey plan	Appendix 2 – Details provided on Site Plan
A locality/context plan	Section 3 – Site Context
Architectural drawings	Appendix 3 – Architectural Plans
Geotechnical report	Section 10 (Environmental Assessment) Appendix 10 – Geotechnical Investigation Report- Benviron
View Analysis	Appendix 20 – Visual Analysis – TCG Planning
Landscape plan	Appendix 4 – Landscape Plans - Ochre
Shadow diagrams	Not required – one storey buildings only, located centrally within the site

Consultation	EIS Reference
<p>Consultation</p> <p>During the preparation of the EIS, you must consult with the relevant local, state or commonwealth government authorities, service providers, community groups and affected landowners.</p> <p>The EIS must describe the consultation process and issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address and issue a short explanation should be provided.</p>	Section 8 - Consultation

Attachment 2 of the Director General's requirements also contained the EIS referral advice provided within correspondence from the Roads and Maritime Services and the Department of Primary Industries (Office of Water), which is summarised within Table 3 below:

Table 3: Summary of Government Agency Referral Advice and Reference within the EIS

Government Agency Advice	
Roads and Maritime Services – Correspondence Dated 29 May 2013	EA Reference
<p>Traffic Impact Study is required. As a guide Table 2.1 of the RMS Guide to Traffic Generating Developments outlines the key issues that may be considered in preparing a traffic impact study.</p> <p>The applicant should identify suitable infrastructure required to ameliorate any traffic impacts and safety impacts associated with the development. This should include identification of pedestrian, cyclists and public transport infrastructure.</p> <p>RMS Strongly recommends that the developer considers the environmental impacts of any proposed road networks as the part of the Statement of Environmental Effects. If these impacts are not considered, then the RMS then the applicant would require the applicant to provide a separate environmental impact assessment, a 'review of Environmental factors', prior to commencing any works that were conditioned as requirements of the development.</p>	<p>Section 10 (Environmental Assessment)</p> <p>Appendix 19 – Traffic Impact Statement - KFW</p>
Department of Primary Industries, Office of Water – Correspondence Dated 25 May 2012	EA Reference
<p>Legislation:</p> <p>The EIS should take into account the objects and regulatory requirements of the Water Act, 1912 and the Water Management Act, 2000. Proposals and management plans should be consistent with the objects (s.3) and Water Management principles (s.5) of the WMA.</p> <p>Water Sharing Plans:</p> <p>The proposal is within the area covered by the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources and the water Sharing Plan for the Greater Metropolitan Groundwater Sources. The EIS should:</p> <ul style="list-style-type: none"> demonstrate how the proposal is consistent with the rules of the WSP including rules for access licences, distance restrictions for water supply works and rules for management of local impacts; provide a description of any site water use and management of sediment dams, clear water diversion structures etc.; provide an analysis of the water supply arrangements against the rules for access licences and other requirements under any relevant WSP. <p>Relevant Policies:</p> <p>The EIS is required to take into account the following policies:</p> <ul style="list-style-type: none"> NSW State Rivers and Estuary Policy 1993 NSW State Groundwater Policy Framework Document, 1997 NSW State Groundwater Quality Protection Policy, 1998 NSW State Groundwater Dependent Ecosystems Policy, 2002 Office of Water Guidelines for Controlled Activities, 2010/2011 	<p>Section 6 (Statutory planning Framework)</p> <p>Appendix 14 – Flood Analysis Review - KFW</p> <p>Section 6 (Statutory Planning Framework)</p>
<p>Licensing Considerations:</p> <p>Adequate mitigating and monitoring requirements to address impacts to surface water and groundwater sources and dependent ecosystems.</p> <p>Construction of watercourse crossings and/or any works in or within 40m of a watercourse must demonstrate consistency with the NSW Office of Waters Controlled Activity Guidelines.</p>	<p>Appendix 9 – Groundwater Assessment - Benviron</p> <p>Section 6 (Statutory planning Framework)</p> <p>Appendix 17 – Vegetation Management Plan – Southern Habitat</p>

Attachment 2 of the Director General's requirements also contained the EIS referral advice provided within correspondence from Wollongong City Council, which is summarised in Table 4 below:

Table 4: Summary of Wollongong City Council Referral Advice and Reference within the EIS

Wollongong City Council Advice	
Correspondence Dated 25 May 2013	EA Reference
<p>Planning: Permissibility of the development will be required to be considered under WLEP (West Dapto) 2010. Consideration is required of Clause 6.2 (Development Control Plan) of WLEP (West Dapto) 2010 in conjunction with Chapter D16 (West Dapto Release Area) of Wollongong DCP 2009 which requires the proponent to submit a Neighbourhood Plan in consultation with adjacent landowners. Defined Neighbourhoods are shown in Figure 5.1 of Chapter D16.</p>	Section 7 – Local Planning Framework
<p>Riparian Land: A watercourse traverses the site and the site is affected by a riparian corridor. An assessment of the impacts of the riparian area running through the property is also required he requirements of Clause 7.6 of WLEP (West Dapto) 2010 and Chapter 23 Riparian Land Management of Wollongong DCP 2009 are to be addressed to ensure the development does not adversely impact on riparian lands.</p>	Section 10 (Environmental Assessment) Appendix 17 – Vegetation Management Plan
<p>Bushfire Prone Land: Council's records identify the site to be bushfire affected. The proponent should provide bushfire assessment report and the assessment will need to take into consideration NSW Rural Fire Service Planning for Bushfire Protection 2006."</p>	Section 10 (Environmental Assessment) Appendix 18 – Bushfire Protection Assessment
<p>Contaminated Land: Council's records indicate that the site has the potential to be affected by contaminated land. The proponent and assessment will need to consider the requirements of State Environmental Planning Policy No.55- Remediation of Land and such that the proposed use is suitable for the land</p>	Section 10 (Environmental Assessment)
Correspondence Dated 25 May 2013	EA Reference
<p>Acid Sulphate Soils The site is also identified to be potentially affected by acid sulphate soils. Consideration should be given to Clause 7.1 of WLEP (West Dapto) 2010 such that the proposed development does not cause environmental damage and identify whether the proposal requires an acid sulphate soils management plan.</p>	Section 10 (Environmental Assessment) Appendix 12 - Acid Sulphate Soils Assessment
<p>Traffic: The proposal is listed in Column 2 of Schedule 3 of the SEPP Infrastructure as Traffic Generating Development which requires consideration by NSW Roads and Maritime Services. And requires a traffic impact assessment (TIA) in accordance with the RTA Guide to Traffic Generating Development. The assessment will need to consider the future road network, existing and future background traffic with and without the development and provide a multi model analysis of the traffic generation to/from the site and thorough consideration of safety/capacity implications on local and state roads. Consider Wollongong DCP 2009 Chapters E3, B5 and D16 and the Australian Standard series, in particular AS2890.1, AS2890.2 and AS2890.6.</p> <p>A key consideration of the neighbourhood plan and TIA is the future upgrade of Wyllie Road which will become part of the proposed Northcliffe Drive Extension; a 4 lane major collector road with a significant intersection treatment (roundabout) midway along the site. The applicant should provide one centralised access point from the proposed roundabout.</p>	Section 10 (Environmental Assessment) Appendix 19 – Traffic Impact Assessment
<p>Landscape: A landscape plan for the proposed development would be required to address the further expansion of the site and consideration to Chapter E6 Landscaping of Wollongong DCP 2009.</p>	Appendix 4 – Landscape Plans

<p>Stormwater: A flood study should be carried out by a suitably qualified consulting engineer for the watercourse traversing the site to determine the development potential of this property strictly in accordance with the requirements of Chapters E13 and E14 of Wollongong DCP 2009 and the NSW Governments Floodplain Development Manual 2005.</p> <p>Climate Change" impacts should also be considered by increasing rainfall intensities as recommended by the Office of Environment and Heritage within the Premier and Cabinet. Consideration should also be given to the Mullet and Brooks Creeks Floodplain Risk Management Study and Plan dated February 2010, Mullet Creek, West Dapto Extension of Model dated December 2011 and Chapter D16(West Dapto Release Area) in Councils Wollongong DCP 2009.</p> <p>It is recommended that a green corridor be established along the Category 2 watercourse traversing the site be defining the "Riparian" extents (Councils Environment Section) and the Probable Maximum Flood (PMF)" extents (Flood Study) and establishing the greater of two as being a "Green Corridor" or "Environmental Corridor." In this respect in determining the development potential of the site Councils Riparian Corridor Management Study should be considered.</p> <p>On site stormwater management should be detailed to ensure the water quality of the watercourse is not affected. As it is envisaged that the proposed development will generate nutrient rich runoff that will require appropriate control prior to discharge into natural watercourse.</p>	<p>Appendix 2 – Stormwater Plans</p> <p>Appendix 14 – Flood Analysis Review</p>
<p>Geotechnical: A geotechnical report should be submitted as per Chapter E12 of Wollongong DCP 2009 as Council records list the land to be identified as potentially unstable land. Geotechnical implications of the proposed development will be required to be considered with regard to the geotechnical constraints of the site.</p>	<p>Section 10 (Environmental Assessment)</p> <p>Appendix 10 – Geotechnical Assessment</p>
<p>Environmental: The EIS should access both the direct and indirect ecological impacts associated with the site.</p>	<p>Section 10 (Environmental Assessment)</p> <p>Appendix 16 – Biodiversity Assessment Report</p>
<p>Flora and Fauna: A flora and fauna assessment undertaken by a suitably qualified ecologist is required to be included in the EIS. The assessment must be undertaken in accordance with the provisions of Chapter E18: Threatened Species Impact Assessment" of Wollongong DCP 2009.</p>	<p>Appendix 16 – Biodiversity Assessment Report</p>

Correspondence Dated 25 May 2013	EA Reference
<p>Vegetation Management Plan: A Vegetation Management Plan (VMP) would need to be submitted which outlines the management of existing vegetation on the site and the management of the required riparian corridor. The VMP should include clear objectives, responsibilities and timelines.</p> <p>Dust Assessment: A dust assessment and management report should be provided to ensure that the dust generated from the proposed development is acceptable and can be appropriately managed such that there are not adverse impacts on the surrounding area in particular the residences of Farmborough Heights.</p> <p>Acoustic Assessment: An acoustic report should be provided to ensure the noise generated from the activities associated with the proposed use is acceptable and will not adversely impact the nearby residents in particularly the residential area of Farmborough Heights to the north, north east of the site.</p>	<p>Appendix 17 – Vegetation Management Plan</p> <p>Section 10 (Environmental Assessment)</p> <p>Appendix 8 – Air Quality Assessment</p> <p>Section 10 (Environmental Assessment)</p> <p>Appendix 9 – Noise Assessment</p>

2.5 Project Team

TCG Planning has engaged a project team on behalf of Bicorp Pty Ltd to undertake the design and specialist investigations pertaining to the project. This team comprises:

- Town Planning – TCG Planning
- Visual Analysis – TCG Planning

- Community Consultation – TCG Planning
- Biodiversity Assessment - Conacher Environmental Group
- Acoustic Assessment - GHD
- Acid Sulphate Soil Assessment - Benviron Group
- Vegetation Management Plan- Southern Habitat
- Arborist – David Potts
- Flood/ Stormwater- KFW and Associates Pty Ltd
- Air Quality Assessment - GHD
- Geotechnical Assessment - Benviron Group
- Groundwater Assessment- Benviron Group
- Traffic- KFW and Associates Pty Ltd
- Landscape - Ochre Landscapes Pty Ltd
- Bushfire - Eco Logical Australia Pty Ltd
- Salinity and Groundwater Assessment – Benviron Group
- Preliminary Hazard - Benviron Group
- Waste Management – Benviron Group
- Greenhouse Gas Assessment - Pacific Environment Limited
- Water Sensitive Urban Design Strategy – KFW
- Soil and Water Management Strategy- KFW
- Leachate Control Plan - KFW
- European and Aboriginal Heritage - Artefact Heritage

2.6 Consultation

The preparation of the Environmental Impact Assessment has involved consultation with a number of government and non-government organisations and interest groups. The consultation was undertaken to identify the views and concerns of interested/affected parties with respect to the likely environmental, infrastructure and amenity impacts of the proposed development.

Consultation has continued throughout the preparation of the Environmental Impact Assessment and in particular consultation has taken place with the following agencies, groups and organisations:

- Wollongong City Council;
- Department of Planning and Infrastructure;
- Environmental Protection Authority;
- Office of Water;
- Roads and Maritime Services.

Further, comments provided by Jemena Gas during consideration of previous development applications have also been addressed during preparation of this EIS.

The consultation process has been instrumental in determining issues surrounding the proposed development and in shaping the design of the subject site. A comprehensive review of the issues raised through the consultation process is provided in the consultation outcomes contained in Section 8 of this Environmental Impact Statement.

2.7 Accompanying Documentation

Table 5 below contains a list of the documents which inform this EIS and which comprise the Appendices of this Environmental Statement.

Table 5: Accompanying Documentation

GENERAL DOCUMENTATION				
Title	Author	Dated	Document No	
Preliminary Hazard Assessment	Benviron Group	September 2014	Ref:E49/4	
Waste Management Plan	Benviron Group	May 2014	Ref.E49/8	
Greenhouse Gas Assessment	Pacific Environment Limited	October 2013	Job No. 7326-01	
Air Quality Assessment	GHD	June 2014		
Noise Assessment	GHD	June 2014		
Geotechnical Assessment	Benviron Group	May 2014	Ref: G2013-001	
Salinity Assessment	Benviron Group	August 2013	Ref: E49/7	
Acid Sulphate Soil Assessment	Benviron Group	March 2014	Ref:E49/5	
Groundwater Assessment	Benviron Group	June 2014	Ref: E49/6	
Flood Analysis Review (WSUD & Flood Analysis Report)	KFW	June 2014	KF110816	
Biodiversity Assessment	Conacher Environmental Group	March 2014	Ref:4029	
Vegetation Management Plan	Southern Habitat	June 2014		
Bushfire Assessment	Eco Logical Australia Pty Ltd	July 14	Project No. 13GOSBUS-0034	
Traffic Impact Assessment	KF Williams and Associates Pty Ltd	September 2014	KF110816/D	
Visual Analysis	TCG Planning	July 14		
Arborist Report	David Potts	December 2012		
Minerals Review Assessment	Benviron	April 2014		
DEVELOPMENT AND ENGINEERING DRAWINGS				
Title	Dated	Dated	Drawing No.	Revision No.
Site Plan	KFW	16 Sept 2014	KF110816 - C10	M
Site Sections	KFW	10 June 2014	KF110816- C11	E
Pond details	KFW	16 Sept 2014	KF110816 -C12	G
Soil and Water Management Plan	KFW	10 June 2014	KF110816 - C13	G
Soil and Water Management Details	KFW	25 February 2014	KF110816 - C14	B
Surfaces Plan	KFW	18 October 13	KF110816 - C15	C
OSD Basin B	KFW	10 June 2014	KF110816-C16	B
Shredding Area Detail	KFW	25 February 2014	KF110816- C17	B
Swept Path and Car Parking	KFW	25 February 2014	KF110816 -C18	D
Existing Site Plan	KFW	20 February 2014	KF110816-C19	A
Site Plan - Proposed Layout	KFW	June 2014	KF110816-C27	B
Cut and Fill Plan	KFW	February 2014	KF110816 - C28	A
Site Plan - Usage Areas	KFW	February 2014	KF110816 - C29	A
Site Plan - Flood Lines	KFW	10 June 2014	KF110816 - C30	B
Rainwater Harvesting Plan	KFW	10 June 2014	KF110816 - C31	B
Leachate Control Plan	KFW	17 June 2014	KF110816 - C32	B
Q100 Flood Levels	KFW	Feb 2014	KF110816 - C33	A
Operational Plan - Layout Version 1	KFW	Feb 2014	KF110816 - C34	
Landscape Concept Plan	Ochre	11 Sept 2014	1442-LC01E -Sht 1&2	
Architectural Plans	DJ Little	8 July 2014 29 Aug 2014	21304 Sheets 1 -5 and 7-18 (Rev B) Sheet 6 (Rev C)	

3 Site Context

3.1 Subject Site

The subject site is located at No. 50 Wyllie Rd, Kembla Grange, also identified as Lot 10 DP 878167, as shown in Figure 1. The site is located within the Lake Illawarra catchment and covers approximately 21.7 hectares in area. The proposed development site has an area of approximately 49,425m².



Figure 1: Location of subject Property (Lot 10 DP878167) Source: Six Maps

The split zoning of the land reflects this variation in land use, with the area of workings zoned being located in the IN2 Light Industrial and the vegetated areas principally zoned RE2 Private Recreation pursuant to Wollongong LEP 2009. Figure 2 shows the approximate extent of the development area within the subject property.



Figure 2: Approximate Area of Proposed Workings on Subject Property (Lot 10 DP 878167) Source: Six Maps

The site is located on the northern side of Wyllie Road and contains cleared areas used for building material storage and recycling material, while the remainder of the site across the northern and eastern section remains vegetated. The site also contains a single pond which provides for OSD requirements and for runoff storage. However, the site has undergone significant disturbance associated with historical broad scale vegetation clearing and disturbance to the land surface within the south western section of the site due to the use of the site as a resource recovery facility.

The site is bounded to the north by an existing ridgeline. The ground is steeply sloping from the south-eastern entrance from Wyllie Rd at approximately +RL 44.0 AHD to a level platform located at the western part of the site at + RL 21.0 AHD. Within the site the Gwynneville soil landscape comprises the areas on the foot slopes of the Illawarra escarpment, local relief is approximately 30-100m and slope gradients are up to 25%. The underlying geology consists of the Illawarra Coal Measures and occasional rock outcropping is present along the drainage line which intersects the site.

The site is well elevated and is well above the Mullet Creek/Lake Illawarra flood plain. The site is bisected by a natural watercourse that flows north-south through the central portion of the site and there are two transmission line easements which traverse the site.

The current building material storage and recycling facility was approved pursuant to DA 2009/1153 on 29 April 2010, with Modification 2009/1153/A issued on 17 July 2012, granting approval to an increase in the annual tonnage to 29,999 tonnes. Evidence of workings associated with such approvals seen in the aerial photograph contained in Figure 3 (*nearmap.com.au*). The current facility includes a number of stockpile areas, a dam, buildings and two shipping containers, as shown in Figures 4-14.



Figure 3: Subject Property showing positioning of existing workings (Lot 10 DP 878167) Ref: Nearmap

Photographs showing the access to the site, signage, and equipment and on site operations are contained in Figures 4 to 10 below.



Figure 4: Existing stockpiles on site of finished product

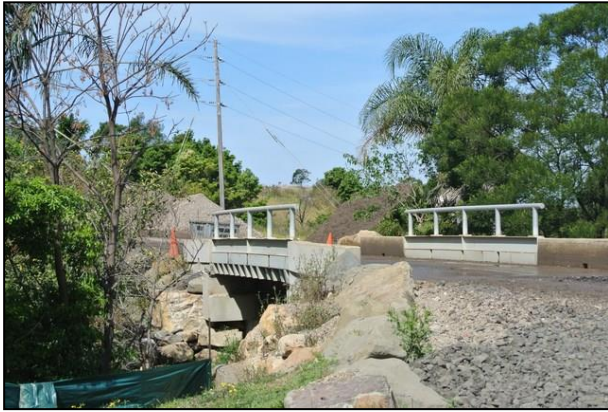


Figure 5: Existing bridge located within the subject site.



Figure 6: View of the subject site looking towards the current area of workings



Figure 7: Stockpile areas within the subject site.



Figure 8: Existing operations on site



Figure 9: Water spraying conducted on site



Figure 10: Existing operations on site

3.2 Section 149(5) Certificates

The subject site is currently zoned IN2 Light Industrial and RE2 Private Recreation under the current environmental planning instrument, *Wollongong Local Environmental Plan 2010 (West Dapto)*. The development will be contained within the IN2 zone. The section 149 certificates issued by Council for Lot 10 DP 878167 indicate the following constraints:

Bushfire Prone Land: The land is identified as bushfire prone land.

Mine Subsidence: The land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

Road Widening and Road Alignment: Council has no record that the land is affected by any Road Widening or Road Alignment.

Contaminated Land: Council's records show that because of the previous uses the land may be contaminated.

Land Stability: Council's land constraint/stability assessment maps show that the land is located in an area where landslip and/or subsidence have occurred, or stability is suspected.

Flood and Drainage: Council's records indicate that this property is located within an Uncategorised Flood Risk Precinct.

Erosion: The subject site is not impacted by erosion.

Contribution Plans: The West Dapto Area 94 Contributions Plan applies to the subject site.

Biodiversity Certified Land: The subject site is not identified as being biodiversity certified land.

3.3 Surrounding Development

A water treatment facility is located to the west of the site, together with other heavy industrial uses such as 24 hour pipe coating operations, and steel manufacturing (refer Figures 15-16). Other uses sited to the west of the site include a substation and storage facilities, the Wollongong Waste and Recovery Park (formerly known as the Whytes Gully Tip) and the Soilco site. To the east is the Macedonian Orthodox Church, vacant land, open space and the Wollongong Lawn Cemetery. Both adjacent uses are accessed via Wyllie Road.

To the north, buffered by bushland, is the residential neighbourhood of Farmborough Heights. The residences located to the north of the site are sited on an elevated rock shelf that is approximately 15-30 metres up slope above the proposed development site. The nearest residence are approximately 500m from the proposed area of working. A vegetated buffer consisting of moderately dense sclerophyll forest separates the closest residences to the north from the proposed development site.

The siting of the above described adjacent landuses is shown in the aerial photograph in Figure 13.



Figure 11 & 12:
View of adjacent
industrial and
storage facilities to
the west and
south-west of the
site.

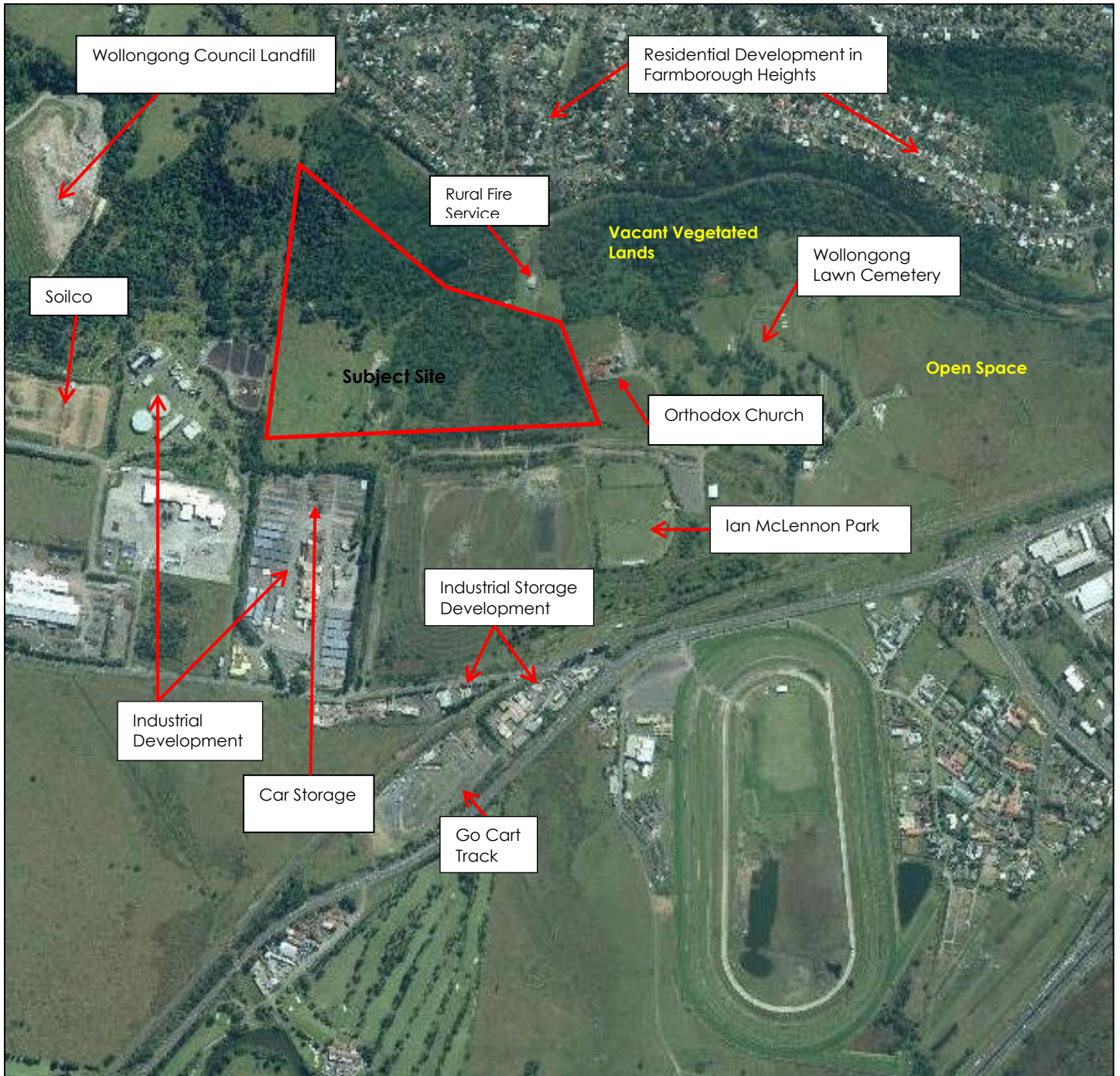


Figure 13: Aerial map showing surrounding development. Ref: Six Maps.

4 Project Description

Section 4 contains a summary of the development history of the site operations; a detailed description of the capacity and operation of the facility; as well as a discussion of the need for the project.

4.1 Development History

4.1.1 Summary of Approvals

The existing building material storage and recycling facility which operates on the site was approved pursuant to DA-2009/1153 on 29 April 2010. The description, terms and key conditions of this consent and a number of later modifications are detailed in sections 5.1.1 to 5.1.4 below and summarised in Table 6.

Table 6: Summary of Development Applications - 50 Wylie Rd, Kembla Grange

Application	Development	Outcome	Consent Authority
DA 2009/1153	Building material storage and recycling facility, which incorporated a workshop building; work / storage area and two shipping containers for storage purposes.	Approved 29 April 2010	Wollongong City Council
DA 2009/1153/A	Increase in annual tonnages to 29,999 tonnes per year, and to increase the maximum storage capacity to 2,500 tonnes.	Approved 17 July 2012	Wollongong City Council
DA 2009/1153/B	Relocate approved structures on the site, provide an additional equipment storage area for trucks, and provide a more functional operational arrangement for the site.	Withdrawn 15 March 2013	Wollongong City Council
DA 2009/1153/C	Seeks to vary the terms of Condition 8 so that an interim occupation certificate may be issued.	Under assessment	Wollongong City Council
DA 2009/1153/D	Seeks approval under section 96(2) of the EPA Act for alterations and additions (including relocation of buildings and carparking) with no increase in processing capacity.	Under assessment	Wollongong City Council
DA 2013/435	Expansion of the footprint of storage areas and the construction of a perimeter road, with no increase in the capacity of the facility.	Withdrawn 29 Sept 2013	Wollongong City Council
DA 2014/793	Redesign and expand the footprint of the development with no increase in tonnage.	Rejected 25 July 2014	Wollongong City Council
DA 2014/1073	Redesign and expand the footprint of the development with no increase in tonnage.	Rejected 15 September 2014	Wollongong City Council

DA-2009/1153

Development Consent DA-2009/1153 granted consent for a "building material storage and recycling facility". Specifically, this consent approved the following (as described in SEE dated September 2009, MMJ):

- Construction of a workshop building (50m x 75m) within the south-western portion of the property;
- Establishment of a work / storage area (90m x 75m) immediately to the east of the workshop building which is to be a reasonably level surface of compacted crushed concrete and road base material;
- Placement of an office within the south eastern corner of the hardstand work area, together with 4 on site car parking spaces and equipment storage area; and
- The placement of two shipping containers for storage purposes on the western fringe of the hardstand area and a further shipping container within the main work area.

The operational process outlined within the SEE was as follows:

The processes involved on-site will included individual product separation, cleaning and storage (both manually and with small plan), together with the crushing of concrete by use of a hydraulically-operated excavator mounted "Eco Crusher". The purpose of this facility is to allow for the viable recycling of redundant building materials in lieu of deposition to landfill sites.

This activity is an owner-operated development with no more than four (4) persons being on-site at any one time. The hours of operation will be 6:00am to 6:00pm daily, apart from Sundays. There will be no work undertaken on Sundays. The machines to be used for this activity are two (2) front-end loader vehicles (maximum) with one machine to be contained permanently on-site."

4.1.2 Modification DA-2009/1153/A

A subsequent approval was issued on 17 July 2012 for DA-2009/1153/A which granted an increase in annual tonnages to 29,999 tonnes per year, and to increase the maximum storage capacity to 2,500 tonnes. The following amendments were made to the consent:

- Condition 19 – amended to provide for 10 car parking spaces, where the location is to be shown on the CC plans;
- Condition 95 – 98 – new conditions relating to:
 - Condition 95 – allows for the increased tonnage to a maximum of 29,999 tonnes per year;
 - Condition 96 – limits stockpile capacity of organic matter to 2,500m³ at any one time;
 - Condition 97 – requires the preparation of an interim report for odour monitoring 6 months following commencement of shredding and composting; and
 - Condition 98 – requires that stormwater runoff be directed to a sediment pond.

4.1.3 Modification DA-2009/1153/B

An application for modification to the building materials and storage facility under Section 96(1A) of the EPA Act, 1979 was lodged with Wollongong City Council on 25 October 2012. This application (Modification B) sought to relocate approved structures on the site and to provide an additional equipment storage area for trucks, and to provide a more functional operational arrangement for the site.

This development application was withdrawn from Council on 15 March 2013 due to Council's concern that the proposed changes to the approved plans were not substantially the same as the approved development and hence could not be considered as a Section 96 modification. The proposed relocation to the approved

structures (in a slightly altered position) has therefore now been incorporated within this current subject development application and environmental impact assessment.

4.1.4 Modification DA-2009/1153/C

An application for modification to the building materials and storage facility under Section 96(1A) of the EPA Act, 1979 was lodged with Wollongong City Council on 17 July 2014. This application (Modification C) seeks to vary the terms of Condition 8 so that an interim occupation certificate may be issued. The application is currently under consideration by Council.

4.1.5 Modification DA-2009/1153/D

An application for modification to the building materials and storage facility under Section 96(2) of the EPA Act, 1979 was lodged with Wollongong City Council on 28 August 2014. This application (Modification D) seeks approval for alterations and additions (including relocation of buildings and carparking) with no increase in processing capacity. The application is currently under consideration by Council.

4.1.6 DA-2013/435

In April 2012 DA 2013/435 was lodged with Wollongong City Council for the expansion of the footprint of storage areas and the construction of a perimeter road. This development application did not seek to increase the capacity of tonnage of building material or recyclables on the site but to increase the footprint of the development, thereby providing a more functional operational arrangement. Approval was sought for this increased footprint to provide scope for approval of an increased tonnage at a later application date. This application was withdrawn in September 2013 following Council's advice that the application be re-submitted as designated development supported by an Environmental Impact Statement.

4.1.7 DA-2014/793

In July 2014 DA 2014/793 was lodged with Wollongong City Council for the redesign and expansion of the Building Material Storage and Resource Recovery Facility of less than 30,000 tonnes per annum. The application was rejected by Council on 25 July 2014 as Council advised that the application failed to address submission requirements, namely "*Schedule 1, Part 1, Clause 2(e) and environmental impact statements (in the case of designated development or State Significant development)*". It appears that Council did not consider the application under Clause 35 of Part 2 of Schedule 3 of the EPA Regulations, 2000 which confirms that alterations and additions which do not significantly increase the environmental impacts of the total development are not designated.

4.1.8 DA-2014/1073

On 3 September 2014 the application which was previously referred to as DA 2014/793 was re-lodged with Wollongong City Council and was accompanied by additional information. This application was rejected by Council on 15 September 2014 as the application did not address submission requirements, with Council indicating that the application would not be considered as alterations and additions.

4.1.9 Conversion to Single Development Consent

The site currently operates under development consent DA 2009/1153/A, with the original development consent granting approval for the waste recycling facility and the modified consent granting approval for an

increased capacity to 29,999 tonnes per annum. The current development application (SSD 5300) seeks to increase the tonnage to 230,000 tonnes per annum, with a redesigned and expanded working area and infrastructure.

We note that Development Consent 2009/1153/A will be extant as this consent gave approval for a number of works and activities which remain in existence, such as the access bridge. However, the new consent will replace the previous consent for all operative works/areas.

4.2 Project Justification

A "Waste Management Plan" was prepared by Benviron in May 2014 (contained in Appendix 6) to determine the environmental impact of waste generated from the facility and to determine the measures to be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007.

The report provides a detailed analysis of waste to be received by the facility, including the quantity of various materials to be stored, the process and handling of each material, proposed storage, and the anticipated residual waste to be deposited as landfill. Based on this breakdown, it can be seen that minimal waste will be generated by the recycling facility. The facility will instead allow for the achievement of the following as outlined within the Waste Management Report:

- *Preventing and avoiding waste;*
- *Increasing recovery and use of secondary materials;*
- *Reducing toxicity in products and materials; and*
- *Reducing litter and illegal dumping.*

Furthermore, the recycling facility will also aid in achieving NSW targets specifically by reducing waste quantities in the following manner:

- *Municipal waste – from a baseline 26% to 66%*
- *Commercial and industrial (C&I) waste – from a baseline 28% to 63%*
- *Construction and demolition (C&D) waste – from a baseline 65% to 76%*

The Waste Management Plan prepared by Benviron estimates that less than 20% of material received on site will be unable to be recycled. Further, this report concludes that the proposed facility expansion will promote the recovery and use of secondary material and the prevention and avoidance of waste in accordance with the NSW DECC Waste Avoidance and Resource Recovery Strategy (2007) goals.

4.3 Project Description

This subject application seeks approval for expansion to the Kembla Grange Waste Recovery Facility which will provide mixed construction and demolition waste sorting, processing and recycling facilities for the Illawarra region. The facility will handle construction & demolition (C&D) and commercial & industrial (C&I) waste which are covered by the protection of the Environment Operations (POEO) Act, 1997.

The current building material storage and recycling facility was approved pursuant to DA 2009/1153 on 29 April 2010, with Modification 2009/1153/A issued on 17 July 2012 granting approval to an increase in the annual

tonnage to 29,999 tonnes. The current facility includes a number of stockpile areas, a dam, and other associated infrastructure contained within the IN2 Light Industrial zone of the site.

This Environmental Impact Statement accompanies a development application which seeks approval for expansion of the Kembla Grange Waste Recovery Facility to allow:

- The processing of up to 230,000 tonnes per annum of building and demolition waste, including brick, concrete, soils, timber, general/solid waste, and non putrescible organic waste;
- Building material storage, waste storage, and processing/stockpiling areas; and
- Ancillary infrastructure including plant and equipment such as crushers, screens and front-end loaders.
- The redesign and expansion of the footprint of storage areas on site, thereby providing a more functional operational arrangement. In addition to an expansion of the footprint of the operations this development application seeks consent for the provision of an upgraded stormwater management system; the provision of buildings on the site including office/amenities, OHS training room and workshop; a weighbridge; the provision of additional and/or relocated car parking spaces; the authorisation of the weighbridge; the provision of a truck parking area, skip bin storage area and an additional equipment storage area.

4.3.1 Development Capacity

The development application seeks approval for:

- An increase in the processing capacity to up to 230,000 tonnes per annum, with a redesign and expansion of the footprint of the development, thereby providing a more functional operational arrangement.
- A maximum storage capacity of 45,000 tonnes of waste at any one time, increased from the 2,500 tonnes which can currently be stored on the site pursuant to Development Consent 2009/1153/A;
- Processing of up to 871 tonnes per day.
- Processing of up to 30,000 tonnes of non putrescible organics per annum (of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood)
- Storage of no more than 2500m³ of organic matter on the site at any time (which includes timber, tree stumps etc). Of the 2500m³ of organics, no more than 500m³ tonnes of this will comprise compost.

Stockpile heights will be as follows:

- Stockpiles of inert material such as concrete, brick, soil etc will be stockpiled to a maximum of 5m in height.
- Stockpiles of organic material such as timber, garden waste, composting material etc will be stockpiled to a maximum of three (3m) in height.

4.3.2 Development Summary

Table 7 below provides a description of key aspects of the proposed development and a comparison with the existing approved development.

Table 7: Summary Table of key Components of Proposed Development

Component	Existing Operations	Proposed Operations
Capital Investment Value		\$774,676
Total Waste Capacity	29,999 tonnes per annum	230,000 tonnes per annum
Max Storage Capacity	2,500 tonnes	45,000 tonnes
Maximum daily product delivery rate	120 tonnes per day (approx)	871 tonnes per day
Organic Matter Maximum received	Not stated in relevant consent	30,000 tonnes per annum - inclusive of organics (non putrescibles), garden/vegetative waste and timber - of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood)
Organic Matter Max Storage Capacity	2500m ³ (stored on site at any one time)	2500m ³ (stored on site at any one time) of which a maximum of 500m ³ will be compost
Staff Numbers		Construction: 4-6 persons on site
	Operation: 8 full time	Operation: 40 staff members, which will include: <ul style="list-style-type: none"> ▪ Office staff; ▪ Weighbridge operators; ▪ Mechanics/welders; ▪ Truck/loader operators; ▪ Labours; ▪ Environmental engineer; ▪ Safety officer; ▪ General Manager; and ▪ Sales rep/estimators.
Daily vehicle movements Based on total equivalent movements of Car/ute = 1 Single unit truck = 1.5 Truck/Dog or semi - 4	Employees - 8 Visitors - 8 Machinery/deliveries - 12 <u>Material delivery:</u> Cars/utes - 48 Single truck units - 18 Truck/dogs - 48 <u>Material Sales:</u>	Employees - 40 Visitors - 32 Machinery/deliveries - 36 <u>Material delivery:</u> Cars/utes - 174 Single truck units - 87 Truck/dogs - 160 <u>Material Sales:</u>

Component	Existing Operations	Proposed Operations
	Cars/utes - 48 Single truck units - 18 Truck/dogs - 48 TOTAL: 260 day	Cars/utes - 174 Single truck units - 87 Truck/dogs - 160 TOTAL: 950 day
Plant Equipment	1 x front end loader 1 x excavator 1 x mobile soil screen 1 x mobile crusher	<ul style="list-style-type: none"> 2 x 30 tonne front end loaders to load trucks and push up materials to be recycled 3- 4 x 20 to 50 tonne excavators with attachments for processing, stockpiling, loading 2 x bobcats (1 with sweeper and 1 inside shed) to operate cleaning up and moving pallets, sorting waste, cleaning road with broom 50 tonne mobile jaw crusher to primary crush rock and rubble, concrete to size 1 x 50 tonne mobile impact crusher to fine crush rubble, rock, concrete waste 1 x shredder mobile low speed to shred timber and waste to size (operate inside shed) 1 x high speed mobile shredder to fine shred timber and waste to size (operate inside and outside shed) 1 x mobile reclaimer to separate waste spoil to size 1 x mobile screen to fine separate waste and concrete to size 1 x picking station with 12 persons to sort and separate waste to products (operate inside shed) skip bin trucks and storage of skip bins from various companies 2 x small tipper trucks 1 x 30 ton bulldozer to push up waste materials
Hours of operation	<ul style="list-style-type: none"> Monday to Saturday 6am to 6pm No work Sundays and public holidays 	<ul style="list-style-type: none"> Mondays to Saturday 6am to 6pm Sunday 8am to 4pm Public Holidays - no work
Carparking	10 spaces	<ul style="list-style-type: none"> 26 carparking spaces Parking for 10 truck and dogs or semi trailers used to cart and deliver waste and products Parking for hire fleet of machines including mini excavators, excavators, dump trucks, loaders, crushers, screens, attachments and buckets
Infrastructure	<ul style="list-style-type: none"> Access road to site Bridge over watercourse Processing and stockpile area OSD ponds Workshop (west) Offices Carparking area Equipment storage area 	<ul style="list-style-type: none"> Upgraded access road to site Workshop (west) Additional weighbridge Offices/staff rooms Expanded carparking area Equipment storage area <p>Expanded working area to accommodate the increased plant capacity, with additional works to include:</p> <ul style="list-style-type: none"> Workshop on eastern edge of site. Installation of 50x30 m indoor processing shed Concrete pavement for mobile equipment maintenance and storage area for excavators. 7 X 900 x 900 m grated surface inlet pit and heavy duty grate around border of processing area. Pit south west of green waste shredding area. Grated box drain around green waste shredding area. 900x900 bypass control pit north of water quality recycling pond. Humeceptor at outlet to water quality recycling pond. Table drain on western border of development. To be directed towards water quality/recycling pond.

Component	Existing Operations		Proposed Operations				
			<ul style="list-style-type: none"> Retaining wall on eastern boundary Parking area. OSD basin. Asphalt or bitumen seal from weighbridge to property boundary from Wyllie Road. Permanent cattle grate at end of bitumen seal. New access road next to existing one. Gate at property boundary. Batter along southern and western borders of property. Table drain at toe of batter. Diversion catchment drain at top of batter. 1.8 m high chain wire fence at property boundary. Bollards at 4.5 m spacing to delineate gas easement on western border. Bollards are to be installed at 10 m intervals. 2 x 100,000 litre rainwater tanks on south-west and north-west edges of indoor processing shed. Redirection of diversion and subsoil drains at northern borders of development. Construction of landscaped earth wall at southern border of property to assist in visual and environmental impacts. 				
Staging Plan			Component	Commencement	Duration	Completion	
			Bulk Earthworks	October 2014	3 months	February 2015	
			Construction of plant, stormwater works and infrastructure	March 2015	6 months	August 2015	
			Plant Commissioning	August 2015	3 months	December 2015	
Waste Types	Tonnes Per Annum		Tonnes Per Annum		Process	Products	Customers
	General Solid Waste		General Solid Waste				
	Green Waste	Annual quantity not specified. Max storage capacity of 2500 m ³ (ie approx 3750 tonnes)	Organics (non putrescible), garden/vegetative waste, timber	30,000 tonnes (of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood)	<ul style="list-style-type: none"> - Sheared and shredded with 30 tonne mobile shredder - Reshredded to size and screened; or - Composted 	Compost Mulch Wood Chip Soil	<ul style="list-style-type: none"> - Households, trades, landscapes, developers, agriculture
	Other Waste	Total 29,999 tonnes per annum (including green waste)	Metal (including steel, iron, aluminium, copper, lead etc)	10,000 tonnes	<ul style="list-style-type: none"> - Screened - Separated - Stored - Transported off site 	Unchanged	<ul style="list-style-type: none"> - Metal Recyclers

Component		Existing Operations	Proposed Operations				
			Brick	15,000 tonnes	<ul style="list-style-type: none"> - Pulverised and crushed with a 50 tonne mobile jaw crusher - 2nd crush with impactor/cone crusher - Screened to different sizes with portable mobile screen 	<ul style="list-style-type: none"> - Aggregates - 70,40,20,10mm - Sand to RMS specifications - Road Base 40 and 20mm 	<ul style="list-style-type: none"> - Handyman - Government - Builders - Landscapers
			Concrete	20,000 tonnes	<ul style="list-style-type: none"> - Pulverised and crushed with a 50 tonne mobile jaw crusher - 2nd crush with impactor/cone crusher - Screened to different sizes with portable mobile screen 	<ul style="list-style-type: none"> - Aggregates - 70,40,20,10mm - Sand to RMS specifications - Road Base 40 and 20mm 	<ul style="list-style-type: none"> - Handyman - Government - Builders - Landscapers
			Building & demolition waste	30,000 tonnes	<ul style="list-style-type: none"> - Sorted into various materials that can be recycled - metal , plastic, timber - Cut as firewood - Sorted material stockpiled on site 	Secondhand building material Firewood	<ul style="list-style-type: none"> - Redistributed to relevant recycling area - Material that cannot be recycled sent to landfill
			Glass	2,500 tonnes	<ul style="list-style-type: none"> - Material washed, crushed and screened into various products - Granular material graded to various sizes and stockpiled on site 	Road aggregate and drainage backfill	<ul style="list-style-type: none"> - Handyman - Government - Builders - Landscapers
			Plastic	2,500 tonnes	- Material sorted into various types	- Unchanged	- Plastic recycler
			Plasterboard	1,000 tonnes	<ul style="list-style-type: none"> - Material crushed and gypsum removed - Paper backing is separated for recycling 	- Soil amendments	- Manufacturer for reprocessing
			Ceramics	1,000 tonnes	<ul style="list-style-type: none"> - Material crushed and screened into various products - Granular material graded to various sizes and stockpiled on site 	<ul style="list-style-type: none"> - Road aggregate - Drainage backfill 	<ul style="list-style-type: none"> - Handyman - Government - Builders - Landscapers
			Paper/ cardboard	5,000 tonnes	- Material sorted into various types	<ul style="list-style-type: none"> - Paper - Cardboard 	- Recycler
			Household waste from municipal cleanup	7,500 tonnes	- Sorted into various materials that can be recycled (metal timber, plastic etc.)	Secondhand building material	<ul style="list-style-type: none"> - Public - Landfill
			VENM	20,000 tonnes	<ul style="list-style-type: none"> - Separated, screened. - Sorted material stockpiled on site 	Landscaping materials - soil & rocks	<ul style="list-style-type: none"> - Landscapers - Builders

Component	Existing Operations		Proposed Operations				
			Asphalt waste & Railway Ballast	5,000 tonnes	- Crushed and screened into various products	- Road aggregate - Drainage backfill	- Handyman - Government - Builders - Landscapers
			Cured concrete waste	5,000 tonnes	- Crushed and screened into various products - Graded to various sizes and stockpiled	- Road aggregate - Drainage backfill	- Handyman - Government - Builders - Landscapers
			Mixtures of the above materials	10,000 tonnes	- Sorted into various materials that can be recycled - metal , plastic, timber - Sorted material stockpiled on site	Secondhand building material	- Redistributed to relevant recycling area - Material that cannot be recycled sent to landfill
			EPA Exemptions				
			Waste accepted under NSW EPA resource Recovery Exemptions	15,000 tonnes	- Soils and rock are processed into landscaping material	- Landscaping and earthworks material	- Handyman - Government - Builders - Landscapers
			General Solid and Restricted Waste				
			Soils	50,000 tonnes	- Soils and rock are processed into landscaping material	- Landscaping and earthworks material	- Handyman - Government - Builders - Landscapers

4.3.3 Composting Capacity

Currently approved in accordance with Condition 96 of DA-2009/1153/A, there is an allowance for a stockpile of organic matter not to exceed 2500m³ at any one time.

Schedule 1 of the Protection of the Environment Operations (POEO) Act 1997 declares that composting is a scheduled activity if the activity takes place inside the regulated area, or takes place outside the regulated area but receives organics from inside the regulated area, and:

- (i) *it has on site at any time more than 200 tonnes of organics received from off site, or*
- (ii) *it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics,*

or

Where it takes place outside the regulated area and does not receive organics from inside the regulated area:

- (i) *it has on site at any time more than 2,000 tonnes of organics received from off site, or*
- (ii) *it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics.*

(3) For the purposes of this clause, 1 cubic metre of organics is taken to weigh 0.5 tonnes.

Bicorp Pty Ltd currently have approval for stockpiles of up to 2500m³, of organic material according to Condition 96 of DA-2009/1153/A, with this consent not specifying a maximum quantity of organics which may be accepted at the facility. The current development application seeks approval for the acceptance of 30,000 tonnes of non putrescible organics, garden/vegetative waste and timber at the site per annum (of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood) The maximum storage capacity of 2500m³ of organics (as currently approved) will be maintained, with this to comprise 1000m³ of unprocessed organic greenwaste, 1000m³ of mulches and 500m³ of compost.

In summary, the site will:

- Have no more than 2500m³ of organic matter on the site at any time (which includes 1000m³ of unprocessed organic greenwaste, 1000m³ of mulches and 500m³ of compost); and
- Will receive up to 30,000 tonnes of non putrescible organics, garden/vegetative waste and timber at the site per annum, with 6,300 tonnes of this to be composted and 23,700 tonnes per annum will be mulched or sold as firewood.

4.3.4 Development Staging

The existing facility currently has approval for a maximum capacity of 29,999 tonnes. Although approval is not sought for the facility in stages, it is intended that the site capacity will be increased initially through the expansion of the development footprint areas to accommodate the additional storage, stormwater and landscaping works.

The bulk earthworks involved in creating the site facilities would occur over a period of approximately 3 months. The plant would be constructed over a period of approximately 6 months and then commissioned over the following 3 months. Overall, all components required to commence site operation would occur over

a period of approximately 12 months. This will then be followed by a gradual increase in capacity to 230,000 tonnes over a period of approximately 2-5 years.

4.3.5 Development Outline

The subject application involves the following:

The proposal involves the works as shown on the Site Plan prepared by FK 110816 Drawing C29 which includes, but is not limited to, the following:

- Redesign and expansion of the footprint of the operations conducted on the site to accommodate:
 - A perimeter road extending from the existing access road which provides access to a new weighbridge area and untarping area and which will allow for one way access through the site;
 - A central processing and stockpiling area including an operational area for outdoor shredders, crushers, loaders and equipment;
 - Identification of the approved workshop as an indoor processing area and minor alterations to the design of the building;
 - A vehicle turning/backing area to the north of the processing area;
- Additional drainage works to accommodate the redesigned and expanded storage areas and better wastewater management including a shredding runoff pond, enlarged water recycling pond and detention basins;
- The provision of buildings on the site as shown on the Site Plan Ref K110816, Drawing C10 and the architectural plans prepared by DJ Little Design. The proposed workshop in the eastern section of the site will be used for servicing and mechanical repairs of trucks and plant equipment.
- Relocation and/or construction of carparking spaces to provide a total of 26 carparking spaces on the site;
- The authorisation of the existing weighbridge;
- Provision of a truck parking area to the east of the watercourse to accommodate day and night time truck storage.
- Provision of an equipment storage area and a skip bin storage area in the north-eastern sector of the site;
- Landscaping around the perimeter of the site.

The floor areas of the proposed development and the overall building heights of the buildings as shown on the architectural plans contained in Appendix 3 are summarised in Table 8.

Table 8: Building Floor Areas and Heights

	Building Floor Areas	Overall Maximum Height (m)
Field/ Safety Office A	15.15m ²	3.979m
Lunch Room B	15.15m ²	3.200m
Meeting and Training Room C	36.27m ²	3.438m
Office D	36.18m ²	4.011m
Office E	36.18m ²	3.411m
Workshop F	679.9m ²	8.103 m
OH&S Training G	30.23m ²	2.411m
Approved Workshop	1500m ² . Approved. No change	Approved. No change

(in western section of site)		
TOTAL	2349.06m ²	

Photos of examples of the existing buildings on the site are contained in Figures 14 to 17.



Figure 14: Lunch Room (B)



Figure 15: Office manager's office



Figure 16: Meeting and Training Room



Figure 17: Portable Safety Office (A)

4.3.6 Outdoor Open Storage Bins

The position and configuration of open air storage bins to be located in the Outdoor Processing and Storage Area are designated on the Site and Usage Plans [and any other fixed or semi fixed structure excluding mobile equipment and transportable bins] at the commencement of occupation under the consent are shown on a plan entitled the Operational Plan Layout Version 1 – drawing KF110816 DA C 34.

However, there needs to be in-built flexibility in the consent to permit the operator in the future to be able to alter the placement of outdoor open storage bins within the outdoor processing and stockpiling area so that the configuration and layout of these can be readily altered in response to commercial operating requirements. It is therefore suggested that a condition of consent be included that provides certainty in the

development consent on bin size and location without being unnecessarily restrictive on how the facility is operated.

It is proposed that the condition of consent will require the applicant to provide the consent authority from time to time with an updated Operation Plan Layout (sequentially numbered) and this will be mandatory requirement whenever there is a substantial alteration in the position and configuration of open air storage bins.

Proposed Draft Condition of Consent for Operational Plan Layout

- (a) The applicant shall maintain a plan of the Outdoor Processing and Storage Area showing with reasonable accuracy the position and configuration of open air storage bins [and any other fixed or semi fixed structure excluding mobile equipment and transportable bins] located in the outdoor processing and stockpiling area as exists from time to time –entitled the Operational Plan Layout which is to be dated and numbered sequentially with each issue.
- (b) Consent is granted to the Operational Plan Layout Version 1 drawing KF110816 DA C 34 being the first such plan.
- (c) Open storage bins used in the outdoor processing and stockpiling area after commencement of occupation of the premises shall be located and constructed generally as shown on the approved Operational Plan Layout Version 1 – drawing KF110816 DA C 34.
- (d) The applicant may later alter the number, type, position, configuration and day to day use of open storage bins in the outdoor processing and stockpiling area [and any other fixed or semi fixed structure excluding mobile equipment and transportable bins] provided that any substantial change is recorded in an updated version of the Operational Plan Layout (dated and sequentially numbered) approved as reasonably accurate by a PCA and submitted to the NSW Environment Protection Authority (for its records) within 60 days of any such substantial change.

4.3.7 Waste Management Plan

The resource recovery is to be undertaken in accordance with the Waste Management Plan by Benviron (Revision 6 dated 27 May 2014).

It is requested that some flexibility be in-built into the consent that allows the Waste Management Plan to be reviewed and updated from time to time in accordance with current best practice and allowing for any change in EPA regulations and guidelines.

4.3.8 Building Materials Storage

The current consent permits the storage of building materials that may not be categorised as waste under the POEO Act and/or may not be input raw materials used for processing. This application seeks the same consent.

4.3.9 Operational Hours

The operational hours will be Mondays to Saturdays, 6am to 6pm; and 8am to 4pm Sunday with no work to take place on Public Holidays. It is noted that the facility does not open to the public before 7.00am and hence no machinery will be utilised nor will deliveries occur between the hours of 6am to 7am.

4.3.10 Employee Numbers

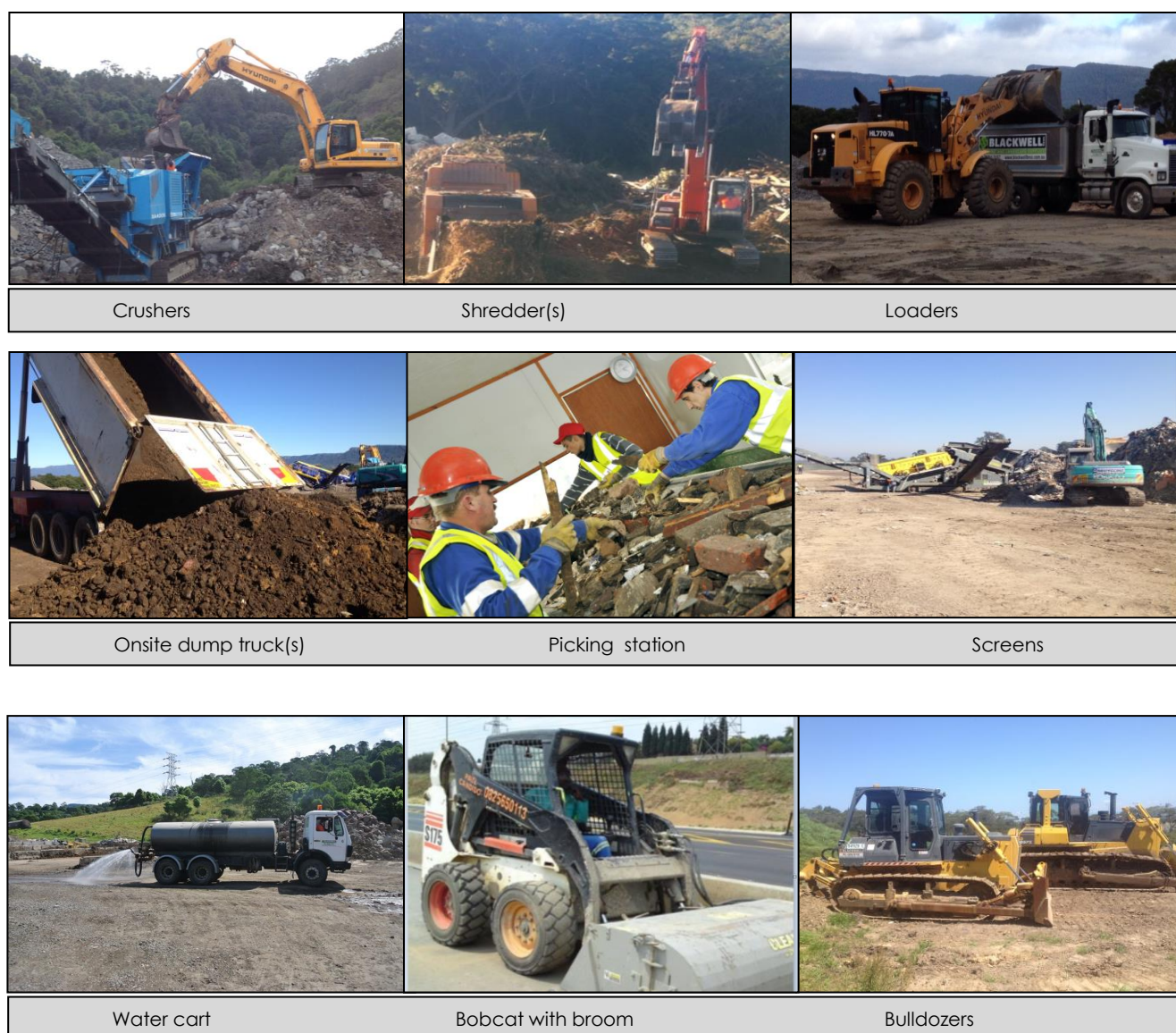
The proposal is to upgrade the capacity of the facility progressively over the next 5 years from 30,000 t/pa to 230,000 t/pa and therefore the number of employees will progressively increase from 8 to 40 staff members, which will include:

- Office staff;
- Weighbridge operators;
- Mechanics/welders;
- Truck/loader operators;
- Labours;
- Environmental engineer;
- Safety officer;
- General Manager; and
- Sales rep/estimators.

4.3.11 Plant and Equipment

The plant and equipment to be utilised on the site at full capacity will include the following as shown in Figure 18:

- | | |
|---|--|
| <ul style="list-style-type: none"> ▪ 2 x 30 tonne front end loaders to load trucks and push up materials to be recycled ▪ 3- 4 x 20 to 50 tonne excavators with attachments for processing , stockpiling , loading ▪ 2 x bobcats to operate cleaning up and moving pallets , sorting waste , cleaning road with broom ▪ 50 tonne mobile jaw crusher to primary crush rock and rubble, concrete to size ▪ 1 x 50 tonne mobile impact crusher to fine crush rubble , rock , concrete waste ▪ 1 x shredder mobile low speed to shred timber and waste to size (operate inside shed) ▪ 1 x high mobile speed shredder to fine shred timber and waste to size (operate inside shed) | <ul style="list-style-type: none"> ▪ 1 x mobile reclaimer to separate waste spoil to size ▪ 1 x mobile screen to fine separate waste and concrete to size ▪ 1 x picking station with 12 persons to sort and separate waste to products (operate inside shed) ▪ 1 x mobile picking station for running with screens and crushers ▪ skip bin trucks and storage of skip bins from various companies ▪ 2 x small tipper trucks ▪ 1 x 30 ton bulldozer to push up waste materials |
|---|--|

Figure 18: Example of Equipment Utilised on the Site

4.3.12 Customers

The product on site is purchased by individuals, businesses, developers and Council. Wollongong City Council has a (5) five year contract with Bicorp trading as Wollongong Recycling. The following list represents some of products that can be purchased on site, with the type building and landscaping products produced dependent on market demand and EPA resource recovery exemptions:

Concrete/brick recycled

- Crusher dust
- Concrete/Brick Agg 10mm
- Concrete/Brick Agg 20mm
- Concrete/Brick Agg O/S 40/70mm
- Concrete road base 20mm
- Concrete road base 40mm

Sandstone

- Sandstone Rock 300mm to 500mm manhandling
- Sandstone Rock 500mm to 1m Bobcat
- Sandstone Rock 1m to 3m excavator

Venm Recycled

- VENM Soil- unscreened
- VENM Soil-screened
- VENM Soil-mixed with compost (garden soil budget)
- VENM Clay/Shale

ENM Recycled

- ENM Clay-subbase 20mm
- ENM Soil –screened 10mm
- ENM Tailings 20/40mm

Mulches Recycled

- Mulch decomposed
- Mulch screened 30mm

Firewood

- Recycled 50/50 blend

Waste Disposal

Municipal, commercial & industrial, construction & demolition and general solid waste

- Brick (Clean)
- Bick and concrete (clean)
- Concrete 500-(clean)
- Concrete 500+ (clean)
- Green waste and stumps up to 500mm thick
- Green waste and stumps over 500mm thick
- Rotamil
- Sandstone rock builders over 1m in size (no soil)
- Steel clean
- Terracotta Tiles
- Timber (No treated, glue, lead paint, chipboard)

VENM- Must have validation

- Clay
- Sandstone /sand

ENM- 98% clean

- Clay
- Sandstone/sand/soil (screenable)

General Solid Waste

- Clay
- Sandstone/sand/soil (screenable)

Construction and Demolition waste

- Civil and rail waste

4.3.13 Waste Materials and Processing

The existing and proposed operation on the site is a resource recovery facility that accepts selective material from building and demolition sites. Materials are transported to site in trucks ranging from 10-50 tonne capacity. The materials are sorted and separated in sections within the site and then recycled and disposed of off-site.

Figure 19 describes the process of the assessment of waste arriving/generated at the site.

Figure 19: Assessment and Handling of Waste Arriving/Generated at the Site

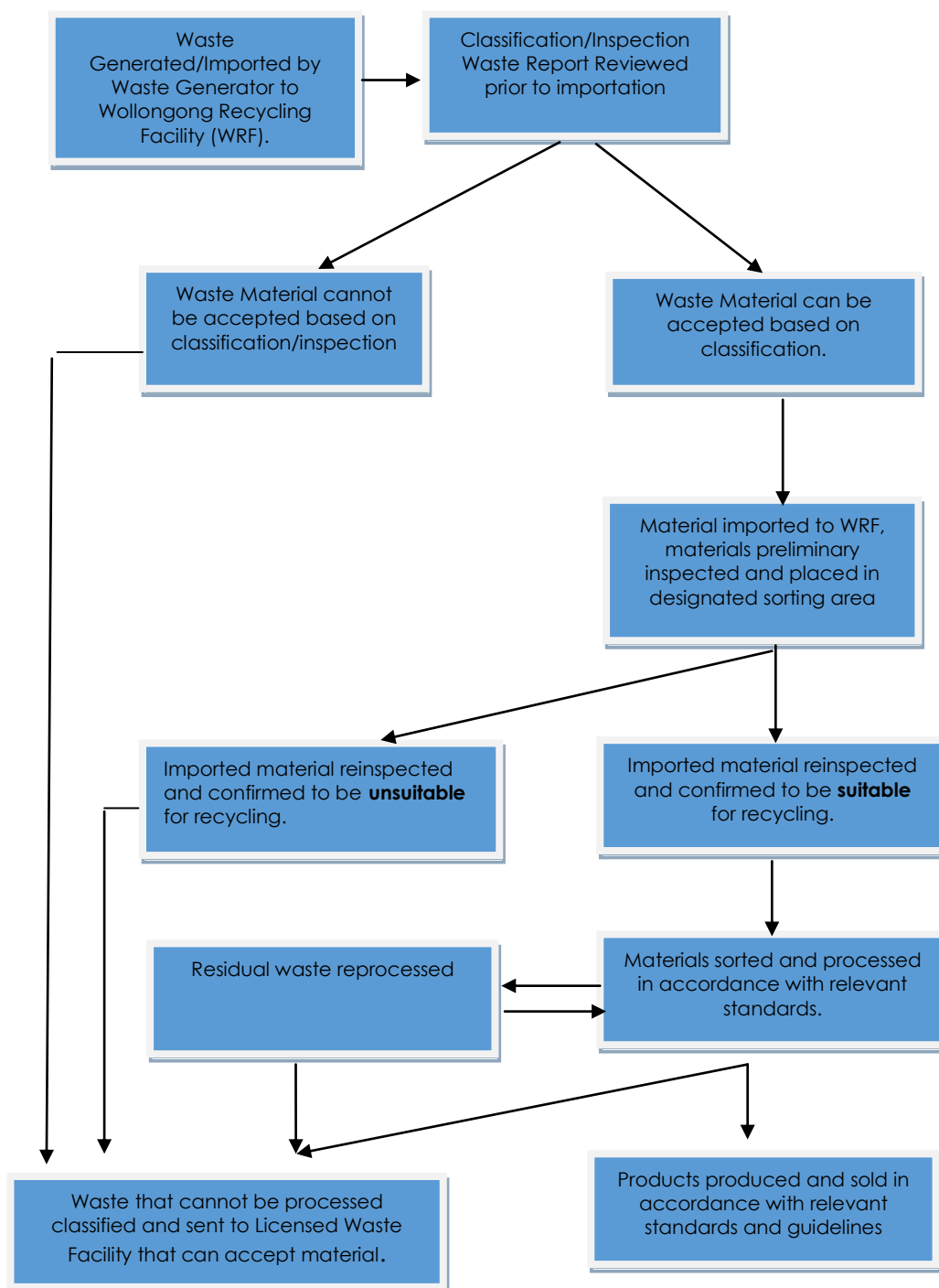


Figure 20 contains examples of the typical materials produced by the facility, whilst Figure 21 details the materials which will be accepted by the facility; the processing undertaken and examples of the finished product.

Figure 20: Example of Some of the Material Produced by the Resource Recovery Facility



Broken concrete, bricks
and tiles



For drainage behind
retaining wall
Sub soil trenches etc



20mm Aggregate



Bricks



Base sand for pavers



Red Sand



Timber Waste



Garden Mulch to
control moisture



Mulch



Green Waste



Top soil for Gardens



Garden Mix Soil

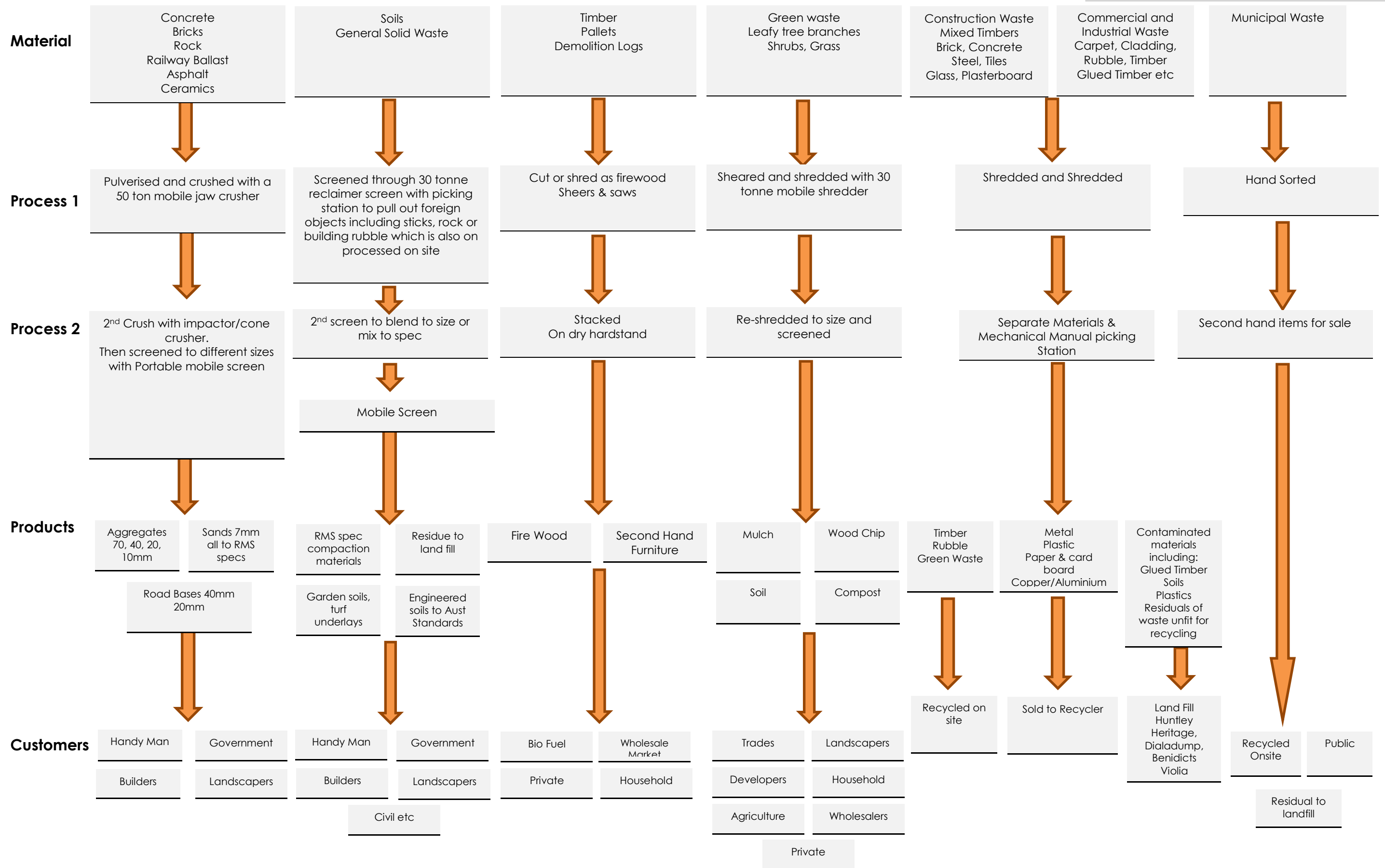


Figure 21: Material Processing Flowchart

4.3.14 Organics Processing and Composting

As organic wastes constitute the largest fraction of the waste stream going to landfill, the composting of these materials will serve to reduce the demands on landfills and recycle resources to produce compost and other materials. The facility is proposed to undertake composting for Class/Category 1 Organic material which include Garden and landscaping material, untreated timber, natural fibrous material. It is to be noted that any organic (green) wastes that will be processed on site will be undertaken generally as per Figure 24, and more specifically as outlined in the flowchart in Figure 25. Benviron confirm within the Waste Management Plan that the following processes will be implemented in relation to composting.

Organic Storage and Waiting Areas

Material stored within the **“green waste” shredding area** will be processed every four-five weeks. During this time material will be stockpiled on site and unprocessed material will be covered with a tarpaulin to minimise breakdown and leachate generation where material is not for direct sale.

It is not expected that material that is shredded for direct sale will be cause for concern due to the rapid turnover of the material and the chance for biological breakdown within this area will be minimal.

Detailed Composting Process

Pre shredded organic green waste will be transported to the **composting shed** and will be stockpiled in trapezoidal aerated windrow stockpiles approximately 3m high x 4m wide by 30m long with a capacity for up to 900T to be processed at any one time. Material will then be processed as follows:

1. Material will be thoroughly mixed using a front end loader prior to pile formation. If not correctly mixed initially turning of the pile during composting can redress this issue.
2. Static Aerated windrows will be formed in the above described dimensions (3x4x30).
3. The ingredients to be used are to be non-putrescible organics such as garden waste, timber, wood, etc which should be easily accommodated by this method because aeration lessens the chance of oxygen deficiency within the pile. However too much aeration can limit processing capacity and form an unstable pile which can allow for pathogens to survive, therefore it is recommended that moisture conditions be strictly monitored. Good management of these conditions limit any odour generation.
4. Moisture content should be near the water holding capacity for the material and measurement of this should be undertaken in accordance with AS4454.
5. As temperature gradients will naturally occur within windrows it is important to maintain temperature across the pile to prevent pathogens from remaining in the pile. Turning on a weekly basis using a front end loader will help to minimise this risk and allow the natural heating and pasteurising process to eliminate any pathogens.
6. In order to increase aeration of the pile perforated pipes will be installed at the base of the pile or within the concrete floors of the shed. This will be used in turn with temperature monitoring in order to maintain pile heat and composting stability and reduce potential for anaerobic composting conditions to form.

7. Composting will be undertaken for approximately 4-6 weeks with 1-2 turns per week depending on pile conditions. Once the composting process has become stable the material will be removed from the composting shed and placed in the composting curing area for a further month. During this time the material will be covered with a tarpaulin to prevent leachate runoff.
8. Material will be tested for compliance with AS4454 and will be sold to the market accordingly.

The shed will be designed to be negative pressure (see shed concept plans contained in Figures 22 and 23) in order to minimise the escape of any potential odours escaping through the roller doors. The air will be drawn into the building through the roller doors and will be vented through a biofilter (if necessary) in the roof of the structure. Air that is vented through a pressurised pipe for the windrow composting building will be pumped into the building and will be vented as described above.

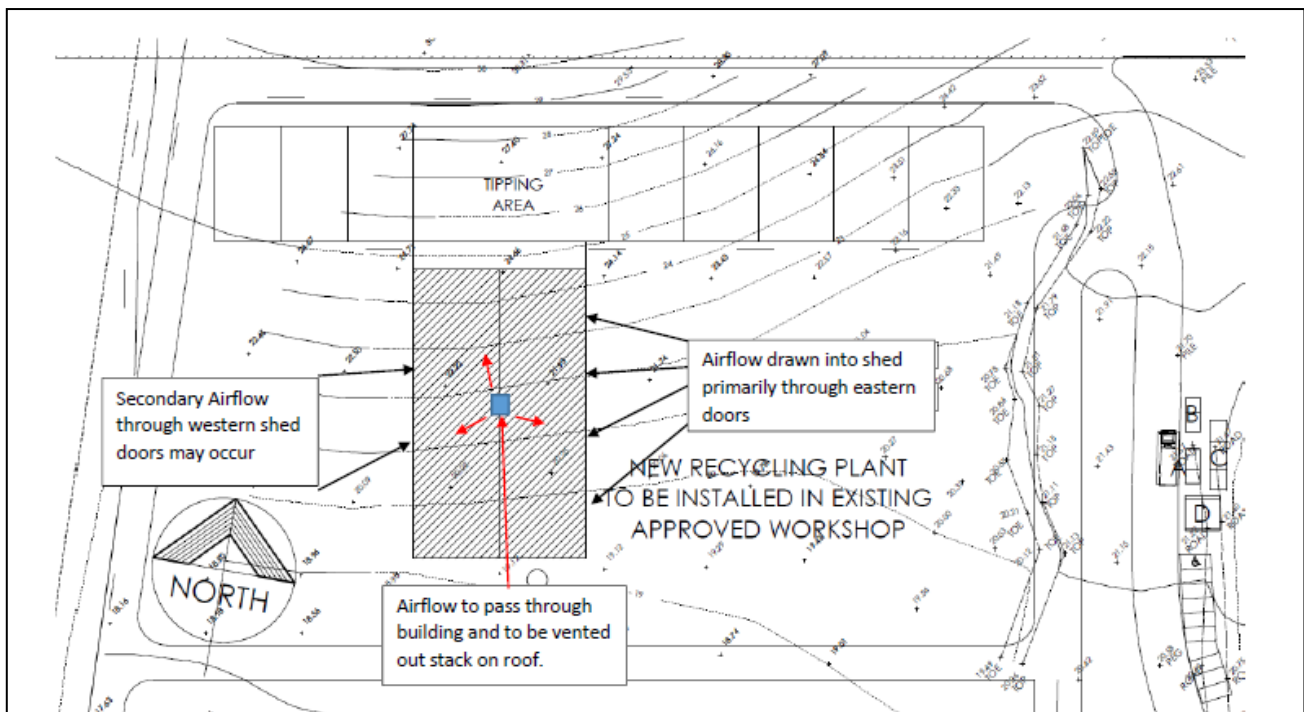


Figure 22: Site Plan showing location of shed and proposed ventilation.



Figure 23: Shed floor plan and elevation showing proposed ventilation.

Figure 24: Assessment and Handling of Organics Arriving/Generated at the Site

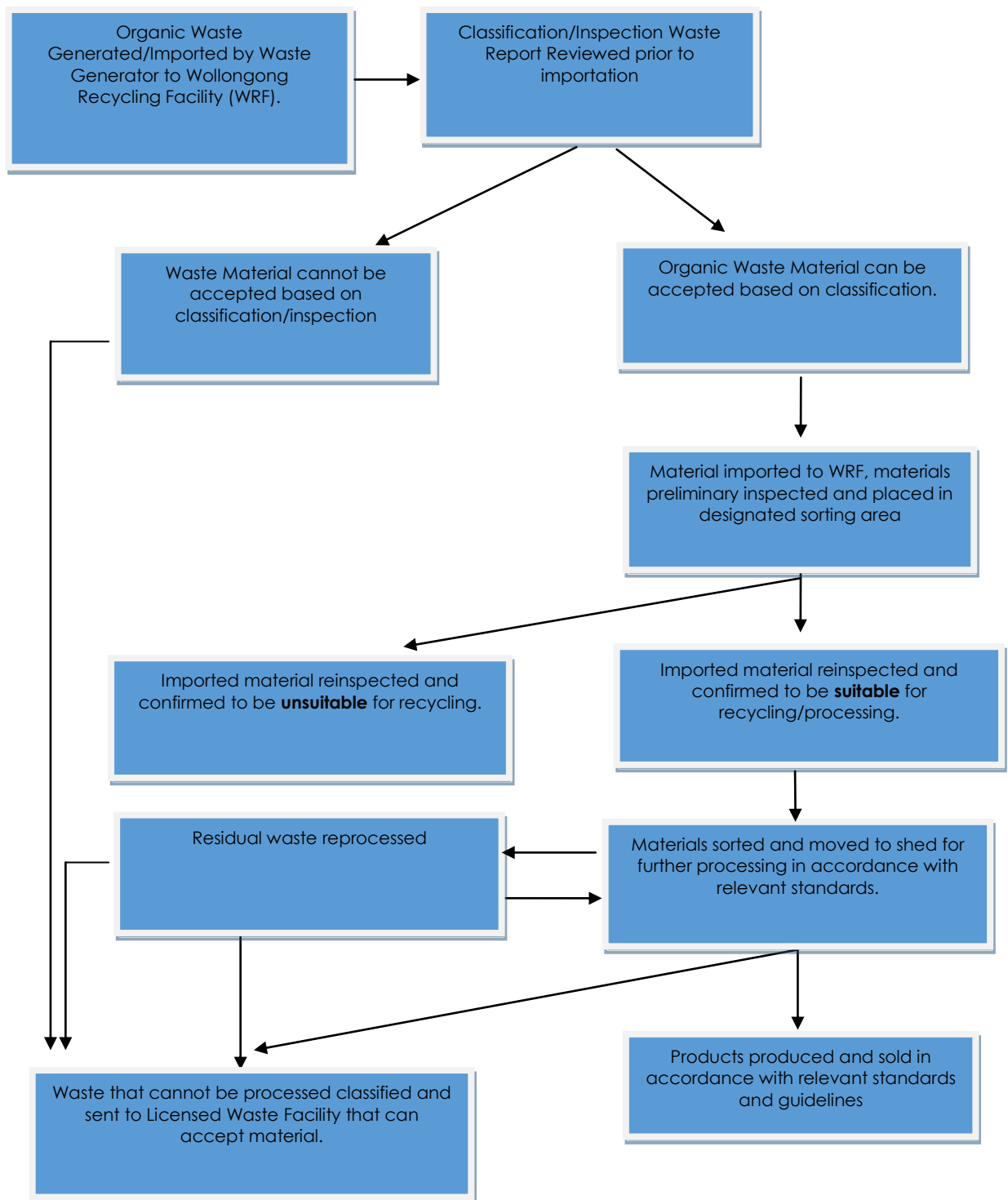
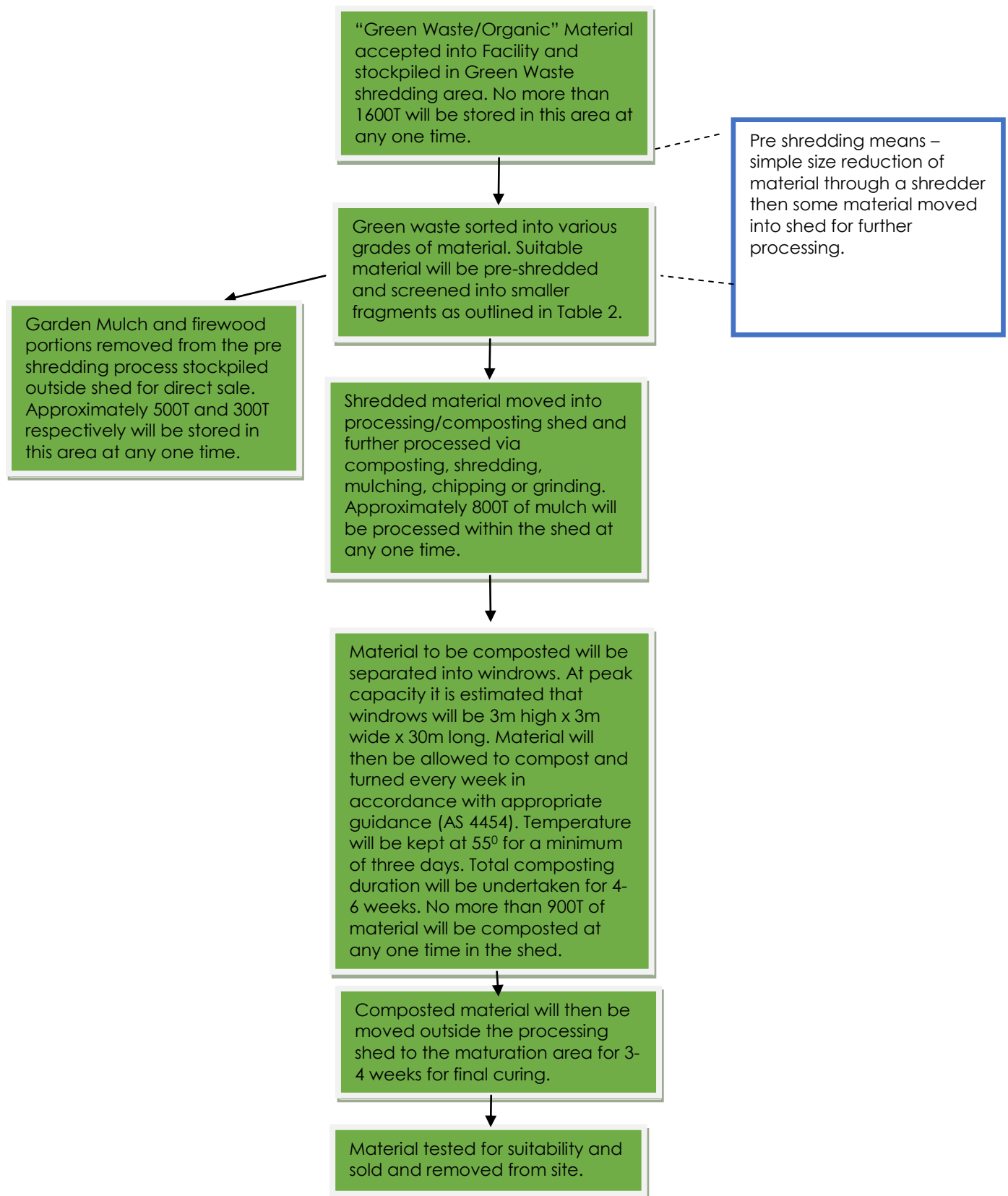


Figure 25: Specific Organics Handling Process Within the Site



4.3.15 Stockpile Heights

Stockpile heights have been based on those outlined in the South Australian Environmental Protection Agency (EPA SA September 2010) and Benviron confirm that they will be as follows in order manage fire, dust and odour:

- Stockpiles of inert material such as concrete, brick, soil etc will be stockpiled to a maximum of 5m in height. Height Poles to the exact length (5m) will provide on-site guidance for stockpile management.
- Stockpiles of organic material such as timber, garden waste, composting material etc will be stockpiled to a maximum of three (3m) in height. Again height poles (3m) will be used for on-site guidance for stockpile management.

4.3.16 Leachate Control

The leachate will be managed in accordance with the KFW Development plans (See Appendix 2). The process is generally as follows

- The green waste shredding area will have an impervious concrete or asphalt concrete layer to prevent infiltration from the shredding surface.
- The green waste shredding area has a perimeter drain to collect and direct runoff to the green waste runoff collection pond.
- Composting and storage will be undertaken in a weatherproof shed which will have a concrete floor.
- The composting process will occur under cover in a weather-proof building and will produce no or at worst a small volume of leachate.
- The composting process shed will have a concrete floor underlain by a polyethylene membrane in order to prevent leachate infiltration into the groundwater.

The compost process leachate collection system will consist of the following:

- A primary concrete tank with a volume of 5,000 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness.
- A secondary concrete tank with a volume of 2,500 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness.
- The secondary tank will be connected to the primary tank at the level where the primary tank is at 4,000 litre storage (80%) capacity.
- The primary collection tank will be fitted with a sensor to indicate 75% capacity (ie 3,750 litres. At this point the site manager shall arrange to have the primary tank pumped out by a liquid waste tanker and disposed of at an appropriate treatment facility.

5 Project Need and Alternatives

Section 5 contains a discussion of the need for the project and consideration of alternatives to satisfy the requirements of the Director General.

5.1 Need for the Proposed Development

5.1.1 Social and Economic Impacts

This facility will be one of the first privately operated recycling facilities in Wollongong. This new facility will provide job opportunities for the region and cost effective solutions for the management of increased waste generation within Dapto. The development is also strategically placed with a close proximity to the Wollongong Waste and Resource Recovery Centre (Whytes Gully Tip) which is operated by Wollongong Council and which does not accept the type of material which will be accepted by the Kembla Grange facility (ie construction and demolition waste). In addition, Wollongong Recycling has showed support of Bicorp Pty Ltd proposal through their signage of a five year contract to assist in their recycling initiatives.

5.1.2 Competitors

The following facilities represent the current operating resource centres within the region:

SCE Recycling

Specialisation: Concrete and Demolition Materials, Asphalt, Soils, Glass, Sands, General Solid Waste, VENM, ENM and other recyclable materials; Earth Moving and Excavating equipment/Quarries)

Location: Shellharbour Road, Kemblawarra, NSW 2505

Cleary Brothers (ceased operations)

Specialisation: construction, quarrying, earthmoving and plant hire civil engineering, concrete, transport and waste disposal fields.

Location: 39 Five Islands Rd, Port Kembla, NSW 2505

The Cleary Brothers tip in Port Kembla ceased operations in early October. This will result in an increased need for waste recovery facilities within the Illawarra region.

Dunmore Resources and Recycling

Specialisation: VENM/ENM (Clean Fill), concrete, brick, tile, asphalt

Location: 57 Buckleys Rd, Dunmore.

Huntley Colliery

Specialisation: Landfill

Location: Avondale Rd, Avondale

Wollongong Landfill (Wollongong City Council)

Specialisation: Wollongong Waste and Resource Recovery Park does not accept builders' wastes for landfill disposal including mixed soils, concrete, bricks, tiles, plasterboard, wood waste and general mixed builders waste.

Location: Reddalls Road, Kembla Grange

Whytes Gully Waste Transfer Station

Specialisation: Electronic waste

Location: Reddalls Rd, Kembla Grange, NSW 2526

Helensburgh Waste Depot (Wollongong City Council)

Closed

5.2 Project AlternativesAlternative Option 1 – No Development

This option would see the subject site remain in its current state, whereby the facility is capable of recycling waste to a capacity of 29,999 tonnes, despite this Environmental Impact Statement confirming that additional capacity for waste recycling on this land is feasible in an appropriate manner. The subject site (areas zoned IN2) is currently predominately cleared of vegetation. A range of uses which are permissible within an IN2 zone could be considered, however, these uses would require compatibility with the existing waste recycling facility in operation on the site, and therefore it is unlikely that there is a viable alternate future use on the site in conjunction with the current operations.

The proposal will be instrumental in achieving increased recovery and use of secondary materials, reducing toxicity in products and materials, as well as reducing litter and illegal dumping. Therefore an approach of 'no development' is not considered to be an acceptable outcome given the need for such a facility for the Illawarra and likelihood that an alternate site within the region would be required.

Alternative Option 2 – Utilising alternate Bicorp facilities - Expansion of Walker Street Helensburgh Site Operations

The applicant (under the company Blackwell Building and Landscape Supplies Pty Ltd) also operates an earthmoving, and soil, compost and timber reuse building and landscaping business on land located at No. 159 Walker Street, Helensburgh (identified as Lot 1 DP 112876). This facility was granted approval in 1983 pursuant to DA-1983/668. The facility currently accepts a range of waste for recycling and reuse purposes including timber, excavated material and organic materials. The landowners have previously lodged an application to modify DA-1983/668/A to clarify the nature of the permitted use, as the development consent which was issued in 1983 does not clearly confirm the nature and volumes of waste which can be received, processed, recycled and stored. RD-1983/668 was granted approval in March 2014 however the approved facility is limited in its ability to accept increased volumes of waste. Hence, the Kembla Grange facility is intended to accommodate expansion of the Bicorp/Blackwell Brothers operations on a site which has been specifically purchased for this purpose.

Alternative Option 3 – Utilising an alternate site within Wollongong LGA

A site was identified by Bicorp on Canterbury Road, Kembla Grange (Lot 552 DP 832355) as a potential location for the waste recovery facility. This site had previously been approved for the purposes of a waste recycling facility. Bicorp Pty Ltd sought to purchase this site, however, despite the purchase moving forward it did not proceed at the instigation of the vendor. Therefore, this site is not an option for such a facility in operation by Bicorp. Extensive investigations by Bicorp identified the Wyllie Road site as the most viable and suitably located alternative as it had a current development consent to operate as a waste recovery facility.

Alternative Option 4 – A smaller scale development

This option would provide a reduced size and scale of the project in an attempt to reduce potential environmental impacts. However, the Waste Management Report prepared by Benviron confirms that the proposed expansion will aid in the NSW government to achieve the following targets:

- *Municipal waste – from a baseline 26% to 66%*
- *Commercial and industrial (C&I) waste – from a baseline 28% to 63%*
- *Construction and demolition (C&D) waste – from a baseline 65% to 76%*

The availability for the increase capacity of recycling will significantly assist in achieving waste recycling targets. A smaller scale development is currently in operation on the site, whereby an allowance of 29,999 tonnes operates.

Following the recent closure of the Cleary Bros facility the Kembla Grange site has seen a 50% increase in demand and is unable to accept additional waste due to the tonnage limitations imposed by its current consent, causing people to illegally tip or drive out of the Illawarra to another facility.

Alternative Option 5 – A Varied Site Layout

The concept plan layout has principally been guided by the zoning of the site, vegetation, watercourses, contours, existing road access points and relationship to the existing operation. The Plan has evolved as a result of specialist assessments and input including engineering, drainage considerations, landscaping and vegetation considerations, siting of asset protection zones, traffic and roadway requirements, and an assessment of the requirements of the functional operation of the facility to locate parking, site offices and amenities. The location of the stockpile areas and processing areas have been designed and located to ensure safe and efficient access to the area from the perimeter road and have been located the greatest distance from the watercourse and appropriately separated from the site offices, amenities buildings, carparking area and general pedestrian area.

The Preferred Alternative

An expansion of the Wyllie Road site was chosen as it satisfied Bicorp's operational requirements and it's compatibility of expanding the existing facility on the site. The key benefits of the site and chosen layout included:

- Ease of access to main transport networks including the M1 Princes Motorway;
- Central location to service the Illawarra region;
- Existing operation on the site and availability of land area on site for expansion;
- Low amenity impacts on residential areas including noise, odours and air quality;
- Low environmental impacts upon flora and fauna;
- Little visual impact; and
- Ability of the site to contribute to the regional demands for waste recycling targets.

The expansion of this facility is also supported by the Illawarra Regional Strategy (DOP) which notes that a number of landfills in the region have reached capacity, and hence opportunities for new regional resource recovery and landfill facilities will need to be identified to provide adequate solutions to waste management.

6 Statutory Planning Framework

The following section provides the state and regional planning and legislative framework for the proposed development. The purpose of this section is to outline the approval process and identify the applicable state planning policies, regional plans and other legislative requirements that relate to the proposed development.

6.1 State Legislation

6.1.1 Environmental Planning and Assessment Act 1979

Section 5 Objectives

The EP & A Act and accompanying Regulation provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and to provide opportunity for public involvement. The objectives of this Act as contained in Clause 5 are:

- (a) to encourage:
 - (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
 - (ii) the promotion and co-ordination of the orderly and economic use and development of land,
 - (iii) the protection, provision and co-ordination of communication and utility services,
 - (iv) the provision of land for public purposes,
 - (v) the provision and co-ordination of community services and facilities, and
 - (vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and
 - (vii) ecologically sustainable development, and
 - (viii) the provision and maintenance of affordable housing, and
- (b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and
- (c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Relevance to proposed development:

The proposed development is consistent with the nominated objectives of the Act and is considered capable of fulfilling the statutory requirements. The site investigations have determined that the proposed development will not result in any significant negative impacts that cannot be adequately mitigated or managed. This Environmental Impact Statement confirms that the proposed development can be undertaken in a manner which will not adversely impact on natural resources but will promote the economic use of the land in a manner which will provide an improved level of resource management within the Illawarra.

6.1.2 Section 89C Development that is State Significant Development

Section 89C(2) of the EPA Act enables a State Environmental Planning Policy to declare any development, or any class or description of development, to be State significant development. This clause states:

- (1) *For the purposes of this Act, "State significant development" is development that is declared under this section to be State significant development.*
- (2) *A State environmental planning policy may declare any development, or any class or description of development, to be State significant development*
- (3) *The Minister may, by order published in the Gazette, declare specified development on specified land to be State significant development, but only if the Minister has obtained and made publicly available advice from the Planning Assessment Commission about the State or regional planning significance of the development.*

Note: For orders under this subsection, see the Historical notes at the end of this Act.

- (4) *A State environmental planning policy that declares State significant development may extend the provisions of the policy relating to that development to State significant development declared under subsection (3).*

A State Environmental Planning Policy (State and Regional Development SEPP 2011) has declared the proposal to be state significant development, which will be further discussed in section 6.2.1 below. Therefore, under the EP&A Act, the subject development is State significant development.

6.1.3 Section 89E Consent for State significant development

Pursuant to 89D (1) the Minister is the consent authority for State significant development. Clause 89E (2) confirms that development consent may not be granted if the development is wholly prohibited.

As confirmed in Section 7.1.1 of this Environmental Impact Assessment the proposed development, which is defined as a resource recovery facility, is permissible within consent within the IN2 zone of WLEP 2009 and hence the Minister may grant consent to the application.

6.1.4 Environmental Planning and Assessment Regulation, 2000

Schedule 3 of the Environmental Planning and Assessment Regulations lists the following type of facility as designated development:

13 Composting facilities or works

Composting facilities or works (being works involving the controlled aerobic or anaerobic biological conversion of organic material into stable cured humus-like products, including bioconversion, biodigestion and vermiculture):

- (a) *that process more than 5,000 tonnes per year of organic materials, or*
- (b) *that are located:*
 - (i) *in or within 100 metres of a natural waterbody, wetland, coastal dune field or environmentally sensitive area, or*
 - (ii) *in an area of high watertable, highly permeable soils, acid sulphate, sodic or saline soils, or*

- (iii) within a drinking water catchment, or
- (iv) within a catchment of an estuary where the entrance to the sea is intermittently open, or
- (v) on a floodplain, or
- (vi) within 500 metres of a residential zone or 250 metres of a dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, visual impacts, air pollution (including odour, smoke, fumes or dust), vermin or traffic.

16 Crushing, grinding or separating works

(1) Crushing, grinding or separating works, being works that process materials (such as sand, gravel, rock or minerals) or materials for recycling or reuse (such as slag, road base, concrete, bricks, tiles, bituminous material, metal or timber) by crushing, grinding or separating into different sizes:

- (a) that have an intended processing capacity of more than 150 tonnes per day or 30,000 tonnes per year, or
- (b) that are located:
 - (i) within 40 metres of a natural waterbody or wetland, or
 - (ii) within 250 metres of a residential zone or dwelling not associated with the development.

(2) This clause does not apply to development specifically referred to elsewhere in this Schedule.

The proposed material storage and recycling facility would ordinarily be classed as designated by virtue of the capacity of the facility. However, under section 77A of the EPA Act, the proposed development is not designated development due to classification as State significant development. Clause 77A (Designated Development) states:

- (1) Designated development is development that is declared to be designated development by an environmental planning instrument or the regulations.
- (2) Designated development does not include State significant development despite any such declaration.

6.1.5 Water Management Act, 2000

The Water Management Act 2000 replaced the provisions of the Rivers and Foreshores Improvement Act 1948 coming into effect from February 2008. The Water Management Act provides for the protection of river and lakeside land in NSW and aims to provide for the sustainable management of the water sources throughout NSW. The aims of the Act are to “provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:

- (a) to apply the principles of ecologically sustainable development, and
- (b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and
- (c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:
 - (i) benefits to the environment, and
 - (ii) benefits to urban communities, agriculture, fisheries, industry and recreation, and
 - (iii) benefits to culture and heritage, and

- (iv) benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,*
- (d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,*
- (e) to provide for the orderly, efficient and equitable sharing of water from water sources,*
- (f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,*
- (g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,*
- (h) to encourage best practice in the management and use of water."*

The Water Management Act provides for the granting of various licences and approvals, including for the use of water and water supply works. Generally speaking the following approvals may be required under the Water Management Act:

- a water access licence – which entitles the holder to a share of available water in a river
- or aquifer (groundwater body);
- water use approval – which authorises use of water on land for a particular purpose at a particular location; or
- water management works approval – which authorise construction and use of water
- supply works such as bores, pumps, dams and channels.

Relevance to proposed development:

The proposed development will involve work within waterfront land as defined under the *Water Management Act 2000*, being

- (a) the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river, or*
- (a1) the bed of any lake, together with any land lying between the bed of the lake and a line drawn parallel to, and the prescribed distance inland of, the shore of the lake, or*
- (a2) the bed of any estuary, together with any land lying between the bed of the estuary and a line drawn parallel to, and the prescribed distance inland of, the mean high water mark of the estuary, or*
- (b) if the regulations so provide, the bed of the coastal waters of the State, and any land lying between the shoreline of the coastal waters and a line drawn parallel to, and the prescribed distance inland of, the mean high water mark of the coastal waters,*
where the prescribed distance is 40 metres or (if the regulations prescribe a lesser distance, either generally or in relation to a particular location or class of locations) that lesser distance. Land that falls into 2 or more of the categories referred to in paragraphs (a), (a1) and (a2) may be waterfront land by virtue of any of the paragraphs relevant to that land.

Section 91 of the EPA Act, 1979 confirms that state significant development is not defined as integrated and hence a controlled activity approval is not required. This clause states:

"91(1) Integrated development is development (not being State significant development or complying development) that, in order for it to be carried out, requires development consent and one or more of the following approvals...."

It is noted that the NSW Office of Water has previously issued a Controlled Activity Approval for the existing development (Approval No. 10ERM2009/1008) with this approval incorporating the existing bridge. No additional bridge works are proposed in conjunction with this application.

6.1.6 Water Act, 1912

The Water Act 1912 is an instrument used to consolidate the Acts relating to Water Rights, Water and Drainage, Drainage Promotion and Artesian Wells. The Water Management Act 2000 repeals Water Act 1912 within Schedule 7.

6.1.7 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 aims to conserve threatened flora and fauna species, endangered populations and endangered ecological communities and their habitats within NSW (excluding fish and marine plants which are protected by the Fisheries Management Act 1994).

A 'Biodiversity Report' (Appendix 16) was conducted by Conacher Environmental Group dated February 2014. This report undertakes an assessment process under the Threatened Species Conservation Act, 1995 which confirms that the proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats and a Species Impact Statement is not required for the proposed development. Further, Conacher Environmental confirm that *"the proposed development would maintain or improve biodiversity values within the site and locality through the avoidance of impacts to areas of high biodiversity value, the retention and management of the riparian corridor which intersects the site and the implementation of the amelioration measures proposed"*.

6.1.8 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) prohibits any person from causing pollution of waters, or air and provides penalties for air, water and noise pollution offences. Section 48 of the POEO Act requires a person to obtain an Environment Protection License (EPL) from the Department of Environment and Heritage before carrying out any of the premises based activities described in Schedule 1 of the Act.

Schedule 1 of the Act (34) details "Resource Recovery" as an activity. This clause applies to the following activities:

- **Recovery of general waste**, meaning the receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing, otherwise than for the recovery of energy.
- **Recovery of hazardous and other waste**, meaning the receiving of hazardous waste, restricted solid waste or special waste (other than asbestos waste or waste tyres) from off site and its processing, otherwise than for the recovery of energy.
- **Recovery of waste oil**, meaning the receiving of waste oil from off site and its processing, otherwise than for the recovery of energy.
- **Recovery of waste tyres**, meaning the receiving of waste tyres from off site and their processing, otherwise than for the recovery of energy.

Each of these activities is declared to be a scheduled activity if it meets the following criteria:

Activity	Criteria
Recovery of General Waste	<ul style="list-style-type: none"> involves having on site at any time more than 2,500 tonnes or 2,500 cubic metres, whichever is the lesser, of waste involves processing more than 120 tonnes of waste per day or 30,000 tonnes of waste per year
Recovery of hazardous and other waste	<ul style="list-style-type: none"> involves having on site at any time more than 200 kilograms of waste
Recovery of Waste oil	<ul style="list-style-type: none"> involves processing more than 20 tonnes of waste oil per year or having on site at any time more than 2,000 litres of waste oil
Recovery of Waste tyres	<ul style="list-style-type: none"> involves having on site at any time more than 50 tonnes of tyres (where 100 tyres are taken to weigh 1 tonne) involves processing more than 20 tonnes of tyres per day or 5,000 tonnes of tyres per year

Further, Schedule 1 lists "Waste Storage" as a Scheduled Activity if:

- (a) more than 5 tonnes of hazardous waste, restricted solid waste, liquid waste, clinical or related waste or asbestos waste is stored on the premises at any time, or
- (b) more than 50 tonnes of waste tyres or 5,000 waste tyres is stored on the premises at any time, or
- (c) more than 2,500 tonnes or 2,500 cubic metres, whichever is the lesser, of waste (other than waste referred to in paragraph (a) or (b)) is stored on the premises at any time, or**
- (d) more than 30,000 tonnes of waste (other than waste referred to in paragraph (a) or (b)) is received per year from off site.**

Schedule 1 of the Protection of the Environment Operations (POEO) Act 1997 also declares that composting is a scheduled activity if the activity takes place inside the regulated area, or takes place outside the regulated area but receives organics from inside the regulated area, and:

- (iii) it has on site at any time more than 200 tonnes of organics received from off site, or
- (iv) it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics,

or

Where it takes place outside the regulated area and does not receive organics from inside the regulated area:

- (iii) it has on site at any time more than 2,000 tonnes of organics received from off site, or
- (iv) it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics.

(3) For the purposes of this clause, 1 cubic metre of organics is taken to weigh 0.5 tonnes.

Relevance to the proposed development:

It is proposed that a maximum of 45,000 tonnes of waste will be stored on the site the any one time and the development will process up to 871 tonnes per day and 230,000 tonnes per annum of waste. A maximum of 30,000 tonnes of non putrescible organics will be received on the site per annum, with up to 2,500m³ of non

putrescible organics stored on the site at any one time. Accordingly, an Environment Protection License will be required for the following Scheduled Activities:

- Recovery of general waste;
- Waste storage; and
- Composting.

6.1.9 Contaminated Land Management Act 1997

The object of the Contaminated Land Management Act, 1997 is to establish a process for investigating and (where appropriate) remediating land that is significantly contaminated and requires remediation. Under the Act (and also under the provisions of State Environmental Planning Policy No. 55 – Remediation of Land) it is necessary to establish if the proposed is to be developed on land which has been declared or found to be significantly contaminated.

Relevance to proposed development:

The 149(5) certificate for the subject site noted that Council has not been advised that the land is contaminated. Further, whilst the site is most likely contaminated due to nature of the current operations, the use of the site will be unchanged and hence the development is not captured by the provisions of clause 7(2) of State Environmental Planning Policy No. 55 – Remediation of Land) as discussed in section 6.2.3 below.

6.1.10 Dangerous Goods (Road and Rail Transport) Act 2008

The *Dangerous Goods (Road and Rail Transport) Act 2008* and associated *Dangerous Goods (Road and Rail Transport) Regulations 2009* establish a process for regulating the transport of dangerous goods by road and rail in order to promote public safety and protect property and the environment.

Relevance to proposed development:

The facility will not be licensed to handle dangerous or hazardous goods. In the event that any goods which are inadvertently transported to the facility are classified as potentially hazardous and/or potentially dangerous goods Bicorp Pty Ltd will ensure that the waste transport contractor/operator(s) collecting such waste are appropriately licensed to handle and transport the proposed materials from the site.

6.1.11 Roads Act 1993

The *Roads Act 1993* provides for a number of issues including the establishment of procedures for opening and closing public roads, acquisition of land for roadways in addition to regulating the carrying out of various activities on public roads including roadwork and road widening operations.

Relevance to proposed development:

No closure of public roads would be required in order to gain access to the subject site. The site contains an operating waste transfer facility, which gains access to the site via Wyllie Road. The current application does not seek to alter the access arrangements within the public roadway.

6.2 State Environmental Planning Policies

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

State Environmental Planning Policy (State and Regional Development) 2011 applies to certain development that is considered to be of significance to the state. For the purpose of clause 89C of the Environmental Planning and Assessment Act, 1979 development is declared to be of state significance if:

- 8(1)(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
- (b) the development is specified in Schedule 1 or 2.*

Schedule 1 of SEPP (State and Regional Development) 2011 lists the types of development that are regarded as state significant development. The proposed development is captured by Clause 23 of Schedule 1, which lists the following as being of state significance:

"23 Waste and resource management facilities

(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 proposed resource recovery facility will handle 230,000 tonnes per annum and is therefore captured by Clause 23(3) of Schedule 1, being a facility that will handle more than 100,000 tonnes of waste per year.

The Director General's requirements for the proposal (SSD-5300) were provided on 30 May 2012. A copy of the requirements are attached as Appendix 1.

6.2.2 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) was gazetted on 13 March 1992. Through SEPP 33 the permissibility of an industrial proposal is linked to its safety and pollution control performance. SEPP 33 provides for a merit-based assessment and aims to ensure that the merits of proposals in relation to off-site risk and offence are properly assessed before being determined. SEPP 33 applies to any proposals that fall under the policy's definition of 'potentially hazardous industry' or 'potentially offensive industry'.

Specifically, SEPP 33 – Hazardous and Offensive Development aims to “ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact”.

Relevance to proposed development:

A Preliminary Hazard Analysis was prepared by Benviron Group on 16 August 2013 to address the proposed increase of processing capacity of up to 230,000 tonnes of construction and demolition waste materials per annum with associated waste storage, stockpile areas and ancillary structures (i.e. plant and equipment). The Preliminary Hazard Assessment addresses the requirements of State Environmental Planning Policy (SEPP) No.33 (Hazardous and Offensive Development); the Guidelines or Hazard Analysis: Hazardous Industry Planning Advisory Paper No. 6 (DUAP, 1992a); AS/NZ 4360:2004 Risk Management; and Risk Criteria for Land Use Safety Planning; Hazardous Industry Planning Advisory Paper No. 4 (DUPA, 1992b)..

The objective of this study was to identify the risks posed to people, property and the environment. The assessment also considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The hazard treatment measures that have been proposed assist in producing a 'low' level of risk in accordance with the risk acceptance criteria.

6.2.3 State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

Under the provisions of State Environmental Planning Policy No. 55 – Remediation of Land) it is necessary to establish if the proposal is to be developed on land which has been declared or found to be contaminated, where rezoning of the land is proposed or where development contemplates a change of use. Specifically, clause 7(2) this requirement states:

“(2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.”

Subclause (4) includes reference to "land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out".

Relevance to proposed development:

Whilst the site is most likely contaminated due to nature of the current operations, the current development application does not "involve a change of use". The site is currently utilised and approved as a waste recovery centre and the primary function of the site will be unchanged as a result of the current development application.

Irrespective of this, the Groundwater Assessment, which was prepared by Benviron in March 2014 considered the potential for contamination to migrate from the site as a result of groundwater concentration levels and flow directions. This report confirms that "...it is considered that the potential for significant contamination of soil and groundwater from current and previous activities within the site is low. However, there is potential for minor contaminant concentrations or localised surface soil contamination in the future during the operation of the site". Further the report confirms "Surface water runoff from within the site would generally be deposited in the stormwater drainage pits and potentially the nearby creek within the site. Based on this reason ...the potential for migration of contamination via surface runoff is moderate, however as the site geology is mostly heavy clay any infiltration of contaminants is expected to be low. The potential for significant impact of site soils, if contaminated, on the water bodies collecting surface water runoff from the region is considered low". Accordingly, Benviron conclude that the site is considered suitable for the proposed development, subject to the preparation of a Soil and Water Management Plan; the engineering of the development working platform to minimise infiltration; and quarterly testing of groundwater.

6.2.4 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) commenced on 1 January 2008 and contains specific planning provisions and development controls for 25 types of infrastructure works or facilities. The Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the state. Clause 121 of the SEPP confirms that "development for the purpose of waste or resource management facilities may be carried out by any person with consent on land in any of the following land use zones (iii) IN2 Light Industrial". The subject site is zoned as IN2 Light industrial and is therefore permitted with consent.

However, Clause 123 further outlines how the consent authority must take the following matters into consideration:

- (a) whether there is a suitable level of recovery of waste, such as by using alternative waste treatment or the composting of food and garden waste, so that the amount of waste is minimised before it is placed in the landfill, and
- (b) whether the development:
 - (i) adopts best practice landfill design and operation, and
 - (ii) reduces the long term impacts of the disposal of waste, such as greenhouse gas emissions or the offsite impact of odours, by maximising landfill gas capture and energy recovery, and
- (c) if the development relates to a new or expanded landfill:
 - (i) whether the land on which the development is located is degraded land such as a disused mine site, and

- (ii) whether the development is located so as to avoid land use conflicts, including whether it is consistent with any regional planning strategies or locational principles included in the publication *EIS Guideline: Landfilling* (Department of Planning, 1996), as in force from time to time, and
- (d) whether transport links to the landfill are optimised to reduce the environmental and social impacts associated with transporting waste to the landfill.

Relevance to proposed development:

In considering the above, the proposed facility seeks to recycle building and landscaping supply products including sand, soil, pine, bark, mulch (limited quantity only), metal, engineering materials and cement. The materials are to be recycled and not proposed to be deposited as landfill, which satisfies (a).

An assessment of dust, noise, odours, green house and water sensitive design have been undertaken to assess the impact of the waste recycling facility. These are addressed in detail in Section 9, however, these assessments and their included recommendations seek to ensure a reduction in the long term impacts including greenhouse gas emissions and reduction in odour, as well as the adoption of best practice principles to satisfy (b). Transport to the site is available from the nearby Princes Highway and M1 Princes Highway, with no new road network required to accommodate the facility. Some upgrading and paving will be undertaken to the site access to improve dust control and access for trucks.

Referral requirements:

Schedule 3 of the SEPP lists those activities which are required to be referred to the Roads and Maritime Services and includes reference to "landfill, recycling facilities, waste transfer station" of any size or capacity. Hence, referral to this agency will be required.

Further clause 84 (Development involving access via level crossings) applies to development that involves "a likely significant increase in the total number of vehicles or the number of trucks using a level crossing that is in the vicinity of the development." The level crossing over the South Coast line is located near the intersection of West Dapto Road and the Princes Highway to the south-east of the subject site. Vehicles will cross the South Coast line at this point before accessing Wylie Road. The Traffic Impact Statement prepared by KFW indicates that the Princes Highway at this intersection has an approximate AADT flow of 14,000 vehicles. The current estimated AADT (7 days) for Wylie Road is 4189 vehicles, with this AADT traffic flow estimated to increase to 24,989 by 2036.

Based on an predicted weekday traffic generation rate of 1,348 vehicles per day when the facility reaches full capacity an increase in traffic flow over the level crossing is predicted. The Department of Planning and Infrastructure, as the assessing authority, will be required to make a determination as to whether this increase in traffic is significant and warrants referral to NSW Railcorp.

6.3 State and Regional Planning Strategies and Policies

6.3.1 NSW Waste Avoidance and Resource Recovery Strategy 2007;

NSW Waste Avoidance and Resource Recovery Strategy

The NSW Waste Avoidance and Resource Recovery Strategy were prepared by the NSW Department of Environment, Climate Change and Water in December 2012. This policy provides an essential framework for reducing waste generation and improving the efficient use of resources. This strategy is the third version of the

Waste Avoidance and Resource Recovery Act 2001. The Waste Strategy sets waste avoidance and resource recovery goals and targets in four key areas:

- *Preventing and avoiding waste*
- *Increasing recovery and use of secondary materials*
- *Reducing toxicity in products and materials*
- *Reducing litter and illegal dumping.*

The NSW State Plan and the Waste Strategy set resource recovery targets, to be achieved by 2014, for three waste sectors: municipal, commercial and industrial (C&I) and construction and demolition (C&D).

Relevance to proposed development:

The Kembla Grange waste recovery centre will assist in meeting the intended waste avoidance and recovery goals of the strategy by increasing recovery and use of secondary materials; reducing toxicity in products and materials; and reducing litter and illegal dumping.

6.3.2 Water Sharing Plans (Office of Water)

Water Sharing Plans provide a legislative basis for sharing water between the environment and consumptive purposes. Water sharing plans also recognize the economic benefits that commercial users bring to the region. The expansion of water extraction across NSW in the 20th Century has placed area at or close to the limit of sustainable water extraction. This has seen increasing competition between water users for access to water.

Water sharing plans have been implemented for rivers and ground water systems across New South Wales following the introduction of the Water Management Act 2000. Water sharing plans assist in protecting the health of rivers and groundwater, while also providing water users with perpetual access licences, equitable conditions, and increased opportunities to trade water through separation of land and water.

Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources

This plan was made under Section 50 of the Water Management Act 2000. This plan applies to the ground water sources within the Southern Water Management Area, The Hawkesbury-Nepean Water Management Area, the Southern Sydney Management Area, the Southern Sydney Water Management Area and the Sydney Harbour Water Management Area. Most of the demand for water from unregulated systems usually occurs at those times when stream flow is low. In order to protect a proportion of these very low flows for the benefit of the environment, this plan imposes new access restrictions on days when flows are low.

Water Sharing Plan for the Greater Metropolitan Region Groundwater Source, 2011.

This plan was made under section 50 of the Water Management Act 2000. In accordance with section 43 of this Act, this plan will have effect for 10 years from 1 July 2011. However, the Minister may choose to extend this plan for a further 10 years after this plan is due to expire.

Relevance to proposed development:

The Biodiversity Assessment Report prepared by Conacher Environmental confirms that no high priority groundwater ecosystems are identified within the Water Sharing Plan for the Greater Metropolitan Regional Groundwater Source as occurring within 5km of the subject site.

6.3.3 NSW State Rivers and Estuary Policy 1993

The NSW State Rivers and Estuary Policy 1993 was prepared by the NSW State Government in August 1993. The main objectives of this policy are to Manage the Rivers and Estuaries on NSW in ways which:

- *Slow, halt or reverse the overall rate of degradation in their systems,*
- *Ensure the long term sustainability of their essential biophysical functions, and*
- *Maintain the beneficial use of these resources.*

These objectives will be achieved through application of the following strategies:

- *Those uses of rivers and estuaries which are non-degrading should be encouraged.*
- *Non-sustainable resource uses which are not essential should be progressively phased out.*
- *Environmentally degrading processes and practices should be replaced with more efficient and less degrading alternatives.*
- *Environmentally degraded areas should be rehabilitated and their biophysical functions restored.*
- *Remnant areas of significant environmental values should be accorded special protection.*
- *An ethos for the sustainable management of river and estuarine resources should be encouraged in all agencies and individuals, who own, manage or use these resources, and its practical application enabled.*

Relevance to proposed development:

A Flood Analysis Review incorporating a Water Sensitive Urban Design was prepared by KFW & Associates Pty Ltd in June 2014. This Strategy confirms the appropriate storm water detention storage requirements and the water quality treatment required to minimize potential impacts on the watercourse which traverses the site. Further, a 10m wide riparian corridor has been designated on either side of this watercourse, with revegetation of this area to occur in accordance with the Vegetation Management Plan prepared by Southern Habitat in January 2012 and updated in June 2014.

6.3.4 NSW State Groundwater Policy Framework Document, 1997

This document was prepared by the Department of Land and Water Conservation in August 1997. The goal for the management of groundwater in New South Wales is *"to manage the States groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW."*

The adoption of the State Groundwater Policy means that the sustainability of the groundwater resources and their ecosystem support function will be given explicit consideration in resource management decision making. This policy provides better consideration of all issues which affect, or are likely to affect the condition and functioning of the resources of these areas including water chemistry, geology, aquifer recharge and discharge and dependent ecosystems such as wetlands, lakes and streams, springs and seeps.

Relevance to proposed development:

The Groundwater Assessment prepared by Benviron Group in June 2014 addresses the existing groundwater conditions and any potential for contamination to migrate from the site, with this assessment conducted in general accordance with relevant environmental criteria including the NSW EPA Regulatory Guidelines and National Environmental Protection (Assessment of Site Contamination) Measure, 1999. The report concludes

"the risks to human health and the environment associated with soil and groundwater contamination at the site are minimal" and provides recommended strategies to minimize potential impacts.

6.3.5 NSW State Groundwater Quality Protection Policy, 1998

The NSW State Groundwater Quality Protection Policy was prepared by the Department of Land and Water Conservation in December 1998. The main objective of this strategy is *"to manage the States groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW"*.

The policy guides the decision making of landholders and state and local government authorities in their management and use of groundwater and assists in influencing the type and selection of management activities and resource development opportunities that will be supported by the States Resource managers, land use planners and regulators.

Relevance to proposed development:

The Groundwater Assessment prepared by Benviron Group in June 2014 addresses the existing groundwater conditions and potential impacts associated with the development, as discussed in section 6.3.4 above.

6.3.6 NSW State Groundwater Dependent Ecosystems Policy, 2002

The NSW State Groundwater Dependent Ecosystems Policy was prepared by the Department of Land and Water Conservation in April 2002. This policy aims to *"Manage the States groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW."* This policy recognizes the shared goals of the government and the community in promoting the sustainable use and management of groundwater resources in New South Wales and the need for all stakeholders to work collaboratively for the best outcome for our groundwater ecosystems.

Relevance to proposed development:

The Groundwater Assessment prepared by Benviron Group in June 2014 addresses the existing groundwater conditions and potential impacts associated with the development, as discussed in section 6.3.4 above.

6.3.7 Office of Water Guidelines for Controlled Activities, 2010/2011

A controlled activity approval under the Water Management Act 2000 is required for certain types of developments and activities that are carried out in or near a river, lake or estuary. Information and details can be found in the Water Management (General) Regulation 2001 which contains details of exemptions to the requirement to hold a controlled activity approval.

Relevance to proposed development:

Whilst the works are located within 40 metres of the watercourse, section 91 of the EPA Act, 1979 confirms that state significant development is not defined as integrated and hence a controlled activity approval is not required. This clause states:

"91(1) Integrated development is development (not being State significant development or complying development) that, in order for it to be carried out, requires development consent and one or more of the following approvals..."

6.3.8 Illawarra Regional Plan No. 1

Clause 4 of IREP No.1 states the IREP No. 1 applies to *"land, declared to be a region by the Minister under section 4 (6) of the Act, being all land within the Cities of Shellharbour, Shoalhaven and Wollongong and the Municipality of Kiama. This plan does not apply to the land to which the Jervis Bay Regional Environmental Plan 1996 applies."*

However, Clause 1.8(2) of Wollongong Local Environmental Plan (West Dapto) 2010 states:

All local environmental plans and deemed environmental planning instruments applying to the land to which this Plan applies and to other land cease to apply to the land to which this Plan applies.

Therefore IREP No. 1 no longer applies to the Wollongong LGA to which the WLEP (West Dapto) 2011 applies, and hence does not apply to the subject site.

6.3.9 Illawarra Regional Strategy

The Illawarra Regional Strategy 2006 - 2031 applies to the Wollongong, Shellharbour and Kiama Local Government Areas as a guide to allowing *"economic growth, generate local job and housing opportunities and attracting fresh investment"*. The population at the time of publication was 280,000 which were forecast to increase by 47,600 and providing an additional 30,000 new jobs by 2031. West Dapto urban release area is expected to provide 19,350 new dwellings, while increased densities surrounding the CBD and other major town centres is also expected to provide additional housing.

The primary purpose of the Regional Strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the Region's population over the next 25 years. The Regional Strategy aims to:

- Ensure an adequate supply of land strategically located to support economic growth and the capacity for an additional 30,000 new jobs.
- Provide 38,000 new dwellings by 2031 to cater for the region's growing population and changing demographics.
- Protect high value environments including coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that new urban development minimises impacts on these important areas and their catchments.
- Prevent development in places constrained by coastal processes, flooding, wetlands, important primary industry resources and significant scenic and cultural landscapes.

Numerous challenges were identified, including the need to attract economic opportunities while protecting the unique coastal environment.

The Strategy includes a chapter in relation to Water, Energy and Waste and discusses how a number of landfills in the region have reached capacity, whereby opportunities for new regional resource recovery and landfill facilities will need to be identified to provide adequate solutions to waste management. The Strategy indicates that these facilities should be established in a suitable location with appropriate environmental management measures.

Furthermore, one action identified is outlined as follows *"Councils will be encouraged to promote waste avoidance and resource recovery in demolition and building work..."* The Kembla Grange development will provide a facility which can accommodate resource recovery of demolition and building material.

The outcomes of 'Water, Energy and Waste' of the Strategy include efficiency and cost effectiveness of planned waste infrastructure services; the efficient use of water and energy; the recovery of waste resources; and targeting the potential for land use conflict to be minimised. The proposed facility seeks to process 230,000 tonnes of waste per year which will efficiently utilise existing infrastructure on the site. The location of the facility within a light industrial zone in Kembla Grange will be provided with adequate separation to the residential area of Kembla Grange to the north. A number of impact assessments including a greenhouse gas assessment, noise and odour assessment, flood assessment, biodiversity assessment, traffic assessment and bushfire assessment have been undertaken to assess impacts on surrounding land and upon the ecology of the region. These assessments provide recommendations and management strategies, as discussed in section 10 of this EIS.

The Strategy also addresses natural hazards, including flooding. As the site is identified as being flood affected, potential flood impacts and levels have been assessed by KFW in the 'Flood Analysis Review' dated June 2014 contained in Appendix 14. The results of such are discussed in section 10.9 of this EIS.

7 Local Planning Framework

The following section provides the local planning and legislative framework for the proposed development. The purpose of this section is to outline the approval process and identify the applicable local planning controls that relate to the proposed development. This includes relevant local environmental plans and development control plans including Wollongong Local Environmental Plan 2010 (West Dapto).

7.1 Wollongong Local Environmental Plan 2010 (West Dapto)

7.1.1 Site Zoning

Wollongong Local Environmental Plan 2009 is the planning instrument applying to West Dapto, within the Wollongong Local Government Area. The land is currently zoned IN2 Light Industrial and RE2 Private Recreation under this instrument. The proposed development footprint will be located within the IN2 zone. The zoning of the subject site and surrounding land is shown in Figure 26 below.

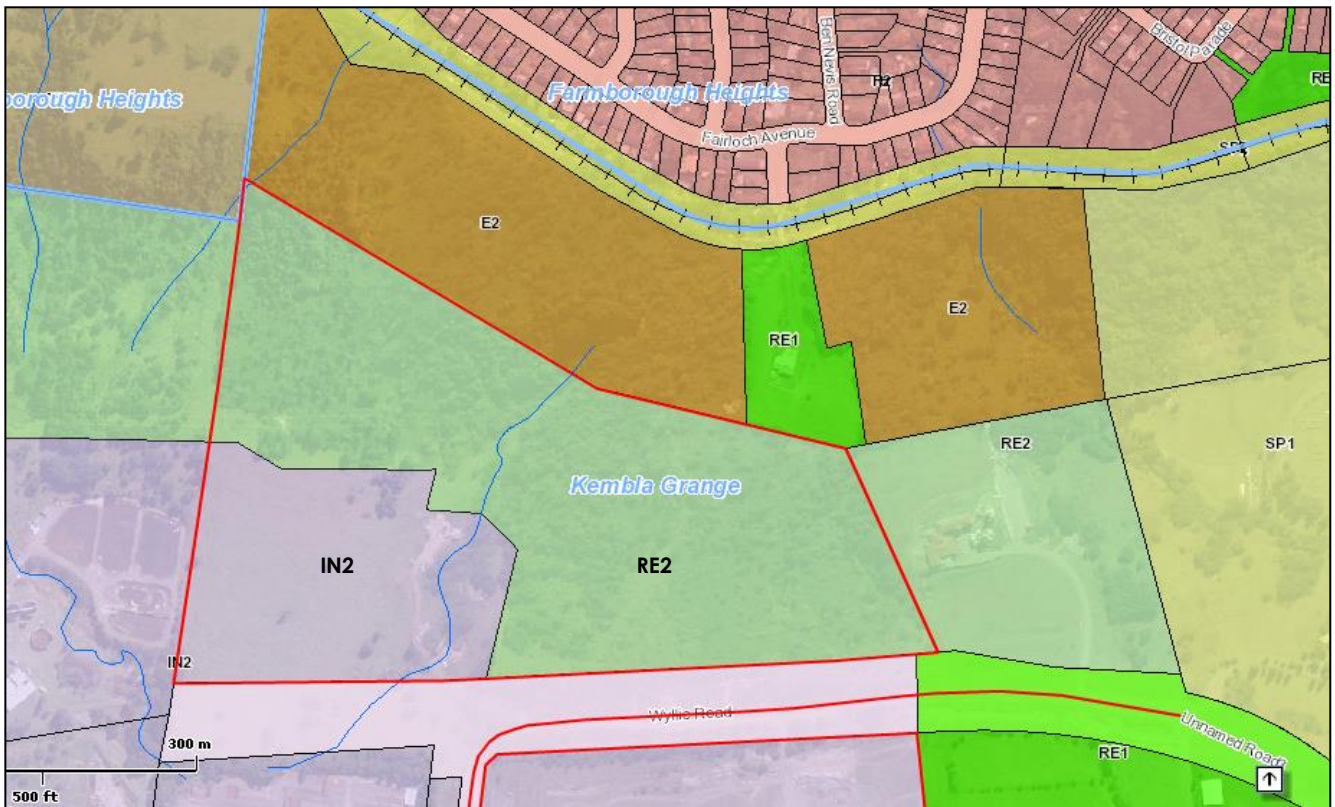


Figure 26: Zoning of the site pursuant to WLEP (West Dapto) 2010; Source: Wollongong City Council

It is noted that the subject site is located at the northern extremity of land which was previously zoned under WLEP (West Dapto) 2010, with land to the immediate north zoned under Wollongong Local Environmental Plan 2009. However, on 6 June 2014 Wollongong (West Dapto) LEP 2010 was consolidated with WLEP 2009 into a single principle local environmental plan covering the Wollongong local Government area. Figure 27 shows the northern boundary of land which was zoned under WLEP (West Dapto) 2010.

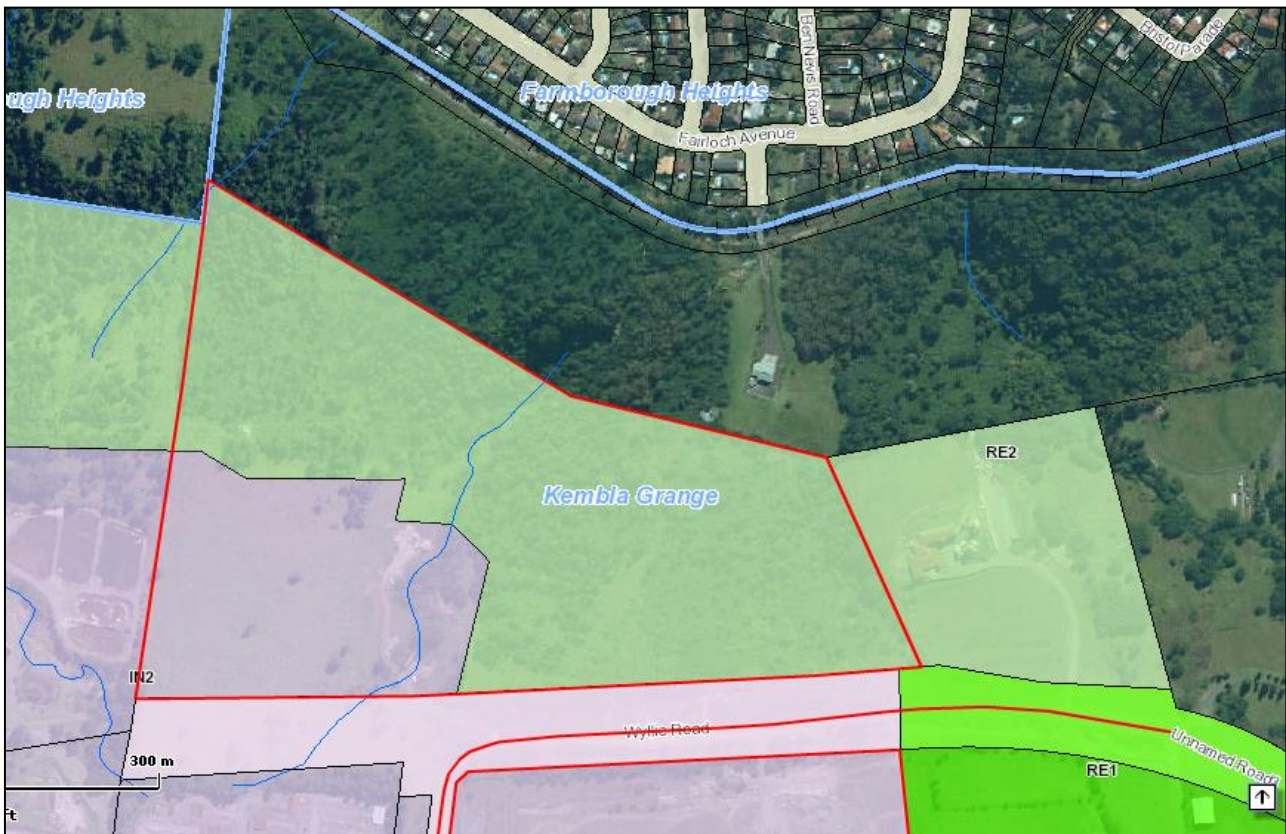


Figure 27: Map showing extent of WLEP (West Dapto) 2010 (now consolidated with WLEP 2009) in relation to the subject site. Source: Wollongong City Council

7.1.2 Zone Objectives

The objectives of the IN2 Light Industrial zone are:

- To provide a wide range of light industrial, warehouse and related land uses.
- To encourage employment opportunities and to support the viability of centres.
- To minimize any adverse effect of industry on other land uses.
- To enable other land uses that provides facilities or services to meet the day to day needs of workers in the area.
- To support and protect industrial land for industrial uses.
- To encourage appropriate forms of industrial development which will contribute to the economic and employment growth of Wollongong
- To provide a wide range of light industrial, warehouse and related land uses.
- To encourage employment opportunities and to support the viability of centres.
- To minimise any adverse effect of industry on other land uses.
- To enable other land uses that provides facilities or services to meet the day to day needs of workers in the area.
- To support and protect industrial land for industrial uses.
- To encourage appropriate forms of industrial development that will contribute to the economic and employment growth of the City of Wollongong.
- To facilitate and encourage suitable types of light industrial, high technology service and manufacturing activities that, due to their nature and the processes involved, are appropriate for inclusion in a light industrial zone.
- To ensure that development cannot be carried out if the processes to be carried on, the transportation to be involved or the plant, machinery or materials to be used interfere unreasonably with the amenity of the area.
- To allow some diversity of activities that will not:

- o significantly detract from the operation of existing or proposed manufacturing and service industries, or
- o significantly detract from the amenity of nearby residents, or
- o Have an adverse impact on the efficient operation of the surrounding road system.

The site will continue to be utilised as a 'building material storage and recycling facility', in adherence with the above objectives, which seek to encourage employment opportunities associated with an industrial use, and provide improved facilities for industrial workers. This EIS considers potential amenity impacts associated with the proposed development and provides appropriate mitigating strategies, also in accordance with the zone objectives.

7.1.3 Land Use Permissibility

Having regard to the land use definitions within the dictionary of WLEP 2009, the land use most that most closely describes the approved activities on the land under that instrument is a "resource recovery facility" as defined below.

resource recovery facility means a building or place used for the recovery of resources from waste, including works or activities such as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from gases and water treatment, but not including re-manufacture or disposal of the material by landfill or incineration. Note. Resource recovery facilities are a type of waste or resource management facility—see the definition of that term in this Dictionary.

Waste or resource management facility means any of the following:

- (a) a resource recovery facility,
- (b) a waste disposal facility,
- (c) a waste or resource transfer station,
- (d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c).

The proposed facility will be sited wholly within the IN2 zone. The land use table for the IN2 zone is as follows:

2 Permitted without consent

Building identification signs; Business identification signs

3 Permitted with consent

Agricultural produce industries; Animal boarding or training establishments; Aquaculture; Boat building and repair facilities; Community facilities; Crematoria; Depots; Environmental protection works; Freight transport facilities; Hardware and building supplies; Helipads; Industrial retail outlets; Industrial training facilities; Kiosks; Landscaping material supplies; Light industries; Mortuaries; Neighbourhood shops; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Roads; Self-storage units; Service stations; Sex services premises; Signage; Take away food and drink premises; Timber yards; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Water treatment facilities

4 Prohibited

Any development not specified in item 2 or 3

The proposed waste management facility (being a resource recovery centre) is permissible within the IN2 zone. The vegetated lands which surround the proposed facility are rezoned RE2 Private Recreation. No development will be located within the RE2 zone.

7.1.4 Other LEP Provisions

Clause 4.3 Height of Buildings

A 9m height restriction applies to the site. The manager's office, staff lunch room and safety office will all be less than 9m in height, whilst the proposed workshop will have an overall height of 8.103m.

Clause 4.4 Floor Space Ratio

A 0.5:1 FSR applies to the site. The approved and proposed buildings have a gross floor area of 2349m², whilst the site has an area of 217,239m². The area of the IN2 Light Industrial zone land, which is to contain the proposed development is 61,303m². Accordingly, the proposed development will result in an FSR on the site of 0.038:1, which is compliant.

Clause 6.2 Development Control Plan

The objective of this clause is to *"ensure that development on land in an urban release area occurs in a logical and cost-effective manner, in accordance with a staging plan and only after a development control plan that includes specific controls has been prepared for the land"*.

Clause 6.2(2) specifies that:

(2) *Development consent must not be granted for development on land in an urban release area unless a development control plan that provides for the matters specified in subclause (3) has been prepared for the land.*

(3) *The development control plan must provide for all of the following:*

- (a) a staging plan for the timely and efficient release of urban land making provision for necessary infrastructure and sequencing,*
- (b) an overall transport movement hierarchy showing the major circulation routes and connections to achieve a simple and safe movement system for private vehicles, public transport, pedestrians and cyclists,*
- (c) an overall landscaping strategy for the protection and enhancement of riparian areas and remnant vegetation, including visually prominent locations, and detailed landscaping requirements for both the public and private domain,*
- (d) a network of passive and active recreational areas,*
- (e) stormwater and water quality management controls,*
- (f) amelioration of natural and environmental hazards, including bush fire, flooding and site contamination and, in relation to natural hazards, the safe occupation of, and the evacuation from, any land so affected,*
- (g) detailed urban design controls for significant development sites,*
- (h) measures to encourage higher density living around transport, open space and service nodes,*
- (i) measures to accommodate and control appropriate neighbourhood commercial and retail uses,*

(j) suitably located public facilities and services, including provision for appropriate traffic management facilities and parking.

However, clause 6.2(4) confirms that the preparation of a Neighbourhood Plan (to be prepared as a section to be inserted within the DCP) is not required for the following development:

- (a) a subdivision for the purpose of a realignment of boundaries that does not create additional lots,*
- (b) a subdivision of land if any of the lots proposed to be created is to be reserved or dedicated for public open space, public roads or any other public or environmental protection purpose,*
- (c) a subdivision of land in a zone in which the erection of structures is prohibited,*
- (d) proposed development on land that is of a minor nature only, if the consent authority is of the opinion that the carrying out of the proposed development would be consistent with the objectives of the zone in which the land is situated.*

Comment: The proposed development comprises the expansion of an approved industrial use. The proposed development does not pertain to the construction of new public roads; the release of new urban lands; a change to public transport routes or availability; the provision of retail or commercial uses; nor the provision of additional community/recreational facilities. Further, the subject site comprises only one allotment located adjacent to existing industrial uses and will not impact on the useability of adjacent lands for future urban release purposes. The development will also not hinder the attainment of the staging plan proposed for West Dapto as it pertains to a contained site, with limited linkages with urban expansion areas within this precinct.

On this basis it is considered that the preparation of a Neighbourhood Plan/Development Controls Plan is not warranted as the proposed development is of a minor nature both in terms of scale and the potential impacts on the overall West Dapto release area. Further, the proposed development addresses the provisions of the zone objectives as discussed in Section 8.1 above.

Clause 7.5 Acid Sulphate Soils

The site is not identified on Council's mapping as containing Acid Sulphate Soils. Accordingly, the preparation of an Acid Sulphate Soils Management Plan is not required in accordance with the provisions of Clause 7.1 of WLEP 2009. Irrespective of this an Acid Sulphate Soils Assessment has been prepared by Benviron Group in March 2014, the results of which are summarised in section 10 of this EIS.

Clause 7.3 Flood Planning Area

This clause applies to land at or below the flood planning level, including land that is in a flood planning area. The 1% and PMF flood lines are shown on the Overall Layout Plan prepared by KFW Drawing No.C30 (Site Plan - Proposed Layout - Flood Lines).

Clause 7.6 Earthworks

(1) The objectives of this clause are as follows:

- (a) to ensure that any earthworks will not have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features of the surrounding land,*
- (b) to allow earthworks of a minor nature without separate development consent.*

(2) Development consent is required for earthworks, unless:

- (a) *the work is exempt development under this Plan or another applicable environmental planning instrument, or*
 - (b) *the work is ancillary to other development for which development consent is required or has been given, or*
 - (c) *the work is of a minor nature.*
- (3) *Before granting development consent for earthworks, the consent authority must consider the following matters:*
- (a) *the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality,*
 - (b) *the effect of the proposed development on the likely future use or redevelopment of the land,*
 - (c) *the quality of the fill or of the soil to be excavated, or both,*
 - (d) *the effect of the proposed development on the existing and likely amenity of adjoining properties,*
 - (e) *the source of any fill material or the destination of any excavated material,*
 - (f) *the likelihood of disturbing Aboriginal objects or other relics,*
 - (g) *proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area.*

The application involves earthworks associated with the construction of the new perimeter road, processing and stockpiling areas and also earthworks associated with the proposed perimeter batters. The current development application seeks approval for such earthworks, as required by clause 7.5(2) of WLEP 2009. The impact of such works on drainage patterns and soil stability is addressed within the Soil and Water Management Plan prepared by KFW. Further, the Landscape Plan prepared by Ochre and the Vegetation Management Plan prepared by Southern Habitat confirm the extent of planting adjacent to the watercourse to minimise impact on bank stability and water quality. With respect to potential impact on Aboriginal heritage, the Preliminary Heritage Assessment conducted by Artefact Heritage concludes that there are no heritage constraints on the current proposal.

Clause 7.4 Riparian Lands

This clause applies to land shown as "riparian land" on the Riparian Land Map. The subject site is partly included as riparian land on this map. This clause specifies that "*development consent must not be granted for development on land to which this clause applies unless the consent authority has considered the impact of the proposed development on the land and any opportunities for rehabilitation of aquatic and riparian vegetation and habitat on that land*". The relocated buildings, whilst located within 40m of the watercourse, are to be located on a site which is currently highly disturbed in the developed areas. The proposed relocation of the buildings will not further impact on aquatic and riparian vegetation on the land. Whilst the works are located within 40 metres of the watercourse, section 91 of the EPA Act, 1979 confirms that state significant development is not defined as integrated and hence a controlled activity approval is not required.

Clause 7.1 Public Utility Infrastructure

The site is not serviced by sewer and water. A pump out septic system will be required, as per Condition 76 of DA 2009/1153/A.

7.2 Other Local Plans and Policies

7.2.1 The West Dapto Release Area 94A Development Contributions Plan (2011)

Section 94A of the Environmental Planning and Assessment Act 1979 (NSW) (EPAA), provides for a fixed development consent levy. Clause 1 of section 94A states that as a condition of a development consent a consent authority may impose *"a requirement that the applicant pay a levy of the percentage, authorised by a contributions plan, of the proposed cost of carrying out the development."*

The purpose of the section 94A levy is to assist Council in providing and maintaining high quality, diverse public facilities to meet the needs and expectations of the residential community of Wollongong City. As stated in the EP&A Act 1979 the monetary contribution is *"to be applied towards the provision, extension or augmentation of public amenities or public services (or towards recouping the cost of their provision, extension or augmentation)," [s94 (a) (3)].* This levy applies to all land within the West Dapto Release area, which the subject site is located.

It is understood that a contribution was payable for the development approved pursuant to DA 2009/1153/A as referenced in condition 38 which requires payment of \$9,200 to Council prior to release of the Construction Certificate. Hence, we request that this contribution be taken into consideration as credit when determining the overall contribution amount payable and that any contribution which is applied to this development relate only to the expanded working area, with this area to be calculated in accordance with Clause 2.5 of the West Dapto Release Area Section 94 Contributions Plan (2011). We also request that areas of the site, such as easements, roads and the like which do not directly accommodate the industrial workings be excluded from the area calculation for the purpose of determining the section 94 contribution payable.

7.3 Wollongong Development Control Plan 2009

Wollongong Development Control Plan 2009 (WDCP 2009) contains Council's standards for development with the Wollongong local government area and is applicable to the proposed development. This proposal is in accordance with all relevant general aims and objectives of this plan in particular:

- c) *To ensure that development contributes to the quality of the natural and built environments.*
- d) *To encourage development that contributes to the quality of the public domain.*
- e) *To ensure future development responds positively to the qualities of the site and the character of the surrounding locality.*
- f) *To encourage the provision of development that is accessible and adaptable to meet the existing and future needs of all residents, including people with a disability.*
- g) *To ensure development is of a high design standard and energy efficient.*
- h) *To ensure new development is consistent with the desired future character for the area.*
- i) *To ensure the threat of bushfire is assessed.*
- j) *To protect areas of high scenic and aesthetic value.*
- k) *To ensure new development contributes to the safe and liveable environments.*

A number of sections contained within WDCP 2009 are of relevance to the proposed Concept Plan. The following compliance tables summarise the manner in which the Concept Plan will address the primary numerical requirements of the relevant chapters of this DCP.

We note that the subject site is located within the West Dapto Release Area Chapter D16; therefore the relevant parts of this Chapter will be addressed.

7.3.1 Chapter D16 West Dapto Release Area

Chapter D16 West Dapto Release Area			
WDCP Requirements		Proposed	Compliance
Section 5: Neighbourhood Plans			
5.1 Requirements for a Neighbourhood Plan	<i>The preparation of a Neighbourhood Plan is required to encourage integration of sites and to supplement information prepared by Council to support the rezoning of West Dapto.</i>	The subject application relates to an expanded working area and increased tonnage for an approved industrial use and is considered to be 'of a minor nature' and hence exempt from the requirements or preparation of a Development Control Plan/Neighbourhood Plan under Clause 6.2 of WLEP 2009.	Exemption sought.
Section 6: Development Controls			
6.3.1 Flora and Fauna	<p><i>The intrinsic West Dapto environment has formed the basis for the creation of new urban structure and a backdrop to the creation of new communities. Areas of sensitivity have been included in the environmental protection zones and will be subject to the stringent development controls with rigorous controls applying in the most sensitive areas.</i></p> <p><i>Areas that have a high conservation values and where revegetation and ongoing management is required have been or will be zoned Environmental Management. Limited compatible development is allowed in these areas.</i></p> <p><i>Areas of lesser environmental significance, but will still require sensitive design and siting have been, or will be, included in the Environmental living zone. In these areas residential development will be allowed but on large lots and having regard to environmental criteria.</i></p>	The expanded working area is located within a cleared area of the site and does not extend beyond land zoned for industrial purposes.	Refer comment
6.3.2 Indigenous and European Heritage	<i>The West Dapto area has strong links to the past both in the recent history of pastoralism and mining, and the prehistoric and post – contact Aboriginal occupation of the coastal hinterland. As well as the presence of known archaeological sites within the study area, the coastal flood plain has been identified as having potential to demonstrate further archaeological evidence of Aboriginal occupation.</i>	With respect to potential impact on Aboriginal heritage, Artefact Heritage conclude that there are no heritage constraints on the current proposal.	Refer Appendix 22
6.3.3 Views and vistas	<p><i>Land within the release area has been accessed for visual quality. Land falls into three categories of visual sensitivity. These include:</i></p> <p>ZONE A (High Concern for Visual Resource) –Development within areas of high scenic quality must be sympathetic to that visual quality as the ability of the</p>	<p>The area of the expanded workings are located within Landscape Management Zone B. There is no development proposed within Landscape Management Zone A.</p> <p>A Visual Analysis is contained in</p>	Refer Appendix 20

Chapter D16 West Dapto Release Area		
WDCP Requirements	Proposed	Compliance
	<p>area to absorb change is low.</p> <p>ZONE B (Moderate concern for visual resource) - Changes to landforms, final contouring and revegetation programs will significantly contribute to reduce the visual impact and therefore must be minimised wherever possible.</p> <p>Zone C (Low concern for Visual Resource) - Proposed development within this zone should remain virtually subordinate the existing landscape.</p> <p>Controls: A visual impact assessment is to be prepared by the applicant and submitted with any Development Application. The visual impact assessment is to demonstrate how retention of the visual quality of the area in which development has been proposed has been considered in the design of the proposal particularly having regard to the visual zone in which land is located. In areas of high scenic quality (zone A), development is to have a maximum height of 2 storeys and a maximum site coverage of 50%.</p>	
6.3.4 Water Management	<p>Appendix 20.</p> <p>Within Zone B the development includes the expanded working area, a number of additional buildings, perimeter road and drainage works. The works are contained on the periphery of an area that is currently highly degraded and hence it is not considered that the additional works will further significantly contribute to a loss of scenic quality.</p> <p>Plans prepared by KFW show the location of the 1% AEP and PMF floodline,</p> <p>The plans prepared by KFW also show the proposed stormwater detention system which will service the expanded working area. Such plans confirm that this stormwater system will incorporate a water quality/receiving pond and table drains to direct runoff towards this pond located near the southern boundary of the site.</p>	Refer Appendix 2

Chapter D16 West Dapto Release Area			
WDCP Requirements		Proposed	Compliance
6.3.5 Riparian Corridors	<p><i>Development Applications shall identify the proposed land use and ownership of the riparian land.</i></p> <p><i>Revegetation of riparian corridors shall not increase the flood risk to the surrounding residential land.</i></p> <p><i>Refer to chapter E23: Riparian Land Management for controls relating to riparian lands.</i></p> <p><i>The extent of riparian management activities is limited to the width of the 1% AEP flood level, which has been typically mapped as the boundary of the E3 Environmental Management and the R2 Low Density Residential zone.</i></p> <p><i>The Riparian land management area can include land use for bush fire mitigation activities.</i></p>	A core riparian zone is proposed which principally extends 10 metres from either side of the banks of the watercourse, with low ground covers only in locations which are identified for APZ purposes. The Landscape Plan prepared by Ochre confirms the location of such planting, whilst the VMP details management and maintenance of these areas.	Refer to Vegetation Management Plan prepared by Southern Habitat and Landscape Plan prepared by Ochre
6.3.6 Open Space and Recreation	Not applicable	The controls of Section 6.3.6 are not applicable to the current development application which pertains only to industrial development.	Not applicable.
6.3.7 Acid Sulphate Soils	1. Land which is subject to Acid Sulphate soils shall be accompanied by an Acid Sulphate Soils Management Plan which demonstrates that the subject land is suitable for the proposed purpose or will be following remediation.	Not located within an acid sulphate zone as mapped in Council's records.	Not applicable.
6.3.10 Road System	<p><i>Development Applications must include a traffic analysis and a road master plan, prepared by a suitably qualified professional, and demonstrate that the objectives and controls are in regard to the roads will be achieved.</i></p> <p><i>Construction over or within waterways should have regard to the Fish Passage Guidelines developed by NSW Fisheries.</i></p>	The proposed development does not include the construction of new public roads. Vehicular access to the site will be gained from Wyllie Road via the existing site access point and bridge.	Refer Appendix 2
6.3.11 Areas under Easement	<p><i>A Development Application shall include the proposed use of all land under easement.</i></p> <p><i>Water management can be carried out in electrical easements</i> <i>Landscape planting (low rise) can be established in electrical easements while allowing for necessary service access.</i></p> <p><i>More significant planting can happen on the edge of electrical easements to create a visual buffer to electrical infrastructure.</i></p> <p><i>Consultation with TransGrid is required to ensure that buffers, road levels and access are adequate.</i></p>	The proposed works are not located under a transmission easement on the site. A 45.72m wide transition line is located to the north of the proposed development area, also clear of the batters.	Not applicable.

Chapter D16 West Dapto Release Area			
WDCP Requirements		Proposed	Compliance
6.3.12 Schools and Community Facilities	<i>Not applicable</i>	The proposed application does not generate a need for additional community facilities as it seeks approval for an industrial use only.	Not applicable.
6.3.13 Employment Area	<p><i>The creation of employment opportunities within and near to West Dapto is a key strategy in enabling people to work close to where they live and thereby reduce the overall traffic generated by the development.</i></p> <p><i>All development within the land zoned for employment purposes shall be accordance with the principles contained within the LGA Employment Lands Strategy.</i></p> <p><i>The principles include preserving large parcels and clusters of light and heavy industrial land and ensuring that business parks are not accommodated in light industrial zones.</i></p> <p><i>Refer to chapter B5 Industrial Development for controls relating to development on industrial lands.</i></p>	<p>The proposed development seeks approval to expand the working area of an approved industrial use which will contribute to ongoing employment opportunities in the Wollongong LGA.</p> <p>For a discussion of specific industrial controls refer to Chapter B5 Industrial Development of WDCP 2009 (below)</p>	Refer to Chapter B5 WDCP 2009.

7.3.2 Chapter B5 Industrial Development

Chapter B5 Industrial Development			
WDCP Requirements		Proposed	Compliance
4 Building Design / Façade Treatment			
4.1.2	<p><i>High quality glass, decorative finished concrete or face brick construction fronting public roads. Alternatively, Colorbond wall materials may be used for up to 50% of the total front façade of the building with the remaining 50% of the façade being of a glass, decorative finish concrete or face brick construction;</i></p> <p><i>Max reflectivity 20%;</i></p> <p><i>Materials schedule to be provided</i></p> <p><i>Large unrelieved expanses of walls to be broken up to provide visual interest</i></p> <p><i>Building to be oriented towards major road frontage with architectural features for both road frontages</i></p> <p><i>The placement of roller shutters, loading docks and other building openings shall, wherever possible, be provided at the side and rear of the building</i></p> <p><i>The main entry to the building shall be easily identifiable from the road and directly accessible from the front of the building</i></p>	<p>The development will contain a number of approved and proposed structures including a number of shipping containers and purpose built colorbond sheds. The form of the structures is consistent with that which has been approved pursuant to development Consent DA 2009/1153/A.</p> <p>The proposed structures will not be sited immediately adjacent to a public road and hence the provisions of this control relative to building orientation are not applicable.</p> <p>The buildings are not adjacent to, and do not front a public road and hence the provisions of this clause are not considered relevant to the current application.</p>	<p>Refer comment</p> <p>Not applicable.</p> <p>N/A</p> <p>N/A</p>

Chapter B5 Industrial Development			
WDCP Requirements		Proposed	Compliance
	<i>Buildings should incorporate decorative roof elements and avoid bulky roof forms.</i>	Development will contain a number of approved and proposed structures including a number of shipping containers and purpose built colorbond sheds. The form of the structures is consistent with that which has been approved pursuant to development Consent DA 2009/1153/A.	N/A
5. Safety and Security			
5.2	<p><i>Front door to face the road;</i></p> <p><i>Administration offices located at front of building</i></p> <p><i>Visible street number</i></p> <p><i>Lighting design to address Crime Prevention through Environmental Design (CPTED) & comply with Ch 2 of CPTED</i></p> <p><i>'Lighting (including bollard lighting) should be provided to the external entry path and the car parking area using vandal resistant light features</i></p>	The development includes an expanded working area for an approved industrial use, which will incorporate a number of additional and relocated buildings. The buildings are not adjacent to, and do not front a public road and hence the provisions of this clause are not considered relevant to the current application.	Not applicable
6. Carparking Requirements			
6.2	<p><i>To meet car parking requirements 100% of parking requirements to be provided on site.</i></p> <p><i>Appropriate disabled car parking provision appropriate materials and attractive landscaping</i></p> <p><i>Car parking to be provided in accordance with the requirements of Chapter E3 of this DCP;</i></p> <p><i>All developments to provide a minimum of one disabled car parking space.</i></p> <p><i>The provision of bicycles and loading / servicing to be in accordance with Chapter E3.</i></p> <p><i>To ensure car parking areas are integrated with the landscape design of the development site. In order to screen the car parking from the public road frontage as much as possible.</i></p>	The level of carparking which was required in conjunction with DA 2009/1153/A will be increased from 10 to 24 spaces, in accordance with the recommendations of the Traffic Impact Statement. The location of this parking is shown on the Site Plan contained in Appendix 2.	Complies
7. Loading Dock Facilities, Vehicular Access and Manoeuvring Requirements			
7.2	<p><i>Appropriate loading facilities in accordance with Part E of this DCP;</i></p> <p><i>Loading docks shall be positioned wherever possible away from the public road frontage. Where such facilities can only be provided to the public frontage, appropriate landscaping will be required in front of the loading facility to adequately screen the development</i></p>	The development will incorporate a turning and backing area located in the northern portion of the site which will provide access to the storage areas. The inclusion of the perimeter road will also provide ease of access and manoeuvring on site.	Complies

Chapter B5 Industrial Development			
WDCP Requirements		Proposed	Compliance
	<p>All internal two way access roads shall have a minimum width of 7m. Lesser widths may be provided if the internal road system is designed to a single one way circulation arrangement within the site including any loading dock facilities. Directional signage shall be shown on all internal roadways to facilitate the orderly movement of truck and other vehicles within the site.</p> <p>Servicing and loading dock facilities shall be provided in accordance with the car parking, Access, servicing/loading facilities and traffic management chapter in Part E of the DCP.</p>	<p>The truck parking and rest area will also incorporate a perimeter road which will allow trucks to ingress and egress this area in a forward direction.</p> <p>The existing approved access road and bridge will provide access to such areas,</p>	
8. Landscaping Requirements			
8.2	<p>Min 10% landscaped</p> <p>Dense landscaping at the front of the property;</p> <p>Car parking areas which adjoin public roads or adjoining non-industrial land uses are to be visually screened by dense landscaping.</p> <p>Min 5m setback from front boundary for landscaping of full property length to arterial/ sub arterial road, 3m to a local or collector road;</p> <p>Trees to be planted min 1 tree per 10 car spaces; A minimum 1.5m landscaping strip is required to be provided after every 5th car parking space.</p>	<p>The Landscape Plan prepared by Ochre shows the provision of planting within the riparian corridor, with a general width of 10m. Further, this plan includes the provision of perimeter planting along the western and southern boundaries of the site.</p> <p>The carpark area is not visible from a public road and hence screen planting is not considered necessary.</p>	<p>Complies</p> <p>Not applicable</p>
8.2.2 Arborist Report	<p>Required in relation to any significant tree on the subject site</p> <p>The report must identify trees on the site survey plan by number, and provide details of the genus and species; health amenity value and S.U.L.E (Safe useful life expectancy) rating of each tree; Impact of the development of each tree; Impact of retaining trees on the proposed development; the Tree Protection Zone (TPZ) required for each tree proposed to be retained; Any root barriers necessary, type and their location and any branch of root pruning which may be required for trees.</p>	<p>An Arborist Report prepared by David Potts dated 7 December 2012 addresses a number of trees located to the east of the watercourse.</p> <p>Specific requirements in relation to a Moreton Bay Fig have been included within this Report.</p>	Complies
9. Outdoor Storage Areas			
9.2	<p>Any storage for raw materials must be provided outside, positioned at the rear and side of buildings, adequately screened by 2m high masonry fence</p> <p>All outdoor storage areas are to be positioned at the rear of the buildings with no storage areas being permitted within the front setback area of either the primary street frontage or any secondary street frontage.</p>	<p>The outdoor storage areas are not located adjacent to the frontage of the site in compliance with this requirement.</p>	Complies

Chapter B5 Industrial Development			
WDCP Requirements		Proposed	Compliance
10. Shipping Container Storage Facilities			
10.2	<p>The storage of shipping containers shall take place within a designated storage area behind the front building line setback. The storage of shipping containers within the front setback area of the development is not permitted.</p> <p>All shipping containers shall be screened away from view from any road frontage and from adjoining residential area by landscaping or other form of screening to the satisfaction of council.</p> <p>All shipping container storage areas shall be separate from truck manoeuvring areas to ensure all trucks can enter and leave the site in a forward direction.</p> <p>Any weighbridge or control device shall be sited at least 30 metres from the site entrance, in order to prevent any queuing of container freight trucks on any public road.</p>	<p>The storage containers are located at towards the central portion and northern area of the site.</p> <p>The weighbridge is located in excess of 30m from the site entrance with adequate queuing area.</p>	<p>Complies</p> <p>Complies</p>
19. Advertising Structures / Signs			
19.1	Must be in accordance with Chapter C1 of this DCP	No additional advertising is proposed in conjunction with this application.	Not applicable
21. Riparian Corridor Management			
21.1	If 40m within watercourse or on waterfront land, must comply with Chapter E23 Riparian Corridor Management in this DCP	Refer to Chapter E23 of WDCP2009 below	Refer to Chapter E23 below
22 Utility Infrastructure Services			
22.1	<p>Satisfactory arrangements are required for:</p> <p>(a) The provision of reticulated water and sewerage;</p> <p>(b) The provision of underground electricity; and</p> <p>(c) The provision of underground telecommunications</p>	There will be no change to the servicing arrangements on the site.	No change

7.3.3 Chapter E2 Crime Prevention Through Environmental Design

Chapter E3 aims to promote the creation of safer spaces through environmental design in the planning and management of development.

Chapter E2 Crime Prevention Through Environmental Design			
WDCP Requirements		Proposed	Compliance
Section 7: Parking Demand and Servicing Requirements			
3.1 Lighting	Lighting: Encourage the use of lighting to create safer places after dark.	Low level security lighting around buildings is to be provided at night. and will be consistent with AS 4282.	Complies
3.2 Natural Surveillance and Sightlines	<p>1. General Requirements</p> <p>Consideration should given to avoid blind corners, sudden footpath grade changes, avoidance of medium height vegetation,</p>	The development site is not adjacent to pedestrian thoroughfares where potential entrapment could occur.	Complies

Chapter E2 Crime Prevention Through Environmental Design			
WDCP Requirements		Proposed	Compliance
	windows that overlook pedestrian areas, facilitation of day and night usage of public spaces	<p>The development also 24 hour security monitoring and has security cameras installed throughout the site.</p> <p>Planting is focused adjacent to the watercourse as per the issued Controlled Activity Approval.</p> <p>The placement of the buildings allows for surveillance of the facility.</p>	
3.3 Signage	<p>All signage must be in compliance with AS1742.10 (1998) Manual of Uniform Traffic control devices – Pedestrian Control and Protection and AS1428.1 (1998) Design for access and Mobility – General Requirements for Access.</p> <p>The size and location of signage should not create entrapment opportunities</p>	A minimal number of signs is proposed, with the sign upon entering the property provided for safety purposes. Signage will not create entrapment opportunities.	Complies
3.4 Building design	<p>1a) Ensure entrances to buildings are clearly defined, secure, well lit and face the street.</p> <p>f) Locate lifts within secure entrances and incorporate graffiti and vandal resistant measures.</p> <p>2a) Consideration should be given to crime prevention measures such as locating the main entrance at the front of the site and in view of the street, providing windows overlooking public areas and avoiding potential entrapment spaces.</p> <p>g) locate disabled parking in highly visible and accessible areas</p> <p>h) Minimize number of entry and exit points.</p>	<p>The buildings are for staff use only and are limited to amenities, site offices and workshops.</p> <p>Only one vehicular entry is proposed from Wylie Rd to minimise point of accesses to the facility.</p> <p>Disabled parking is visible and accessible.</p>	Complies
3.5 Landscaping	<p>Support and reinforce security principles by the careful selection and placement of landscaping.</p> <p>1 Footpath Planting:</p> <p>a) Planting associated with footpaths does not exceed 1m in height where abutting pavements.</p> <p>3. Planting at entrances:</p> <p>a) Avoid plants and trees in areas that screen doorways, entrances and windows.</p> <p>4 Non-Concealing Trees:</p> <p>a) Trees should not have branches below 2.4m above ground level</p> <p>6 Sturdy Plants:</p> <p>a) In areas of high crime plant heavy standard – semi-mature trees (120 – 720mm girth)</p>	<p>Planting is focused adjacent to the watercourse as per the issued Controlled Activity Approval.</p> <p>Appropriate tree species have been selected adjacent to the carparking area to have regard to the required branch height of trees.</p>	Complies

7.3.4 Chapter E3 Car Parking, Access, Servicing and Loading Facilities

Chapter E3 contains Council's general requirements for the assessment and maintenance of traffic impacts and the layout of parking associated with development proposals and hence is relevant to the subject development.

Chapter E3 Carparking, Access, Servicing and Loading Facilities			
WDCP Requirements		Proposed	Compliance
Section 7: Parking Demand and Servicing Requirements			
7.1 Car Parking, Motor Cycle, Bicycle requirements and delivery / serving vehicle requirements	<p>(1) Car parking requirements are outlined in Schedule 1 of Chapter E</p> <p>(2) All parking and bicycle facilities must be fully provided on site.</p> <p>(3) Where a formula in Schedule 1 results in a fraction, numbers are to be rounded up to the nearest whole number.</p> <p>Schedule 1 - Industry</p> <p><u>CARS:</u> 1 car parking space per 75m² GFA</p> <p><u>BICYCLES</u> 1 bicycle space per 200m² GFA</p> <p><u>MOTORCYCLES</u> 1 motor cycle space per 25 car spaces</p> <p><u>SERVICING:</u> Large rigid vehicle</p>	<p>The Traffic Impact Statement prepared by KFW confirms that a total of 26 parking spaces will be required to accommodate the 40 employees and a maximum of 4 visitors. Ten (10) parking spaces are currently located on the site and a further 14 spaces can be provided as shown on the Site plan contained in Appendix 2.</p>	Complies
7.2 Disabled Access and Parking	<p>Disabled access and parking facilities are contained in Schedule 2.</p> <p>Schedule 2 1 car parking space for every 100 car parking spaces or part thereof.</p>	<p>1 disabled parking space is to be provided</p>	Can be conditioned and provided on site
7.3 Bicycle parking / storage facilities	<p>Provision of bicycle parking for a particular use shall be in accordance with Schedule 1</p>	<p>Adequate area exists on site to accommodate bicycle parking, if demand exists however it is considered that this is unlikely.</p>	Refer to comment
7.4 Waiver or Reduction of parking spaces	<p>Council has the discretion to waive or reduce the minimum number of car spaces required if justified, and considering relevant DCP criteria. A 10 to 20% reduction may apply if near public transport and a public car park.</p>	<p>26 spaces to be provided.</p>	Complies
7.5 Car Parking Credits for existing development	<p>Carparking credits for existing development will only be considered where supported by written evidence.</p>	N/A	N/A
7.6 Car Parking Layout and Design	<p>The parking dimensions, internal circulation, aisle widths, kerb splay corners, head clearance heights, ramp widths and grades of the car parking areas are to be in conformity with the current relevant Australian Standard.</p> <p>Vehicles must be able to enter and leave the site in a forward direction.</p> <p>Pedestrian and vehicular entrances are to be separated.</p>	<p>The existing ten (10) parking spaces are located outdoors and has been approved in conjunction with DA 2009/1153/A. The additional parking will be located in a similar position.</p> <p>The dimensions of the parking is compliant with AS 2890.1 and adequate manoeuvring area is provided on site for all vehicles to</p>	Complies

Chapter E3 Carparking, Access, Servicing and Loading Facilities			
WDCP Requirements		Proposed	Compliance
		<p>allow vehicles to enter and leave the site in a forward direction.</p> <p>Plan KFW Plan No. KF110816-C15 (Appendix 2) shows the internal traffic movements for deliveries to the site and sales/pick up.</p>	
Section 8: Vehicular Access			
8.1 General	<p>Access to off-street parking areas must comply with Council's Standard Vehicle Entrance Designs, with any works within the footpath and road reserve subject to a section 138 Roads Act 1993 approval.</p> <p>Sight distances to be used for assessment and determination of a suitable driveway location shall be obtained from Australian Standard AS2890.1 (2004) for car use and Australian Standard AS2890.2 (2002) for any access to be used by a commercial vehicle.</p> <p>Driveway grades, vehicular ramp width/grades and passing bays must be in accordance with AS 2890.1.</p> <p>Generally, direct access to arterial or sub-arterial roads will not be permitted, except where no legal alternative access is available.</p>	<p>The site currently has direct access to Wyllie Road at a northern tangent of a curve in Wyllie Road.</p> <p>The Traffic Impact Assessment prepared by KFW (Appendix 19) confirm that sight distance of 80m is available to the south and in excess of 170m to the north.</p> <p>There is no direct access to an arterial or sub-arterial road.</p>	Complies
9.1 General	<p>Schedule 1 identifies the requirement of a large rigid vehicle for the servicing of the proposed development. The dimensions of the loading area for a large rigid vehicle are: Min length: 12.5m, Min height: 4.5m</p>	<p>The site will be utilised by a range of heavy vehicles with the "Swept Path and Carparking Plan" (Appendix 2) prepared by KFW confirming movements of such vehicles on site.</p>	Complies
9.2 Loading/ Unloading and Manoeuvring Area requirements	<p>All servicing vehicles must be able to manoeuvre entirely on-site and enter and leave the site in a forward direction. All truck turning or manoeuvring areas must be separate from areas of normal pedestrian or vehicular traffic.</p> <p>All loading dock facilities must guarantee satisfactory on-site manoeuvring areas for trucks in accordance with AS2890.2.</p>	<p>The Traffic Impact Statement (Appendix 19) prepared by KFW confirms that all vehicles can enter and leave the site in a forward direction.</p>	Complies

The proposal is in accordance with Council's balanced approach to parking provision and will obtain access from a road network will be able to adequately cater for the traffic generated by the proposed development. The proposal is considered to be consistent with the objectives and the requirements of the DCP.

7.3.5 Chapter E6: Landscaping

Chapter E6 outlines Council's requirements for the lodgement of landscape plans in conjunction with a development proposal.

WDCP Requirements		Proposed	Compliance
Section 4: Minimum Requirements to accompany a Development Application			
4.2 Landscape Concept Plan	<i>1. Community, educational, health, aged care housing, tourism, child care facilities, places of public worship require the provision of a 'Category 3' Landscape Concept Plan, which means it has to be prepared by a Landscape Architect eligible for corporate membership of the Institute of Landscape Architects.</i>	A Landscape Concept plan prepared by Ochre Landscape Architects is contained in Append 4.	Complies
	<i>The submitted Landscape Concept Plan shall comply with the requirements of the Table in section 4.2 of this chapter.</i>	Refer to Landscape Concept Plan	Complies

7.3.6 Chapter E7: Waste Management

Chapter E7 contains general requirements for waste minimisation, management and recycling for all developments within the Wollongong LGA.

WDCP Requirements		Proposed	Compliance
Section 4: Submission / Application Requirements			
4.1 General	<i>1. All applications for development must be accompanied by an SEE, which is to include a Site Waste Minimisation and Management Plan (SWMMP) as the central document of compliance with this chapter. Waste management facilities shall be clearly illustrated on the architectural plans accompanying the development application</i>	A Waste Management Plan prepared by Benviron is contained Appendix 6.	Complies
Part 5: Planning Requirements / Assessment Criteria			
5.7 Commercial Development and Change of Use	<i>A complete Site Waste Minimisation and Management Plan shall accompany the development application. The plans submitted to show: <ul style="list-style-type: none"> Location of waste storage areas; Location of temporary waste areas; Identified collection point; Every development must include a designated general waste storage area.</i>	A Waste Management Plan prepared by Benviron is contained Appendix 6.	Complies

7.3.7 Chapter E14: Stormwater Management

Chapter E14 outline Council's requirements for stormwater drainage design and on-site stormwater detention for all developments within the Wollongong LGA.

WDCP Requirements		Proposed	Compliance
Section 11: Management of Stormwater from Development			
11.1 General	<i>Detailed plans showing the proposed method of stormwater disposal are to be submitted with the development application.</i>	A Stormwater Concept Plan prepared by KFW accompanies the application. (Appendix 2)	Refer Appendix 2
Section 12: On Site Stormwater Detention			
12.1 Application of OSD	<i>OSD requirements generally apply to all types of development.</i>	Pond details Plan prepared by KFW is contained in Appendix 2.	Refer Appendix 2
Section 13: Information Requirements (to be submitted by applicant)			
13.1 DA Stage	<i>1. A stormwater layout is required.</i>	A Stormwater Concept Plan prepared by KFW accompanies the application. (Appendix 2)	Refer Appendix 2

7.3.8 Chapter E16: Bush Fire Management

Chapter E16 contains Council's requirements for development on land classified as bushfire prone. A Section 149 Certificate was obtained confirming the property is considered bushfire prone land and therefore a Bushfire Assessment Report has been undertaken by EcoLogical Australia in April 2013 and is contained in Appendix 18.

7.3.9 Chapter E18: Threatened Species

A Biodiversity Assessment has been prepared by Conacher Environmental Group dated August 2013 which has addressed the Environmental Planning and Assessment Act, 1979; NSW Threatened Species Conservation Act, 1995; and the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999. The Assessment accompanying this application satisfies the objectives and controls contained within Chapter E18 Threatened Species of WDP 2009.

7.3.10 Chapter E19: Earthworks

Chapter E19 outlines Council's requirements and environmental management measures for development involving earthworks. Clause 4.1 requires an application involving earthworks to address impact on the geotechnical stability. Earthworks on steep slopes greater than 1m will generally be required to submit a geotechnical report. A Geotechnical Investigation Report has been prepared by Benviron Group addressing the proposed works, concluding that the proposal is feasible within the site subject to the included recommendations.

7.3.11 Chapter E20: Contaminated Land Management

The controls within Chapter E20 are consistent with the provisions of SEPP No. 55 – Remediation of Land. Section 6.2.3 of this EIS addresses these requirements.

7.3.12 Chapter E22 Soil Erosion and Sediment Control

Soil and Erosion Control details and a Plan have been provided by KFW Project No. 110816 (Drawing C13 and C14), contained in Appendix 2.

7.3.13 Chapter E23 Riparian Land Management

Section 6.1.5 of this EIS confirms that whilst works are within the riparian corridor section 91 of the EPA Act, 1979 confirms that state significant development is not defined as integrated and hence a controlled activity approval is not required.

It is noted however that the Office of Water has previously endorsed the 10m riparian corridor in its consideration of DA 2009/1153/A and through its issuing of Controlled Activity Approval No. ERM 2009/1008 issued on 27 February 2012 for the current facility. The completion of vegetation management works as detailed in the Vegetation Management Plan prepared by Southern Habitat is well progressed, as shown in Figure 28.



Figure 28: Riparian corridor works which have been completed on the site

Table 9A, prepared by Southern Habitat details the works which have been undertaken to date in accordance with this VMP. The revised VMP also contains an updated Restoration Plan and costing.

Table 9A: Works Undertaken since issues of original VMP as advised by Southern Habitat

Date	Activities
9/08/2013	Induction to site covering OHS issues and plan of Management Cut and paint of Lantana south of bridge with mulching of resultant material. Slashing of Kikuyu, Crofton and Thistles on bank edges south of entry bridge. Cut paint and removal of Senna in same area.
12/08/2013	Brush cutting of in stream weeds and banks north of entry bridge. Cut and paint of Senna and lantana north of entry bridge on eastern bank, removal of propagules.
13/08/2013	Cut and paint of Senna and lantana north of entry bridge on western bank, removal of propagules. Slashing of Kikuyu, Crofton and Thistles south of entry Bridge.
23/08/2013	Isolation around Native plants and trees at northern extent of site. Cut and paint of Senna and lantana northern extent of site.
26/08/2013	Chemical application to all weeds remaining throughout entire site. Foliar application of Round up bioactive at 1:100.
11/09/2013	Mechanical processing of all cured weed biomass throughout site.
18/09/2013	Chemical application targeting emerging weeds throughout entire site. Cut and paint of any reshooting woody weeds previously treated. Hand mulching of any remaining cured weeds.
05/10/2013	Installation of mulch to entirety of site.
22/04/2014	Chemical application across site targeting re-emerging exotic grasses, Lantana, Crofton weed, Mist Flower and Cape Ivy.
14/05/2014	Installation and staking of 550 units in southern zones. All plants inserted with Terraform and watered in.
15/05/2014	Installation and staking of 565 units north of bridge. All plant inserted with Terraform and watered in.
20/05/2014	Watering of all installed units
24/05/2014	Watering of all installed units
30/05/2014	Watering of all installed units
06/06/2014	Installation and staking of 290 units into north eastern embankment. All plants inserted with Terraform and watered in.
09/06/2014	Watering of all installed units.

7.3.14 Chapter D8: On Site Sewage Management System

The proposed staff amenities building will require an on-site sewage management system in accordance with the Local Government (General) Regulation 2005 and as required by the Local Government Act 1993. Condition 76 of DA 2009/1153 requires a pump out system to be provided and this arrangement will continue in conjunction with the proposed development.

7.3.15 Chapter E13: Floodplain Management

Chapter E13: Floodplain Management of WDCP 2009 applies to all floodplains within the Wollongong LGA. KFW confirm that the provisions of this chapter do not apply as the site is not located in a floodplain. This is confirmed by KFW in Figure 29 and 30 which indicate the relative elevation and slope of the watercourse through the site from the railway line to a point downstream of West Dapto Road. The lowest point on the site is approx RL16. The RL of the actual flood plain in the down side of West Dapto Road is RL6. It is clearly evident from a consideration of the elevation of the site and consideration of the gradient of the watercourse through the site that the site is not within the Mullet Creek/Brooks Creek flood plain. KFW confirm that any earthworks

which may occur on the site will therefore have no impact on flood levels or flood characteristics downstream of the site.

Despite the provisions of Chapter E13 not apply to the site as it is not located in a floodplain, the objectives of this chapter have been considered within the Flood Analysis Review prepared by KFW (which is summarised in section 9.2.9 of this EIS) which shows the 1% AEP flood level and PMF level as extracted from the Extension Mullet Creek Flood Study (Dec 2011). The results of the review confirm that the site has safe access during the 100 year ARI flood in both the blocked and unblocked scenarios and provides safe refuge for employees during the PMF. KFW conclude that the proposed development is not affected by flooding up to an including the 100 year ARI as flooding is contained within the existing watercourse in the culvert unblocked condition. Minor overtopping occurs during the culvert blocked condition however KFW confirm that flood waters are within safe limits for pedestrians and vehicles in accordance with the NSW Floodplain Development Manual.

7.3.16 Wollongong City Council Recycling Strategy

Wollongong Council has adopted the NSW Waste and Resource Recovery strategy as part of their own waste recovery strategy and are currently preparing a waste action plan for the council area. This is expected to be finalised within the next few years. Section 10.2 of this EIS confirms that the development will generate minimal waste and will assist in meeting the NSW government targets with respect to a reduction in municipal waste, commercial & industrial waste and construction & demolition waste.

Figure 29: Relative Elevation and Slope of Watercourse through Site - Diagram 1
Source: KFW and Google Maps

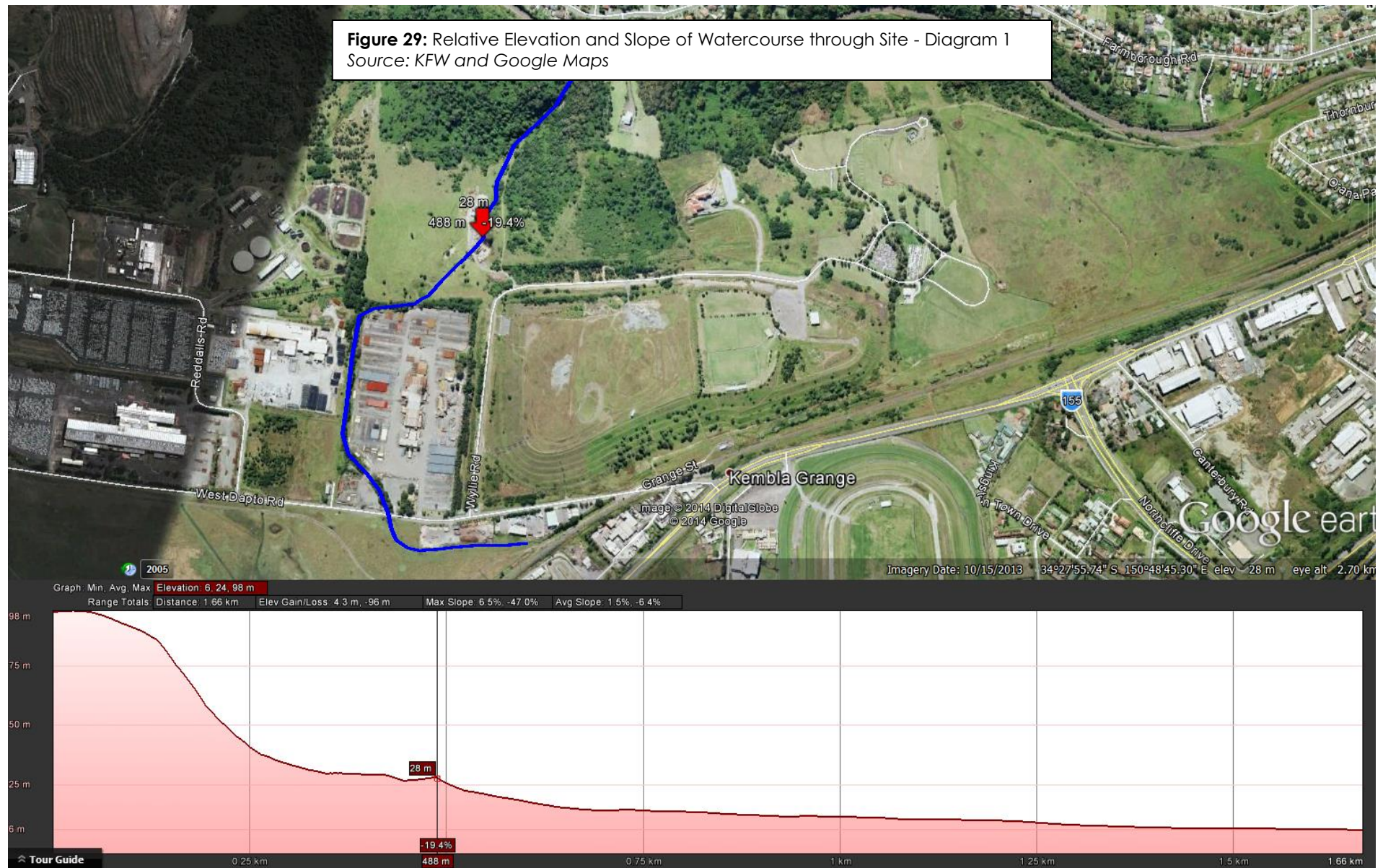
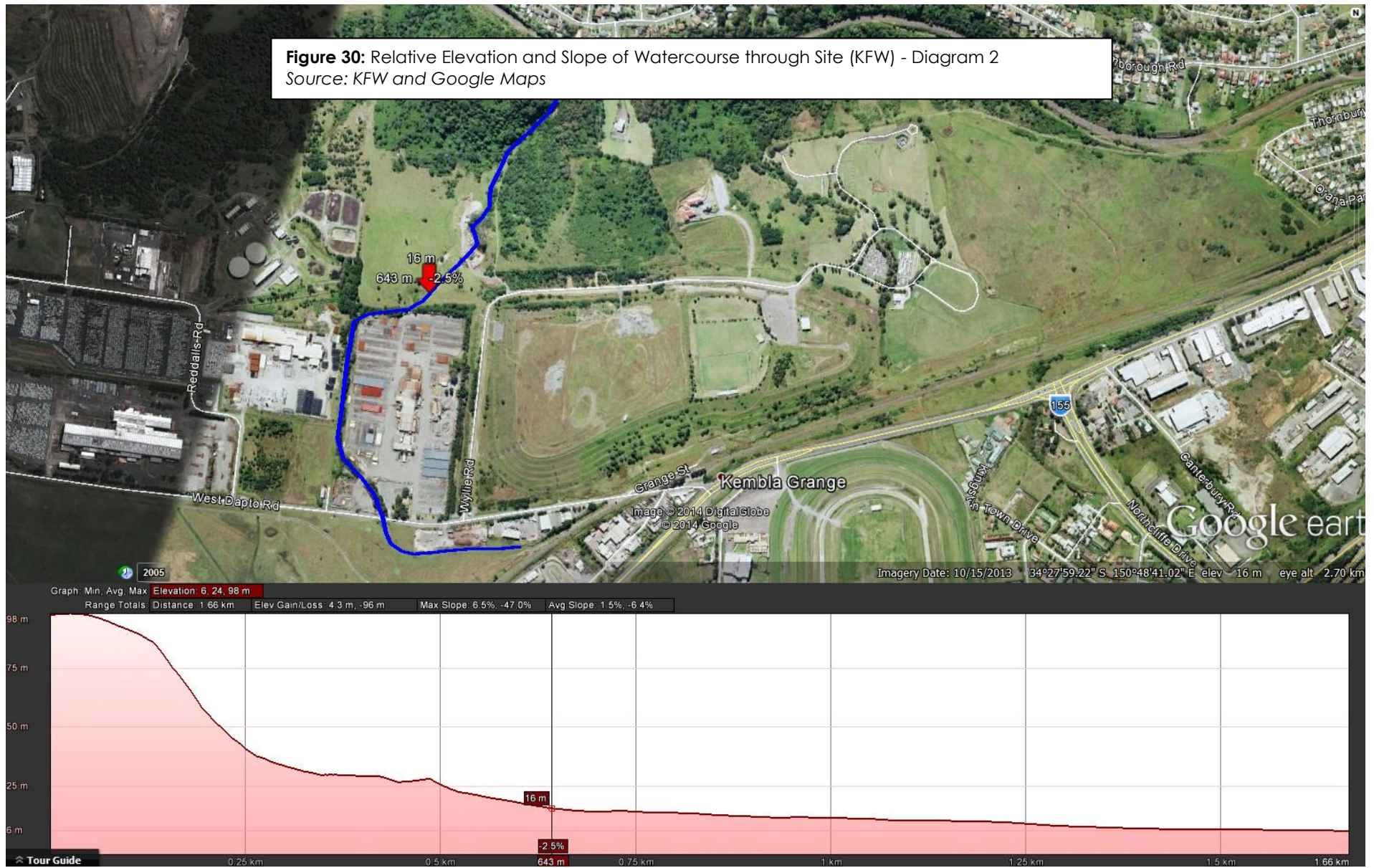


Figure 30: Relative Elevation and Slope of Watercourse through Site (KFW) - Diagram 2
Source: KFW and Google Maps



8 Consultation

The requirements that were received from the Director-General included consultation requirements for the Environmental Impact Statement which includes consultation with specified government agencies, Wollongong City Council and the local community and stakeholders. Accordingly, during the preparation of the Environmental Impact Statement the following agencies were consulted:

- Environment Protection Authority;
- Department of Primary Industries (including the NSW Office of Water);
- Roads and Maritime Services;
- Wollongong City Council.

Further, during consideration of previous development applications comments were obtained by Wollongong City Council from Jemena Gas due to the existence of a gas pipeline which extends along the western boundary of the site. Such comments have been addressed during preparation of the revised plans for the proposed development, as discussed in section 8.2 of this EIS.

It is also a requirement of the Director General to consult with relevant community groups or affected property owners. The consultation processes and issues raised are outlined below for each authority:

8.1 Consultation with Wollongong City Council

A **pre-lodgement meeting** was held with Council on 29 August 2012 to discuss the proposed development, prior to the completion of the architectural plans and consultant reports. This meeting also addressed previously lodged development applications in relation to the facility, including:

1. Section 96 modifications for the relocation of the amenities and office buildings.
2. A Development Application for the expansion of stockpile area (increase of footprint, new workshop and perimeter road).

The items raised in relation to the current application have been included in the following table:

Table 9: Prelodgement Meeting Advice and manner in which application addresses issues

Issue	Comment
Integrated Development	
<i>It appears development occurs within 40 metres of the top of the bank of a watercourse, and therefore a controlled activity approval in accordance with the Water Management Act 2000 is required. The site plan should contain i) The location and name of the creek/watercourse; and ii) The distance from the proposed development from the top of the bank.</i>	The site plan prepared by KFW (Project No110816 Drawing No. C10) shows the location of the watercourse, as well as the name and the distance of the proposed buildings from the top of the bank. Council's attention is drawn to the fact that state significant development is not defined as integrated and hence a controlled activity approval is not required
Land Use Planning	
<i>The new development works which includes increase in development footprint, workshop and equipment accommodation would be captured under Clause 6 of the Wollongong Local Environmental Plan (West Dapto) 2010.</i>	The relationship of the development to the WLEP (West Dapto) 2010 has been addressed in Section 7.1.

Issue	Comment
<p>The proposed development site is mapped within an urban release area and needs to comply with Wollongong LEP (West Dapto) 2010 Clause 6.2 Development control plan which states.</p> <p>"(2) Development consent must not be granted for development on land in an urban release area unless a development control plan that provides for the matters specified in subclause (3) has been prepared for the land."</p>	<p>Clause 6.2 of WLEP (West Dapto) 2010 has been discussed in relation to the preparation of a Neighbourhood Plan and development control plan for the land. As the proposal does not pertain to the construction of new public roads; the release of new urban lands; a change to public transport routes or availability; the provision of retail or commercial uses; nor the provision of additional community / recreational facilities; whereby the subject site pertains to only one allotment and will not impact upon the usability of adjacent lands for future purposes, the preparation of a neighbourhood plan / development control plan is not warranted in terms of scale and the potential impacts on the overall West Dapto release area.</p>
General Planning issues:	
<p>Proposed development involving the expansion of the stockpile area, new workshop building, and perimeter road for the approved use on site is to be lodged as a new development application. The application is to also clearly identify and detail the nature/use of the stockpiles and processes associated with stockpile area. It is also to provide the maximum storage and processing capacity for the development.</p>	<p>This application seeks approval for the expansion of the stockpile area, new workshop building, and perimeter road and has been lodged as a new development application. The Waste Management Plan prepared by Benviron (Appendix 6) confirms quantities of waste to be processed.</p>
<p>Conditions within DA-2009/1153/A restrict the capacity and storage permitted for the development/site. Any development that proposes to increase the amount as approved within this consent is likely to be designated development.</p>	<p>The current application is defined as designated development due to the application seeking to increase capacity and hence this EIS has been prepared.</p>
<p>If the proposal is designated development pursuant to Section 78a(8)(a) of the Environmental Planning and Assessment Act 1979 a development application for designated development must be accompanied by an Environmental Impact Statement.</p> <p>Schedule 3 of the Environmental Planning and Assessment Regulation 2000 describes development that is considered designated development proposed in Part 1 of Schedule 3. It is noted that the development will also require an EPA licence.</p>	<p>As the submitted application is considered designated development, this Environmental Impact Statement has been compiled in accordance with the EP&A Regulations Schedule 3 Part 1. Furthermore, a licence (No. 20213) will be obtained from the EPA.</p>
<p>Owners consent from Council will be required to be lodged with the application if works are proposed within Councils road reserve/property. Works for example involving the alteration/ widening of the existing access road to the property from Wyllie Road.</p>	<p>Widening of the access driveway from Wyllie Road (outside of the property boundary) will be undertaken to improve access to the site. A section 138 permit will be obtained prior to the undertaking of such work.</p>
<p>A development application on bushfire prone land must be accompanied by a Bushfire Assessment Report within the Statement of Environmental Effects demonstrating compliance with the aim and objectives of Planning for Bushfire Protection 2009 and the specified objectives and performance criteria for land use proposed. In particular, the following matters must be addressed:</p> <ol style="list-style-type: none"> A statement that the site is bush fire prone land, where applicable; The location, extent and vegetation formation of any bushland on or within 100 meters of the site, which may determine the likely path of any bush fires; The slope and aspect of the site and any of the bush fire prone land within 100 metres of the site, which may determine the likely path of any bushfires. Any features on or adjoining the site that may mitigate the impact of a high intensity bush fire on the proposed 	<p>The subject site is bushfire prone as confirmed by Council's online mapping and Section 149 Certificate. A Bushfire Report prepared by Ecological accompanies this development application which addresses the stated matters.</p>

Issue	Comment
<p>development, and</p> <p>v. A statement assessing the likely environmental impact of any proposed bush fire protection measure.</p> <p>vi. Whether any building is capable of complying with AS 3959-2009 in relation to the construction level for bush fire protection.</p>	
<p>A preliminary desktop audit in relation to site contamination must be included in the Statement of Environmental Effects. Refer to Wollongong Development Control Plan 2009 Chapter E20: Contaminated Land Management.</p>	<p>Benviron Group has completed a range of assessments in relation to soil salinity, acid sulphate soils, groundwater and a geotechnical assessment. The groundwater assessment (Appendix 13) considers the potential migration of contamination from the site.</p>
<p>A Soil and Water Management Plan is to be submitted. Refer to Chapter E22-Soil Erosion and Sediment Control of Wollongong Development Control Plan 2009.</p>	<p>A Soil and Water Management Plan has been prepared by KFW (Drawing No. C13) Project No. 110816 – refer Appendix 2.</p>
<p>The applicant must address Clause 7.5 Acid Sulphate Soils of Wollongong Local Environmental Plan 2009 within the Statement of Environmental Effects.</p>	<p>The site is not identified on Council's mapping as containing Acid Sulphate Soils, accordingly the preparation of and Acid Sulphate Soils Management Plan is not required in accordance with Clause 7.1 of WLEP (West Dapto) 2010. Irrespective, an Acid Sulphate Soils Assessment has been prepared by Benviron Group and accompanies this application.</p>
<p>The proposal when lodged will be notified in accordance with Wollongong Development Control Plan 2009- Appendix 1: Notification and Advertising Procedures.</p>	<p>Noted</p>
Stormwater/Flooding:	
<p>Council's records indicate the site is coded as "Flood affected-Uncategorised Flood Risk Precinct".</p>	<p>The 1% flood line has been shown on the Site Plan prepared by KFW, consistent with the flood levels established during determination of DA-2009/1153.</p>
<p>In respect to the relocation of the amenities/office: whether the development is lodged as a new application or a section 96 modification a report addressing the flooding constraint on the site, prepared by a suitably qualified civil engineer in accordance with Chapter E 13: (Floodplain Management) of WDCP 2009 is to be submitted.</p>	<p>A flood report has been prepared by KFW in accordance with Chapter E13 and accompanies this application.</p>
Expansion of stockpile area and associated work	
<p>A revised Stormwater Concept Plan including on site detention is to be prepared by a suitably qualified civil engineer in accordance with Chapter E14 of Wollongong Development Control Plan 2009 and submitted with the development application.</p>	<p>Plans prepared by KFW (Appendix 2) contain site sections, details of on site ponds, details of the OSD basin and confirm arrangements regarding stormwater collection.</p>
<p>The full area draining to the proposed OSD basin post development needs to be used as the tributary area in calculation for OSD and clearly stated on the Stormwater Concept Plan.</p>	
<p>The method of capturing and directing the runoff from the tributary area needs to be detailed on the Stormwater Concept Plan.</p>	
<p>The method of separating the 'clean' and 'dirty runoff on the site and final discharge points from the site needs to be detailed on the stormwater concept plan.</p>	
<p>There should be no concentration of stormwater flows from the site onto adjacent/down slope properties.</p>	
<p>The proposed development should not increase flood affectation on the downstream/adjoining properties.</p>	
<p>The applicants consulting engineer should also refer to conditions of consent relating to stormwater/flooding/bridge design within DA2009/1153/A</p>	

Issue	Comment
Integration with the landscape plan and overall development: Site landscaping must be integrated with the stormwater management (drainage) controls. In particular, the location and nature of on site stormwater detention should not conflict with landscaping areas and objectives.	The Landscaping Plan prepared by Ochre and the Stormwater Concept Plan prepared by KFW have been integrated to ensure consistency.
Traffic	
<p>General:</p> <p>i. The applicant should refer to Chapter E3-Car Parking, Access, Servicing/Loading Facilities and Traffic Management of the Wollongong Development Control Plan 2009.</p> <p>ii. The applicant must provide all internal access dimensions on the site plan, including grades, access widths, parking aisle widths which comply with AS2890.1 and swept paths and sightlines at the access which comply with AS2890.2.</p>	<p>Chapter E3 has been addressed within this EIS, furthermore accompanied by a Traffic Impact Statement prepared by KFW.</p> <p>A swept path and car parking plan has been prepared by KFW (Drawing No. C18). Drawing No. C100 provided within the Traffic Impact Statement prepared by KFW provides a guide to the internal access roads.</p>
<p>Traffic Generating Development</p> <p>i. The proposal is considered as Traffic Generating Development as it falls within Column 2 of Schedule 3 of SEPP Infrastructure (Landfill, recycling facilities, and waste transfer station of any size or capacity). As such it will be referred to RMS for comment.</p> <p>ii. A traffic Impact Assessment Study is required to support any future Traffic Generating Development as required under Clause 6.1 of Chapter E3 of DCP.</p> <p>iii. A Traffic Impact assessment will need to be prepared by a suitably qualified consultant and be prepared in accordance with Table 2.1 of the RTA Guide to Traffic Generating Development.</p>	A Traffic Impact Statement has been prepared by KFW to accompany this EIS and it is noted this will be referred to the RMS for comment.
Future Road Work	
Wyllie road forms part of the future road alignment (Northcliffe Drive Extension). The proposed development should allow for this future alignment as part of the future application.	The TIA prepared by KFW addressed future road alignment which states in Section 8.2 of this TIA: "Discussion with Council traffic engineers indicate they would only support one access point from the development onto the future north/south link road which would be 2 lanes in either direction. Due to site constraints the site entry is proposed to be offset from the present Wyllie Road reserve by 70m" Refer to KFI 10816-T04
One consolidated access point is preferred for this development which would then be incorporated into the future roundabout at Wyllie Road (Chapter D16 Future Road Network). The applicant should ensure that the proposed access point does not preclude this future intersection arrangement.	Refer above
Parking and Internal Road Network	
Car parking, bicycle parking and motorcycle parking should be provided in accordance with Schedule 1 of Chapter E3 of the DCP.	24 car parking spaces have been provided which includes one disabled car parking space. Chapter E3 of WDCP has been addressed in this EIS.
Landscape	
The developer is required to submit a Landscape concept plan (scale 1:100 or 1:200) as part of the Development Application in accordance with the requirement of Chapter E6- Landscape and Chapter B5, section 8 Industrial Development of Wollongong Development Control Plan 2009 and must identify all proposed garden beds, retaining walls, paved areas(concrete or otherwise), fences existing/proposed and existing vegetation to be removed /or retained.	A Landscape Plan prepared by Ochre Landscape Architects accompanies this application
Site Landscaping must be integrated with the stormwater management (drainage) controls. In particular, the location and nature of onsite stormwater detention should not conflict with landscaping areas and objectives.	The accompanying Landscape Plan has been integrated with stormwater management, bushfire protection requirements and in accordance with the Vegetation Management Plan.

Issue	Comment
Environment	
Any application should state the maximum intended storage and processing capacities for each classification of waste as defined by the Protection of the Environment Operations Act 1997 and Protection of the Environment operations (waste) Regulation 2005 Clause 51 and 51A Exemptions and whether an application for the Environment protection licence from the Environment Protection Agency is intended to be made and what for(refer to DECCW (2009) Guide to licensing under the Protection of the Environment Operations Act 1997 Part and Part B).	The maximum intended capacities for storage and processing for each classification of waste has been detailed in the accompanying Waste Management Report prepared by Benviron Group, and has been addressed in this EIS. A licence is to be obtained from the EPA.
Should the new development application be submitted after the development subject to DA-2009/1153/A has become operational, then the information submitted with new application should demonstrate all operational phases of the development use of the site conditions of DA-2009/1153/a are being/will be complied with.	Current conditional requirements of DA-2009/1153/A are in operation.
Any dust generation from and dust management for the proposed development additional to that previously addressed with DA 2009/1153 and DA 2009/1153/A will be required to be addressed. A dust emission assessment report is to be prepared by a suitably qualified consultant considering all the previously approved and proposed activities on the site and a dust/air quality management is to be prepared for all activities (previously approved and proposed) are to be submitted with any application.	An Air Quality Assessment has been undertaken by GHD in relation to this application for increased footprint and waste capacity, for all proposed phases and site operation
Any odour generation and odour suppression facilities that previously addressed with DA 2009/1153 and DA2009/1153/A will be required to be addressed.	Refer above
A Water Sensitive Urban Design Strategy with the details of any proposed changes to stormwater management and treatment additional/different to those previously addressed with DA 2009/1153 and DA 2009/1153/A is to be submitted with any application. Performance targets are detailed in Chapter E15-Water Sensitive Urban Design of Wollongong Development Control Plan 2009.	A Flood Review/Water Sensitive Urban Design Strategy has been prepared by KFW dated July 2013 and accompanies this application.
Any potential noise impacts for the proposed development additional to those previously addressed with DA 2009/1153 and DA2009/1153A will be required to be addressed specifically in relation to the residents located within the vicinity. ie Farmborough heights with the provision of an acoustic report prepared by a suitably qualified consultant.	An Acoustic Assessment has been prepared by GHD and accompanies this application which addresses the operation and capacities of this subject application .
Any waste management details for the proposed development additional to that previously addressed with DA 2009/1153 and DA 2009/1153/a are to be provide. Refer to Chapter E7 Waste Management of Wollongong Development Control Plan 2009.	Details of waste management have been provided within a Waste Management Report undertaken by Benviron addressing the proposed waste processing and storage capacity subject to this application.
Any additional trees proposed for removal or with the potential to be impacted by the proposed development that were not part of DA2009/1153 are to be identified on a landscape concept plan and are subject to an arborist report. Refer also to Landscapes requirements about trees.	An Arborist report prepared by David Potts assesses the trees located within the site footprint subject to the proposed expansion. Specific management and protection requirements are provided in relation to a Moreton Bay Fig identified on the site.
As the proposed development is likely to involve native vegetation removal additional to that addressed with DA 2009/1153 and potential indirect impacts on the watercourse, a flora and fauna impact assessment report prepared by a suitably qualified ecologist is required. Refer to Chapter E18- threatened species impact assessment of Wollongong Development Control Plan 2009.As well as any trees proposed for removal will need to be searched for habitat components. (eg hollows)	A Biodiversity Assessment undertaken by Conacher Environmental Group (June 2013) addresses the impact of the subject proposed in relation to site flora and fauna, in addition to that addressed for DA 2009/1153.
Any potential impacts on the riparian area running through the property additional to that addressed with DA 2009/1153 and DA 2009/1153/A are to be addressed.	Refer above
A copy to Council of the Vegetation Management Plan submitted to the Office of Water for the riparian area that has been prepared for DA 2009/1153 AND DA 2009/1153A with the new development application is to be provided.	A copy of the VMP is contained in Appendix 17.

Issue	Comment
<i>An overall operational environmental plan should be prepared and submitted for the site which addresses issues such as site management , dust, water quality and noise compliance due to the crusher operation etc</i>	The Statement of Commitments contained in Section 12 details the measures which are to be implemented by Bicorp in accordance with the recommendations of this EIS.
<i>A separate application to install and/or operate an Onsite Sewerage Management system (pump out system required) must be submitted to Council prior the installation of any pump out system. Refer to Chapter E8- Onsite Sewerage Management Systems of Wollongong Development Control Plan 2009.</i>	Noted – this will be submitted if required.

Discussions were also held with Council traffic engineers (by KFW) during preparation of the Traffic Impact Statement which indicated that Council would only support one access point from the development onto the future north/south link road which would be two lanes in either direction. In accordance with such discussions, the site entry, once Wyllie Road is upgraded, is proposed to be offset from the present Wyllie Road Reserve by 70m. Only one access will be provided to the site in conjunction with the current application and also at a future date upon upgrading of Wyllie Road.

8.2 Agency Consultation

Roads and Maritime Services

TCG Planning consulted with Andrea Boes from Roads and Maritime Services in October 2013. This discussion confirmed that there were no further specific matters to be addressed beyond those raised in the Department's letter of 29 May 2012. The department advised that an electronic copy of the SIDA Analysis should accompany the application and that this proposal would be considered having regard to other projects within the locality.

Office of Water

TCG Planning consulted with Jeremy Morice from Office of Water in October 2013. This discussion determined that there were no further matters to be considered in the preparation of the EIS. The Department has previously reviewed the proposal in the consideration of DA-2013/435 for the expanded working area (which was withdrawn) and is generally satisfied with the on site arrangements including the provision of the riparian corridor.

We note that the Office of Water has previously endorsed the 10m riparian corridor in its consideration of DA 2009/1153/A and through its issuing of Controlled Activity Approval No. ERM 2009/1008 issued on 27 February 2012 for the current facility.

Jemena Gas

Wollongong City Council consulted with Jemena Gas during its consideration of DA-2013/435, which sought to expand the building footprint but was withdrawn. Jemena advised that:

- A suitable barrier is required to raise awareness of construction vehicles not to encroach into the easement corridor.
- Confirmation is required that the proposed tree and shrub buffer and catch drain will be located off the easement with root barriers installed as required.

- Jemena is required to maintain the pipeline and easement from time to time. Clarification is required in the event of an excavation or the location of heavy machinery, the proposed batter, trees and rock wall can be self-supported during this activity.
- Consideration should be given to the provision of a safety barrier to be installed on the north west corner of the development batter and pipeline easement in the event of vehicle or person could not access this location.

In response to the issues raised bollards and signage have been included on the revised Site Plan to delineate the gas easement. Construction work, batters and retaining walls will not encroach upon the easement.

8.3 Community Consultation

An advertisement for an information session for the Resource Recovery Facility was placed in the Advertiser on 4 September 2013. This information evening was held on Tuesday 10 September at the Unanderra Community Centre. The advertisement identified that the application was for a State Significant development to be determined by the Department of Planning and Infrastructure.

No members of the general public or community attended this information session. It is further note that during the consideration of DA-2013/435 for the expanded working area (which was withdrawn) only one objection was received.



Figure 31: Image of the Advertisement placed in the Advertiser on 4th September 2013.

9 Environmental Risk Analysis

This section includes consideration of the potential environmental impact of the project and identification of the key issues which have been the subject of further assessment within specialist sub consultant investigations. Specifically, this section contains an environmental risk analysis to identify potential environmental impacts associated with the resource recovery facility.

9.1 Description of the Existing Environment

The subject site is situated within an industrial area within the suburb of Kembla Grange. The site has road access from West Dapto Road and Wyllie Rd, Kembla Grange. West Dapto Road provides access to the Dapto in the south and adjoins the Princes Highway.

The site is currently operating as a waste recovery facility. The total site area is 21.7 hectares in area. The area covered by the proposed development is approximately 49,425m². The subject site is situated in a sloping area ranging from approximately 15-30 metres above sea level. The topography is expected to minimise air quality and odour impacts to the nearby sensitive receivers (Farmborough Heights residents).

For the purposes of addressing potential noise, odour or dust impacts on adjoining properties the following observations are made regarding the siting of the plant and the nature of surrounding land uses:

- The site is located within an IN2 Light Industrial zone and borders an IN3 Heavy Industrial zone.
- The noise, odour and dust assessments were implemented to assess the impact the development may have on nearby residents. The nearest residents are located within Farmborough Heights which is approximately 500 metres north of the subject site
- Within the Farmborough Heights low density area to the north of the subject site, residential development within this location includes low density housing, predominately containing one to two storey brick dwellings.
- There is an Orthodox church located to the east of the subject site and a Rural Fire Service facility located to the north.
- The prevailing wind is south-westerly in the mornings and north-easterly in the afternoons.

9.2 Identification of key Issues

9.2.1 Potential Hazardous Materials Risks

This Environmental Assessment has identified the storage of materials on the site and bushfire hazard as potential risks which warrants further investigation. Specifically, the proposed operation uses materials which are defined as combustible liquids, flammable liquids including diesel, petrol and hydrocarbons. A "Preliminary Hazard Analysis Report" (September 2014) has been prepared by Benviron Group to assess the hazards and risks associated with the plant operations and to review the adequacy of the safeguards provided.

The study also examines the potential hazards associated with fire risk due to the siting of the development in an area of bushfire hazard. Further, potential risks associated with vehicle roll-over or collision are also addressed.

A summary of the potential risks associated with transport, storage, construction/development and site operations as addressed within the "Preliminary Hazard Analysis Report" (September 2014) prepared by Benviron is contained in Section 10.1 of this Environmental Impact Statement.

9.2.2 Waste Disposal Outcomes

A "Waste Study Report" was undertaken by Benviron in May 2014 to determine the environmental impact of the proposal with respect to the waste generated from the proposal, and to determine if any hazardous or special wastes are generated. Particular consideration was given to the identification and classification of the likely waste streams that be handled/stored/ disposed of at the facility including the current and future off site waste disposal method. The measures would need to be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007. The outcomes of this assessment are contained in Section 10.2 of this Environmental Impact Statement.

9.2.3 Potential Greenhouse Gas Impacts

The Director General's requirements specify that a quantitative assessment must be undertaken of the potential of scope 1, 2 and 3 greenhouse gas emissions of the development, together with a qualitative assessment of the potential impacts of these emissions on the environment. In addition, the assessment must provide a description of the measure that would be implemented on site to ensure that the development is energy efficient.

To address the potential impacts associated with greenhouse gas emissions a 'Greenhouse Gas Assessment' was prepared Pacific Environment Limited on 15 October 2013. The outcomes of this assessment, as contained within the Pacific Environmental Report, are summarised within Section 10.3 of this Environmental Impact Statement.

9.2.4 Potential Air Quality Risk

The operations of the Resource Recovery Facility necessitate consideration of potential risks associated with construction and operational impacts, including dust generation from the transport of materials and stockpiles and details of proposed management and monitoring measures. Specifically, this could include odours which are discharged from emissions associated with the mechanical pre-treatment of soil and other wastes including physical contamination removal, shredding, mixing, homogenisation, screening and cleaning.

Potential risk also include particulate emissions generated during construction and during on site operations including stockpiling and the movement of materials by trucks. There is also potential for emissions generated through the combustion of nitrogen containing fuels or from the emission of sulphur dioxide or carbon monoxide from fuel use and vehicle movement. To address the potential impacts an Air Quality Assessment was prepared by GHD in July 2014. The outcomes of this assessment are summarised within Section 10.4 of this Environmental Impact Statement.

9.2.5 Potential Acoustic Impacts

The main sources of noise from the facility are expected to be from traffic and construction equipment used in the upgrading of the facility, together with noise associated with future operations of the facility. Whilst the

siting of the subject facility within an industrial area, and the separation provided to surrounding residences will extent minimise this potential impact, the implications of construction and ongoing operations require consideration. The nearest residences are located within Farmborough Heights, approximately 500m north to the proposed development areas.

A 'Noise Assessment' was therefore prepared by GHD in July 2014 focusing on the placement of noise monitors in areas most likely to intercept noise impacts and to also target the most sensitive receivers. The outcomes of this assessment are summarised in section 10.5 of this Environmental Impact Statement.

9.2.6 Geotechnical Considerations

The subject site contains two areas of varying topography being the relatively level ground comprising the western section of the site and the more hilly section of land in the east. This area of steeply sloping land slopes from the south-eastern entrance from Wyllie Road at approximately RL 44.0m to a level platform located in the western part of the site located at RL 21.0m. Whilst the majority of the western platform was anticipated to have a low risk in terms of landslide instability it was considered prudent to undertake a geotechnical assessment of the site to determine slope stability of all areas. The purpose of this investigation was to assess the existing site and subsurface conditions in order to provide recommendations from a geotechnical view point on the proposed scheme comprising buildings, roads and storage areas in the proposed Resource Recovery Facilities at Kembla Grange.

Section 10.6 of this Environmental Impact Statement contains a summary of the '*Geotechnical Investigation report*' dated June 2014 which was prepared by Benviron Group.

9.2.7 Salinity Impacts

Due to the nature of the operations to be conducted in the site, which will result in the disturbance of soils it was considered necessary to undertake an assessment of salinity to determine appropriate management measures. Similarly, there is potential that subsurface soils may require management following disturbance if acid sulphate soils are located on the site. In this regard it is noted that the site is not identified on Council's mapping as containing Acid Sulphate Soils. Accordingly, the preparation of an Acid Sulphate Soils Management Plan is not required in accordance with the provisions of Clause 7.1 of WLEP (West Dapto) 2010. However, irrespective of this a Salinity Assessment has been prepared by Benviron Group in August 2013, the results of which are summarised in section 10.7 of this EIS.

9.2.8 Acid Sulphate Soil Impacts

Due to the nature of the proposed development, site disturbances may occur as part of the development works and hence Potential Acid Sulphate Soils (PASS) or Actual Acid Sulphate Soils (ASS) can result in the formation of acid. This acid, once formed, can then lead to damage to infrastructure or harm to ecological systems. Hence an assessment was undertaken by Benviron in March 2014 to determine the presence or absence of Acid Sulphate Soils on the site. The outcomes of this assessment are contained in section 10.8 of this EIS.

9.2.9 Potential Impact on Groundwater

Due to the nature of the operations it was also considered necessary to assess existing groundwater conditions and the potential for contamination to migrate from the site. In proceeding with this assessment it was however noted that groundwater flow rates are likely to be extremely low given the geology of the site which indicates that residual soils within the site are underlain by Shoalhaven Group geological profiles comprising red, brown and grey lithic sandstone. The results of the salinity investigations are contained in the Salinity Assessment prepared by Benviron dated June 2014, the results of which are summarised in section 10.7 of this EIS, whilst the results of the Acid Sulphate Soils assessment are contained in Section 10.8. The results of the groundwater review are contained in the Groundwater Assessment prepared by Benviron in June 2014, which is summarised in section 10.9 of this EIS.

9.2.10 Potential Impacts of Floodwaters

In 2009 KFW were engaged to undertake a flood investigation of the site in relation to previous development applications on the land. It was considered prudent to review the 2009 flood study and to assess the level of the 100 year ARI and PMF based on the culvert under the existing bridge in both a blocked and unblocked condition and having regard to climate change impacts.

The outcomes of the Flood Analysis Review which was conducted by KFW in June 2014 are contained in Section 10.10 of this Environmental Impact Statement.

9.2.11 Potential Water Quality Impacts

The Director General required that the issues of water uses be considered to determine measures that could be implemented to treat, reuse and/or dispose of water. In response to this requirement a Flood Analysis Review (incorporating a water Sensitive Urban Design) was conducted by KFW in June 2014. This study evaluated stormwater detention storage requirements and required water quality treatment for the proposed development.

The outcomes of the WSUD investigations conducted by KFW are contained in section 10.11 of this Environmental Impact Statement.

9.2.12 Potential Biodiversity Impacts

The land which is to accommodate the proposed development currently contains an operational resource recovery centre, which seeks to expand its approved capacity. Whilst the area on which the development to be sited is predominantly cleared, investigations have been undertaken into the potential impacts of the development on biodiversity as the site contains scattered patches of vegetation within the development footprint; and is bordered by vegetated land to the north and east.

Accordingly a Biodiversity Assessment Report has been prepared by Conacher Environmental Group in April 2014 the outcomes of which are contained in Section 10.13 of this Environmental Impact Statement.

9.2.13 Riparian Corridor Revegetation

The general terms of approval from the Office of Water which were issued as part of Development Consent 2009/1153 required the preparation of a Vegetation Management Plan. Accordingly a Vegetation Management Plan (VMP) was prepared by Southern Habitat in April 2012 and updated in June 2014 to

provide the guiding documentation for the site's rehabilitation in accordance with the legislative framework and guidelines from the Office of Water and to provide the agreed basis for the restoration of the subjects site. The June update of this report provides a summary of the works which have now been completed.

A summary of the key recommendations of this vegetation management plan is contained in Section 10.13 of this Environmental Impact Assessment.

9.2.14 Bushfire Threat

The subject land is identified as Bush Fire Prone Land by Wollongong City Council, with potential bushfire prone vegetation impacting on the development being the riparian corridor which traverses the site and adjacent forest vegetation.

Accordingly, a Bushfire Protection Assessment was prepared by Eco Logical Australia Pty Ltd in July 2014, the outcomes of this are summarised in Section 10.15 of this Environmental Impact Statement.

9.2.15 Traffic Impact Assessment

Due to the increase in traffic movements associated with the facility it was considered necessary to determine the ability of the site to accommodate internal manoeuvring requirements and to determine the ability of intersection and the surrounding road networks (both existing and future) to accommodate the additional flows. Accordingly, a Traffic Impact Statement was conducted by KFE in September 2014, the results of which are summarised in section 10.16 of this EIS.

9.2.16 Potential Visual Impacts

Potential risks associated with the project include the possibility that the site would be visually evident and a significant element of the landscape from key vantage points. To address this, a '*Visual Impact Assessment*' was undertaken by TCG Planning in July 2014 to determine the visual impact of the proposal, as discussed in section 10.18 of this Environmental Impact Statement.

9.2.17 Potential Heritage Impacts

Although the site has been significantly disturbed as a result of former and existing land uses, a heritage assessment has been conducted to assess the potential for the proposed development to impact on Aboriginal and non-Aboriginal objects or items. The 'Preliminary Heritage Assessment' prepared by Artefact in March 2014 examines the potential for the expanded development footprint to impact on matters of Aboriginal and European significance, with the results of this investigation summarised in section 10.19 of this Environmental Impact Statement.

9.2.18 Potential Impact on Mineral Resources

The NSW Department of Trade and Investment - Mineral Resources Branch has advised that the potential for the project to impact upon any significant mineral resources (including metallic mineral, industrial and extractive minerals, petroleum, gas and coal resources) must be considered to ensure that such resources are protected from sterilisation by inappropriate development and that access can be maintained to the land for mineral exploration. The outcomes of this investigation are contained in section 10.21 of this EIS.

10 Environmental Assessment

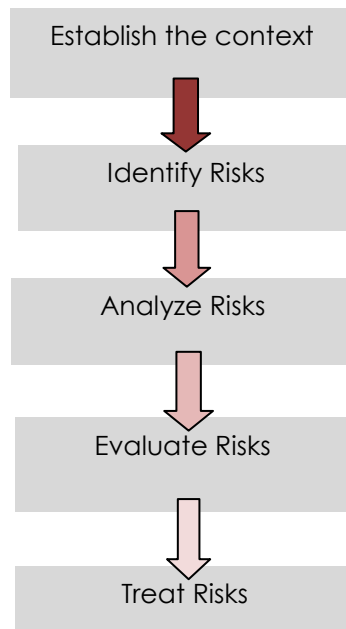
Section 10 provides a description of the existing environment of the proposed Resource Recovery Facility. This section also contains an assessment of the potential impacts of all stages of the project, such as any cumulative impacts, having regard to the outcomes of the specialist subconsultant investigations and the site and operating conditions. This section also takes into consideration the level of compliance of the development with relevant statutory provisions and technical or policy guidelines.

10.1 Preliminary Hazard Analysis

The Director General's Requirements specify that the Environmental Impact Statement must include a Preliminary Hazard Analysis (PHA) of the development and an assessment of the potential fire risks (including bushfire risks) of the development.

The "Preliminary Hazard Analysis Report" prepared by Benviron in September 2014 confirms that for the purposes of hazard identification and assessment the four key areas of transport, on-site storage, construction/development and site operations require consideration. The objective of this PHA was to identify the risks posed to people, property and the environment. This assessment also considered the risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). This assessment however, did not consider the risks to Bicorp Pty Ltd employees or property.

The risk management process included the following components:



The PHA considered the following qualitative criteria (summarised by DUAP, 1992b):

- All "avoidable" risks should be avoided. The necessities investigation of alternative locations and technologies were applicable.

- The risks from a major hazard should be reduced wherever practicable, irrespective of the value of cumulative risk level from the whole installation.
- The consequences (effects) of the more likely hazardous events should, wherever possible be contained within the boundaries of the installation.
- Where there is an existing high risk from the hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.

The report described that it was useful to define (in a descriptive sense) the various levels of consequence of a particular event and the likelihood (or probability) of that event occurring.

Table 10: Qualitative Measures of Probability

Event	Likelihood	Description
A	Almost certain	Happens often
B	Likely	Could easily happen
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Hasn't happened yet but could
E	Rare	Conceivable , but only in extreme circumstances

Table 11: Qualitative Measures of Maximum Reasonable Consequence

	People	Environment	Asset/Production
1	Multiple fatalities	Extreme environmental harm (eg widespread catastrophic impact on environmental values and of an area)	More than \$1 billion (loss of production delay
2	Permanent total disabilities, single fatality	Major environmental harm (eg widespread substantial impact in environmental values of an area)	\$100 million (M) to \$1B loss or production delay
3	Major injury of health effects (eg major lost workday case/permanent disability)	Serious environmental harm (eg widespread and considerable impact on environmental values of an area)	\$5M to \$100M loss or production delay
4	Minor injury or health effects (eg restricted work or minor lost workday case)	Material environmental harm (eg localised and considerable impact on environmental values of an area)	\$250 thousand (K) to \$5M loss or production delay
5	Slight injury or health effects (eg first aid;/minor medical treatment level)	Minor environmental harm (eg minor impact on environmental values of an area).	Less than \$250 K , loss or production delay

The assessment identifies the following potential hazards in relation to the above areas and class of incident:

Diesel: The machinery on the site will use diesel fuels which is defined as a combustible liquid by Australian Standards (AS) 1940:2004 but is not classified as a dangerous good by the criteria of the Australian Dangerous Goods (ADG) Code. The risk associated with the project include diesel storage and usage and in the event of a spill diesel is damaging to soils and aquatic ecosystems and fires can occur if it is ignited. The assessment confirms that the use of diesel and the construction and operations of all fuel storage facilities will be undertaken in accordance with the requirements of AS1940:2004. Approximately 20,000L of diesel will be stored in a bunded transtank. The tank will be coated approximately 400m from the boundary.

Petrol: Petrol, which will also be utilised in limited quantities on the site, is classed as a flammable liquid (Class 3) by AS1940:2004 and as such is classed as a dangerous good by the criteria of the Australian Dangerous Goods

Act. The assessment confirms that fuel storage facilities will be undertaken in accordance with the requirements of AS1940:2004. No storage of petrol is envisaged on the site, however may be present in some vehicles entering the site.

Hydrocarbons: Oil, which is classified as a combustible liquid is classified as a combustible liquid by AS1940:2004. Storage facilities will be in accordance with AS1940:2004 with all waste oil placed in drums or tanks within a bunded area and will be collected by a licensed waste contractor for off-site disposal. Small quantities of grease, degreaser and kerosene will also be required, with such materials to also be stored in accordance with AS1940:2004. Approximately 100L of oils and degreasers will be stored in a bunded tank which will be located approximately 100m from the boundary.

Bushfire Risks: the assessment identified that fire risks can lead to the generation of potentially explosive and/or flammable gas emissions, which can result in impacts such as fire within surrounding vegetation; release of significant quantities of air emissions; contaminated runoff from firewater; damage to property; human injury; and possible plant shutdown. Management measures which are recommended include:

- induction and training of personnel;
- procurement of fire equipment adequate for the level of risk, including adequate maintenance and testing;
- storage and handling of all substances, including waste, under conditions that minimise the risk of fire, explosion or toxic emissions, with specified measures that address the use of solvent-extraction reagents;
- Implementation of specific procedures for high risk tasks such as 'hot work' (eg welding) and use of chainsaws;
- Liaison with Rural Fire Service and monitoring of fire danger ratings.

Vehicle Collision/Roll-over: The assessment notes that potential exists for vehicles bring supplies and similar to the site to be involved in an accident, which could result in the release of product, hydrocarbons or waste materials with consequent adverse impacts on the environment and/or injury or fatality. The following generic classes of incident were identified:

- Leaks/spills
- Fire
- Collision
- Explosion; and
- Theft

Other classes that were identified included:

- Release of odours to atmosphere;
- Equipment/infrastructure malfunction.

To minimise potential risks contractors will be required to comply with Bicorp's procedures and the relevant codes and standards for transport, storage and handling of hazardous materials. Fuel trucks will also carry equipment necessary to respond to an accident that may result in a spill, with any materials to be excavated and recovered as quickly as possible, and relevant authorities notified.

The following project hazard or risk identification summary tables were formulated to identify off-site risks and hazards and provide a qualitative assessment of the risks posed.

Table 12: Hazard Identification Table - Transport

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Collision	Vehicle collision with other vehicle or pedestrian	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training 	C	2	8 (M)
Leaks/spills	Vehicle collision/damage causes spill/leak of hazardous material	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Handling in accordance with Australian standards Emergency response (internal and external) Communications Vacuum and sweeping of paved roads 	C	4	18 (L)
Theft	Vehicle or material within truck stolen	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Contact emergency services (police) Site security/limited access 	D	5	24(L)
Fire	Vehicle fire from equipment failure or poor maintenance	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Fire equipment Bush fire management plan Regular maintenance inspections Contact emergency services (fire brigade) 	D	1	7(M)

Table 13: Hazard Identification Table - Construction

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Leaks/spills	Spills/leaks from construction of development	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Handling in accordance with Australian Standards Emergency response (internal and external) Communications Vacuum and sweeping of paved roads 	D	4	21 (L)
Fire	Building materials catch fire from human error or poor maintenance	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training 	D	1	7 (M)

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
		<ul style="list-style-type: none"> Spill response equipment and training Fire fighting equipment Bush fire management plan Regular maintenance inspections Contact emergency services (fire brigade) 			
Theft	Materials stolen resulting in injury to member of public	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Contact emergency services (police) Site security/limited access 	D	5	24 (L)

Table 14: Hazard Identification Table – On Site Storage

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Fire	Chemicals/fuels ignite by human error or malicious act	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Fire fighting equipment Bush fire management plan Regular maintenance inspections Contact emergency services (Fire brigade) 	D	1	7 (M)
Explosion	Explosion of volatile material stored on site by human error or damage	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Lightening Protection to Australian Standards Emergency response (internal and external) 	E	1	11 (M)
Spills/Leaks	Failed tank or associated pipe works lead to spills	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Handling in accordance with Australian Standards Emergency response (internal and external) Communications Vacuum and sweeping of site 	C	3	13(M)
Theft	Theft of dangerous goods resulting in injury to member of product	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Contact emergency services (police) Site security/limited access 	D	4	21 (L)

Table 15: Hazard Identification Table – Operation of Site (Dust)

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Release of dusts	Dusts generated from the processing of soils which affect workers and nearby residents	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training 	A	5	15(M)

Table 16: Hazard Identification Table – Bushfire

Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Fire	Bushfire caused/affected by operation of site machinery/ equipment that affects workers and nearby residents	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Traffic management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Fire fighting equipment Bush fire management plan Regular maintenance inspections Contact emergency services (fire brigade) 	D	1	7(M)

Table 17: Hazard Identification Table – Operation of Site (operation of Site)

Hazard Identification Table- Operation of site (Operation of Site)					
Incident Type	Scenario	Proposed treatment measures	Likelihood ¹	Consequence ²	Risk ³
Theft	Theft of operation equipment that affects the safety of workers and nearby residents	<ul style="list-style-type: none"> Emergency management/ response Plan Environmental Management plan Work health and safety plan Hazardous material management plan Operator training Spill response equipment and training Contact emergency services (Police) Site Security/Limited Access 	D	5	24(L)

In addition to the above the "Preliminary Hazard Analysis Report" prepared by Benviron provides a number of hazard treatment measures, where required, to produce a 'low' level of risk in accordance as summarised within the Statement of Commitments associated with potential hazards contained in Section 12 of this Environmental Impact Statement.

10.2 Waste Disposal Impacts

The "Waste Management Plan" which was undertaken by Benviron in May 2014 has identified, classified and quantified the likely waste streams that would be handled, stored and disposed of at the facility. Further, this reports describes how the waste will be handled, treated and transported and describes the measures that will be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007.

The aims of the waste management plan are as follows:

- Identify, classify and quantify the likely waste streams that would be handled/stored/disposed of at the facility;
- Describe how this waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite disposal methods; and
- Describe how the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy (2007).

Operational Overview

Benviron confirm that the existing and proposed operation of the site is a Resource Recovery Facility that accepts selective material from building and demolition sites. Materials are transported to the site in trucks ranging in size from 10-25t in capacity. The materials are sorted and separated in sections within the site, processed, and then recycled or disposed of off-site. Figures 19 and 24 describe the process of the assessment of waste and compost arriving/generated at the site.

Table 18 outlines the materials received on-site, the processes to recycle the material, the end-product, final destination of the material, and output material generated.

Table 18: Waste Classification and Generation

Waste Materials to be Received	Waste Classification	Amount Received On Site Annually (tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
Glass	General Solid Waste	2500T	Material washed, crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Plastic	General Solid Waste	2500T	Materials sorted into various types	Sorted material stockpiled on site	Sold to plastic recycler for reprocessing	Nil
Plasterboard	General Solid Waste	1000T	Material crushed and gypsum removed. Paper backing is separated from recycling	Sorted material stockpiled on site	Sold to manufacturer for reprocessing or to landscapers as soil amendments	Some paper material may not be able to be recycled
Ceramics	General Solid Waste	1000T	Material crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Brick	General Solid Waste	15,000 T	Materials crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold as second hand building material or sold for road aggregate and drainage backfill	Nil

Waste Materials to be Received	Waste Classification	Amount Received On Site Annually (tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
Concrete	General Solid Waste	20,000T	Materials crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Metal - incl steel, iron, aluminium, copper, lead etc.	General Solid Waste	10,000T	Metal sorted into sizes and types	Sorted material stockpiled on site	Sold as second hand building material or sold to a metal recycler	Nil
Paper/cardboard	General Solid Waste	5000T	Material sorted into various types	Sorted material stockpiled on site	Sold to paper/cardboard recycler for reprocessing	Nil
Household waste from Municipal cleanup	General Solid Waste	7,500T	Sorted into various materials that can be recycled- metal, timber, plastic, etc	Sorted material stockpiled on site	Sold as second hand building material or to redistributed to relevant recycling area.	Material that cannot be recycled sent to landfill
Organics (non putrescible), Garden/Vegetative Waste, Timber	General Solid Waste	30,000T (of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood)	Large timber cut to size	Sorted material stored on site as mulch or compost	Sold as recycled building material or as landscaping material	Unsuitable green waste must be disposed of to landfill
Virgin Excavated Natural Material (VENM)	General Solid Waste	20,000T	Soils and rock are processed into landscaping material	Sorted material stockpiled on site	Sold as landscaping material	Nil
Building and demolition Waste	General Solid Waste	30,000T	Sorted into various materials that can be recycled- metal, timber, plastic etc	Sorted material stockpiled on site.	Sold as second hand building material or to redistributed to relevant recycling area	Material that cannot be recycled sent to landfill
Asphalt Waste and Railway Ballast	General Solid Waste	5,000T	Material crushed and screened into various products	Material made to various sizes and stockpiled on site.	Sold for road aggregate and drainage backfill.	Nil
Cured Concrete Waste	General Solid Waste	5,000T	Material crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregated and drainage backfill	Nil
Mixtures of above materials	General Solid Waste	10,000T	Sorted into various materials that can be recycled – metal, plastic, timber etc	Sorted material stockpiled on site	Sold as second hand building material or to redistributed to relevant recycling area	Material that cannot be recycled sent to landfill
Waste Accepted under NSW EPA Resource Recovery Exemptions	As per relevant exemption	~15,000T	Soils and rock are processed into landscaping material.	Sorted material stockpiled on site	Sold as landscaping/ earthworks material.	Nil
Soils	General And Restricted Solid Waste	50,000T	Soils and rock are processed into landscaping material.	Sorted material stockpiled on site	Sold as landscaping/earthworks material.	Nil

Table 19 outlines the specifications for the output products:

Table 19: Output Materials produced and their characteristics

Processed Output Products to be Sold	Relevant Standards to assess products	Physical Characteristics	Chemical Characteristics	Biological Characteristics
Recycled Roadbase and associated Bedding and Drainage Materials.	NSW EPA Recovered Aggregate Exemption, NSW RMS QA 3051 Specification, IPWEA Specification for Supply of Recycled Material	Granular material from graded to various sizes ranging between 9mm - 70mm.	Generally Inert but have some contaminant concentrations of Heavy Metals, Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Recovered aggregate Exemption	Nil
Excavated Natural Material (ENM)	NSW ENM Exemption	Soil material made up of silt, clay, sand or rock.	May have some contaminant concentrations of Heavy Metals, TRH/BTEX, PAH or Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA ENM Exemption	Minimal biological activity as should have minimal organic material within soils.
Recycled Glass Sand	NSW EPA Recovered Glass Sand Exemption	Granular material graded to various sizes and stockpiled on site between 2mm and 5mm	Generally Inert but have some contaminant concentrations of Heavy Metals, Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Recovered glass sand Exemption	Nil
Second Hand Building Supplies	N/A - material is sorted and suitable material is stored for sale.	Sorted material such as second hand timber, metal, pipe, furniture etc.	N/A	N/A
Mulch/Compost	AS4419, AS4454 NSW EPA Mulch Exemption.	Material consists of shredded wood and timber.	N/A	High level of biological activity. Processing requires material is pasteurised in order to prevent spread of pathological organisms
Blended Soil Mixes	AS4419, AS4454, NSW ENM Exemption, NSW EPA Recovered Aggregates Exemptions.	Blended soils consisting of sand silt, clay & aggregates.	May have some contaminant concentrations of Heavy Metals, TRH/BTEX, PAH or Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Exemptions. Material will also conform to relevant Australian standards.	Biological activity should have stabilised as organic portions should have already been broken down.

Benviron confirm that "this list covers most of the materials to be produced, however this is not an exhaustive list of materials that may be produced within the site and in the future additional products may be introduced based on market trends. It is important to note that should relevant guidelines and/or Australian/NSW Legislation be changed/amended and the following definitions are added to, amended or are no longer relevant, it is intended that this report will proactively incorporate these changes (where possible and relevant) into this report in accordance with the new guidance/legislation criteria."

Figures 23 and 26 show the resource recovery process, dependent on type of waste, including details of the methods and equipment used to achieve the final product.

Waste Materials

The report concludes that minimal waste is generated from the Resource Recovery centre but that the facility will allow for the achievement of the following outcomes by facilitating the following:

- Preventing and avoiding waste;
- Increasing recovery and use of secondary materials;
- Reducing toxicity in products and materials; and
- Reducing litter and illegal dumping.

Benviron also conclude that there will be a minimal amount of waste that is generated from the Resource Recovery Facility. The facility will also assist in helping the NSW Government in achieving the following targets:

- *Municipal Waste- from baseline 26%to 66%*
- *Commercial and Industrial (C&I) waste from baseline 28% to 63%*
- *Construction and demolition (C&D) waste – from baseline 65% to 76%*

Table 20 outlines an estimated resource recovery for the recycling facility for targeted waste streams by the NSW Government. Benviron confirm these estimates are very conservative and are likely to be much more efficient.

Table 20: Estimated Quantity of Waste Diverted during 10 Year Startup Phase

Municipal Waste Stream

Year	Estimated Tonnes diverted per annum						
	Mixed dry recycling	Paper/Cardboard	Plastics	Glass	Wood/timber	Metals	Mixed residual waste
Capacity of recycling Yard	N/A	5000	2500	2500	40000	10000	N/A
2014/15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2015/16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2016/17	N/A	1500	100	100	2000	3000	N/A
2017/18	N/A	2000	200	200	2500	3500	N/A
2018/19	N/A	2200	300	300	2700	3700	N/A
2019/20	N/A	2500	500	500	3000	4000	N/A
2020/21	N/A	2500	500	500	4000	4000	N/A
2021/22	N/A	2500	500	500	5000	4000	N/A
2022/23	N/A	2500	500	500	5000	4000	N/A
2023/24	N/A	2500	500	500	5000	4000	N/A
2024/25	N/A	2500	500	500	5000	4000	N/A
Total	N/A	20700	3600	3600	34200	34200	N/A

Commercial and Industrial Waste Stream

Year	Estimated Tonnes diverted per annum						
	Mixed dry recycling	Paper/Cardboard	Plastics	Glass	Wood/timber	Metals	Mixed residual waste
Capacity of recycling Yard	10000	5000	2500	2500	40000	10000	10000
2014/15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2015/16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2016/17	1000	1000	500	500	5000	5000	500
2017/18	2000	2000	1000	1000	7000	6000	1000
2018/19	3000	2200	1500	1500	10000	6000	1000
2019/20	4000	2500	2000	2000	10000	6000	1000
2020/21	5000	2500	2000	2000	15000	6000	2000
2021/22	7000	2500	2000	2000	15000	6000	2000
2022/23	10000	2500	2000	2000	20000	6000	2000
2023/24	10000	2500	2000	2000	20000	6000	2000
2024/25	10000	2500	2000	2000	35000	6000	2000
Total	52000	20200	27500	27500	137000	53000	13500

Grey highlight indicates construction phase of proposed recycling yard

Suitable Material to be removed off-site

Any material that is suitable for sale or re-use will be dealt with in accordance with the Protection of the Environment and Operations Act 1997. The material that is deemed suitable will first be tested and classified in accordance with the NSW EPA Resource Recovery Guidelines and also along with any other soil specification guidelines relevant in order to protect human health and the environment. Based on this classification material will be transported to a licensed facilities that can accept such materials or material with appropriate development permissions and only in accordance with specified uses in the NSW EPA Resource Recovery Exemptions.

Unsuitable Material required for Disposal Off-site

Any material that is not suitable for sale or re-use will be dealt with in accordance with the Protection of the Environment and Operations Act 1997. The material that is deemed unsuitable will first be tested and classified in accordance with the NSW EPA Waste Classification Guideline 2009 and based on this classification will be transported to a licensed landfill facilities that can accept such materials in order to protect human health and the environment. These facilities may be:

- Dunmore
- Huntley Heritage
- Dial a Dump
- Benedicts
- Viola

Any material that is classified and is deemed trackable waste as outlined in Schedule 1, Part 1 of the Protection of the Environmental and Operations Regulation (2005) will be managed in accordance with the NSW EPA guidance on Trackable Waste. Benviron estimate that less than 15-20% of material received on site will be unable to be recycled.

Contingency Planning

Table 21 summarises conditions that can be reasonably expected and the resulting problems they may cause and how these problems may be resolved within the context of the resource recovery operation.

Table 21: Contingency Planning Recommendations

Anticipated Problem	Corrective Action By Contractor
Chemical spill / exposure	Stop work, refer to Occupational Health, Safety and Rehabilitation Plan and immediately contact Benviron Group.
Excessive rain	Maintain access roads, cover high-traffic areas with gravel; or cover working areas/stockpiles with plastic during off-shifts; or shut down operations until runoff is more manageable. Inspect & maintain sediment control pond & filter fences.
Unmanageable mud in excavation zone	Improve drainage collection system; add geotextile/gravel in problem areas; or strip off mud/slurry materials; or excavate from the top of the fill.
Excessive drainage	Minimise active/contaminated work area; or improve diversion clean run-on; or maintain sufficient on-site wastewater storage capacity; or mobilise additional storage and/or treatment systems as needed.
Excessive dust	Use water sprays or biodegradable dust sprays, or cease dust-generating activity until better dust control can be achieved, or apply interim capping systems.
Sediment pond water for discharge – analytical results exceed site response levels	Perform in-situ treatment, e.g. flocculant dosing, until response levels are met. Alternatively arrange off-site disposal by a licensed Contractor.
Leachate Pond capacity exceeded	Arrange off-site disposal by a licensed Contractor.
Excessively wet materials	Stockpile and dewater on-site; or add absorbents.
Excessive stockpiling of material within site.	Minimise input of material by refusing to accept material for a period of time to be defined by Site Director. Focus on eliminating wastes of concern from the site through processing or disposal.
Equipment failures	Maintain spare equipment or parts; or maintain alternate rental options; or shut down affected operations until repairs are made.
Release of fuel/oil from machinery	Remove source, use absorbent booms to remove oil and make any repairs as required.
Silt fence fails	Stop work and repair fence to specifications.
Excessive noise	Identify source and review noise attenuation equipment and as necessary provide silencers on noisy equipment.
Excessive odours	Monitor for volatiles using PID and upgrade PPE if necessary. Use odour and volatile suppressing agents to eliminate or reduce odours as required and/or cover odorous material if practicable.

Further, this report concludes that “in accordance with the NSW DECC “Waste Avoidance and Resource Recovery Strategy” (2007) goals, the proposed development facilitates the prevention and avoidance of waste by increasing and promoting the recovery and use of secondary materials”.

Further, the proponent Bicorp confirms that:

- they are aware of the EPA's requirements with respect to notification and tracking of waste;
- they are aware of the relevant legislative requirements for disposal of waste, including relevant Resource Recovery Exemptions, as gazetted by the EPA from time to time.

10.3 Greenhouse Gas Impacts

To address potential impacts associated with greenhouse gas emissions risk a “Kembla Grange Resource Recovery Facility Greenhouse Gas Assessment” was undertaken by Pacific Environment Limited dated 15 October 2013 (Ref 7326-01), as a component of the Environmental Impact Assessment. This assessment involved an investigation into the following matters:

- A quantitative assessment of the potential scope 1, 2 and 3 emissions;
- A qualitative assessment of the potential impacts of the emissions; and
- Measures to ensure the development is energy efficient.

Emission Scopes:

Scope 1: Direct emissions- Emissions from sources owned or controlled by a company, such as company vehicles and office machinery.

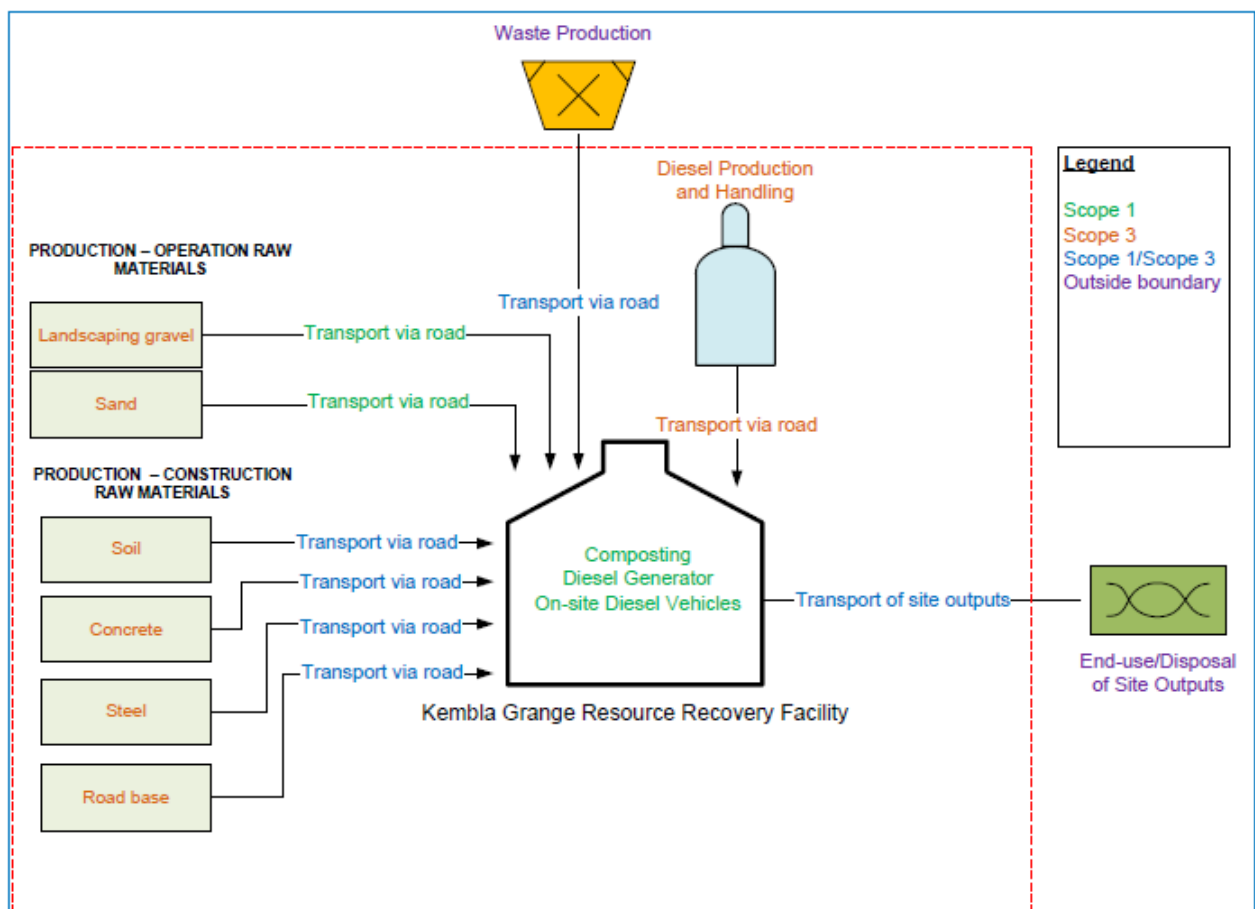
Scope 2: Indirect emissions from electricity consumption- emissions associated with the generation of electricity used by an entity.

Scope 3: Indirect emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled or controlled by the entity (excluding electricity consumption).

Assessment Boundaries:

The boundaries of this assessment are shown in Figure 32.

Figure 32: Assessment Boundaries



Pacific Environment confirm that "waste inputs include green waste, soil, building and demolition waste and non putrescibles rubbish. Site outputs include road base, compost, soil for engineering purposes and soil for landscaping purposes. GHG emissions associated with production and handling of the waste itself and with the end-use/disposal of site outputs recovered from waste are outside of the boundaries of this assessment. For the purposes of comparison with other similar facilities, the emissions associated with the production of input material and disposal of output material would not vary between facilities.

In addition, the following emissions sources are considered to be negligible compared to the major emissions sources and have therefore not been considered in this assessment:

- Fugitive emissions of hydrofluorocarbons (HFCs) from any air-conditioning or refrigeration systems on-site.
- Emissions associated with decommissioning the facility and vehicles associated with the facility.
- Emissions associated with staff and visitors travelling to the site and staff business trips."

Emissions Sources

The Scope 1 and Scope 3 emissions sources considered in this assessment during construction and operation are provided in Table 22. Pacific Environment assumed that the construction phase of the project would be one year in duration and the project lifespan is assumed to be 50 years. Further, they assumed that all electricity required on-site during construction and operation will be generated by diesel power. Therefore, Pacific Environment concluded that there are no Scope 2 emissions associated with electricity purchased from the grid.

Table 22: Emissions Sources Considered in the Assessment

Scope	Emissions Sources
Construction	
Scope 1	Diesel combustion for stationary energy purposes
	Diesel Use in on-site construction vehicles
	Diesel use in vehicles transporting construction materials to site
Scope 3	Emissions associated with the production of diesel
	Emissions associated with the production of construction materials
Operation	
Scope 1	Diesel combustion for stationary energy purposes
	Diesel use in on-site vehicles
	Diesel used in vehicles owned/operated by Bicorp transporting operation raw materials and waste to site and transporting outputs from site to end-use/disposal locations
	Composting Emissions
Scope 3	Emissions associated with the production of diesel
	Emissions associated with the production of operation raw materials
	Diesel used in vehicles not owned/operated by Bicorp transporting operation raw materials and waste to site and transporting outputs from site to end-use/disposal locations

Emissions

The Scope 1 and Scope 3 emissions associated with the construction stage (one year) and operation stage (50 years) of the project are shown in Table 23 and Table 24 respectively. The quantitative analysis of potential Scope 1, 2 and 3 emissions equated to Scope 1 and 3 emissions of 37,382 tonnes of carbon dioxide equivalent during construction, and 1,669 tonnes of carbon dioxide equivalent, per annum, during operation. It was assumed that all electricity required on site during construction and operation would be sourced by diesel power and therefore there are no Scope 2 emissions.

Table 23: Scope 1 and Scope 3 Construction Emissions

Emissions Source	Quantity Consumed	Units	Scope 1 Emissions (t CO ₂ -e)	Scope 3 Emissions (t CO ₂ -e)
Diesel combustion for stationary energy purposes	0.5	Kl	1.3	0.10
Diesel use in construction vehicles ^a	65	Kl	175	13
Construction Materials Embodied Emissions				
Soil	40,000	t	-	920
Concrete	1,000	m ³	-	252
Steel	20,000	t	-	35,400
Road base	20,000	t	-	610
Water	10,000	L	-	ND
Subtotal			177	37,196
Total Scope 1 and Scope 3 Construction Emissions (tCO₂-e)			37,372	

Table 24: Scope 1 and Scope 3 Operations Emissions

Emissions Source	Quantity Consumed/ Processed Annually	Units	Scope 1 Emissions (t CO ₂ -e/y)	Scope 3 Emissions (t CO ₂ -e/y)
Diesel combustion for stationary energy purposes	0.5	Kl	1.3	0.10
Diesel use in vehicles owned/operated by Bicorp	65	Kl	175	13
Diesel use in vehicles not owned/operated by Bicorp	65	kl	-	189
Composting	5,000	t	850	-
Operation Raw Materials Embodied Emissions				
Landscaping gravel	20,000	t	-	340
Sand	20,000	t	-	100
Subtotal			1,027	642
Total Scope 1 and Scope 3 Operations Emissions per year (tCO₂-e/y)			1,669	
Total Scope 1 and Scope 3 Operations Emissions for Project (tCO₂-e)			83,440	

Table 25 shows the project's estimated contribution to regional, national and global emissions of greenhouse gases.

Table 25: Estimated Contribution to Greenhouse Gas Emissions

Greenhouse Indicator	Value	Units	Project Contribution (%)
Project emissions per annum during operation (Scope 1 emissions)	1,027	tCO ₂ -e	-
NSW Total Emissions for 2009-10	157.4	MtCO ₂ -e	0.0007
Australia's Total Emissions for 2009/10	560.8	MtCO ₂ -e	0.0002
Global Anthropogenic 2004 Emissions	49.0	GtCO ₂ -e	0.000002

The impact of the emissions were assessed at a regional, national and global scale, during Scope 1 (operation) only. The project contribution in respect of the NSW total emissions for 2009/10 is 0.0007%. The project contribution for Australia's total emissions for 2009/10 is 0.0002%, while the contribution to the global anthropogenic emissions (2004) is 0.000002% and is therefore considered by Pacific Environment Limited to be negligible. A number of measures for energy efficiency were identified including:

- Implementing energy metering and monitoring.
- Employing efficient lighting and lighting control technologies (timers and light level sensors).
- Utilising energy efficient appliances and office equipment.
- Investigating possibilities to backload trucks.
- Choosing the most direct haulage routes possible.
- Adopting fuel efficient driving practices.
- Considering fuel efficiency when selecting vehicles.

A conclusion of the assessment of the level of emissions, is that the proposed tonnage of waste processed is approximately nine times greater than the emissions intensity for other facilities in NSW. However, the majority of Scope 1 emissions are from composting where not all of other facilities in NSW have on site composting, and would likely not have on site electricity generation. Pacific Environment Limited conclude that when taking these differences into account, it is likely the proposed facility at Kembla Grange would likely be comparable to other facilities.

The total greenhouse gas emissions from the project have been benchmarked against other facilities in the New South Wales Greater Metropolitan Region (NSW GMR) in terms of comparison of emissions per tonne of waste processed.

The Greenhouse gas emissions intensity for the project, in terms of emissions per tonne of waste processed is approximately nine times greater than the greenhouse gas emissions intensity for other facilities in the NSW GMR. The majority of Scope 1 emissions during operation are from composting. The emissions intensity for the project may be higher than for other facilities in the NSW GMR as not all these facilities may have on site composting. It is also likely that many other similar facilities would not have on site electricity generation. That is, a large part of the emissions inventory for other facilities may comprise of Scope 2 emissions. When taking this difference in reporting boundaries into account, the emissions associated with this project would likely be more comparable with those of other facilities.

10.4 Air Emissions Impacts

GHD was engaged to undertake an "Air Quality Assessment" which included an inventory of source odour emission rates (OERs) for the facility; an analysis of meteorological data for the site using TAPM and CALMET; Level 2 modelling assessment to predict odour and dust impact at the nearest residences for existing and proposed scenarios; and determination if compliance to the OEH/EPA odour criterion is met.

Existing Environment and Meteorology

Sensitive Receivers and Land Uses

The report identifies sensitive receivers surrounding the facility as detailed in Table 26 and shown in Figure 33.

Table 26: Air Quality Sensitive Receivers

Receiver	Receiver ID	Receiver Address
Houses on Fairloch Avenue, Farmborough Heights	01	57 Fairloch Avenue, Farmborough Heights
Ian McLennan Park	02	Access off Wyllie Road
Macedonian Orthodox Church	03	11 Wyllie Road, Kembla Grange
Kingston Lodge	04	14A Kingston Town Dr, Kembla Grange
Farmborough Heights Rural Fire Brigade Station	05	Access off Bardess Crescent



Figure 33: Air Quality Sensitive Receivers

Regional Climate and Prevailing Meteorology

GHD confirm that "the local climate is similar to that of the broader Wollongong region with warm to hot summers and cool to mild winters. The local climate at the Albion Park site is affected by broader regional patterns of synoptic pressure and wind with embedded weather systems. Synoptic features vary in intensity and location according to the season. For instance, during summer a high-pressure belt is usually found over or just to the south of Australia, bringing warm weather while the subtropical easterlies cover most of the continent. In winter, the subtropical high-pressure belt is usually located further north over the continent, allowing westerly winds and occasional to frequent strong cold fronts to affect southern Australia. The mean daily maximum temperatures range from 26 °C in summer to 17 °C in winter, and the mean daily minimum temperatures range from 17 °C in summer to 7 °C in winter. The area experiences significant diurnal and seasonal variations in meteorological conditions. According to meteorological data, the average rainfall in the region is 919 mm (Bureau of Meteorology). Average monthly rainfall ranges from between 28 mm and 154 mm, and the driest months are in winter and early spring, with the higher rainfalls experienced between November and March".

Wind Pattern

The report notes that "Local wind climate largely determines the pattern of off-site dust and odour impact. The characterisation of local wind patterns requires accurate site-representative hourly recordings of wind direction and speed over a period of at least a year. The nearest long term meteorological data available is from the BOM Albion Park AWS approximately 10 km to the south of the site. Data was also acquired for Port Kembla AWS. Due to the location of the site and the potential influence of the local terrain three dimensional meteorological data from the CALMET model was used. CALMET requires input from surface weather station networks and upper air stations. The regional-scale prognostic meteorological model, TAPM1, was used to simulate the meteorology over the subject site with consideration to the DECC Approved Methods. TAPM

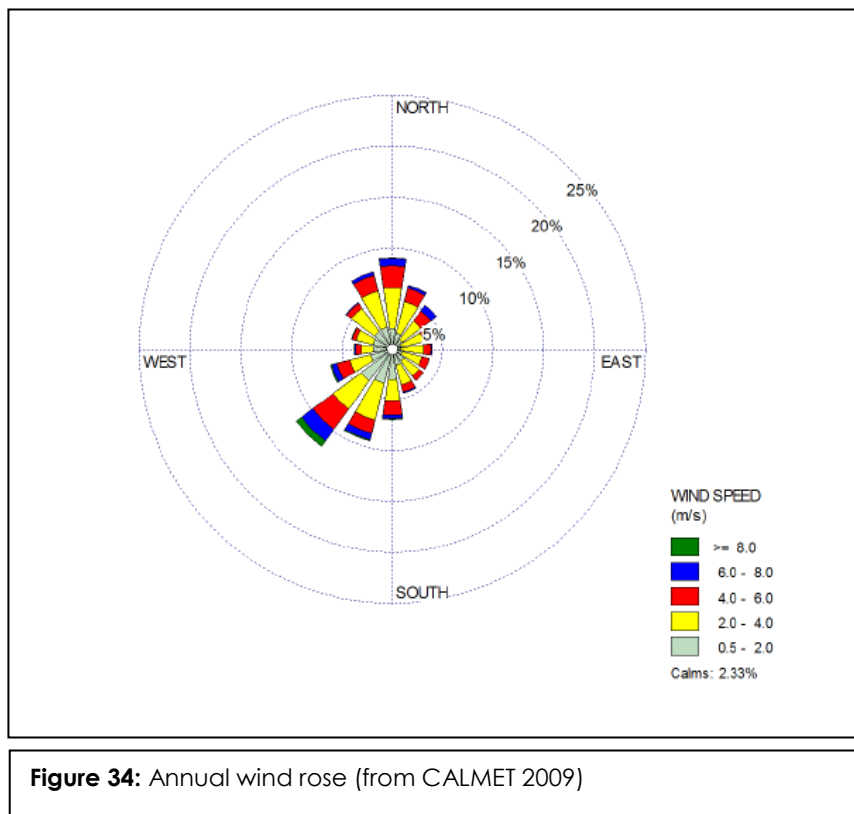
accesses databases of synoptic weather analyses from the Bureau of Meteorology. The model then provides the link between the synoptic large-scale flows and local climatology, which includes characterising such factors as local land use and topography, and their influence on atmospheric stability and mixing height. TAPM was initially configured with a nested model grid coverage designed to capture:

- Broad scale synoptic flows;
- Regional to local scale wind channelling; and
- The influence of local land use.

The TAPM output was then passed to the CALMET model which is the 3D meteorological diagnostic model. The land use and terrain elevation information was derived from US Geological Survey and AusLig data, respectively, with adjustments based upon inspection of aerial photographs, topographical and land uses maps, and a site inspection. CALMET was used to produce hourly site-representative winds and micrometeorological information, which was used with the dispersion model to assess the impacts of the air pollutants on the surrounding land uses".

Annual Wind Rose

Figure 34, which shows the average predicted annual wind rose for the site, indicates that predominant annual average wind directions are from the southwest quadrant and from the north. The annual average wind speed was 2.9 m/s. The observed wind speed distribution indicates that the largest proportion of high wind speeds (> 6 m/s) are from the south west, while the largest proportion of light winds (<2 m/s) are also from the southwest.



Seasonal Wind Roses

The seasonal wind roses in Figure 36 indicate that in winter, the winds are predominantly from the southwest. This observation reflects cool air drainage flows from the hills and mountains from the surrounding land in the west, as well as with the synoptic winter westerlies associated with the pre-frontal (stronger) winds. In summer

the majority of stronger winds are from the north reflecting the synoptic subtropical ridge migrating to the south of this location during the warmer months of the year and the summertime sea breeze in the afternoon and evening. The report notes that "autumn and spring are transitional seasons with a mixture of both winter and summer observations, with peak incidences from the north and southwest. The seasonal incidence of high winds (>6 m/s) is greatest in winter, and lowest in autumn, while the incidence of light (<2 m/s) winds is greatest in autumn. The direction and high proportion of light winds in autumn and winter are predominantly westerly and south-westerly. These air flows are likely to be associated with high stability, and can be expected to define the directions of poorest dispersion for low lying odour emission sources. As the site is located inland with prominent stable winds from the west and southwest, the potential for odour impact is somewhat increased towards the east and northeast".

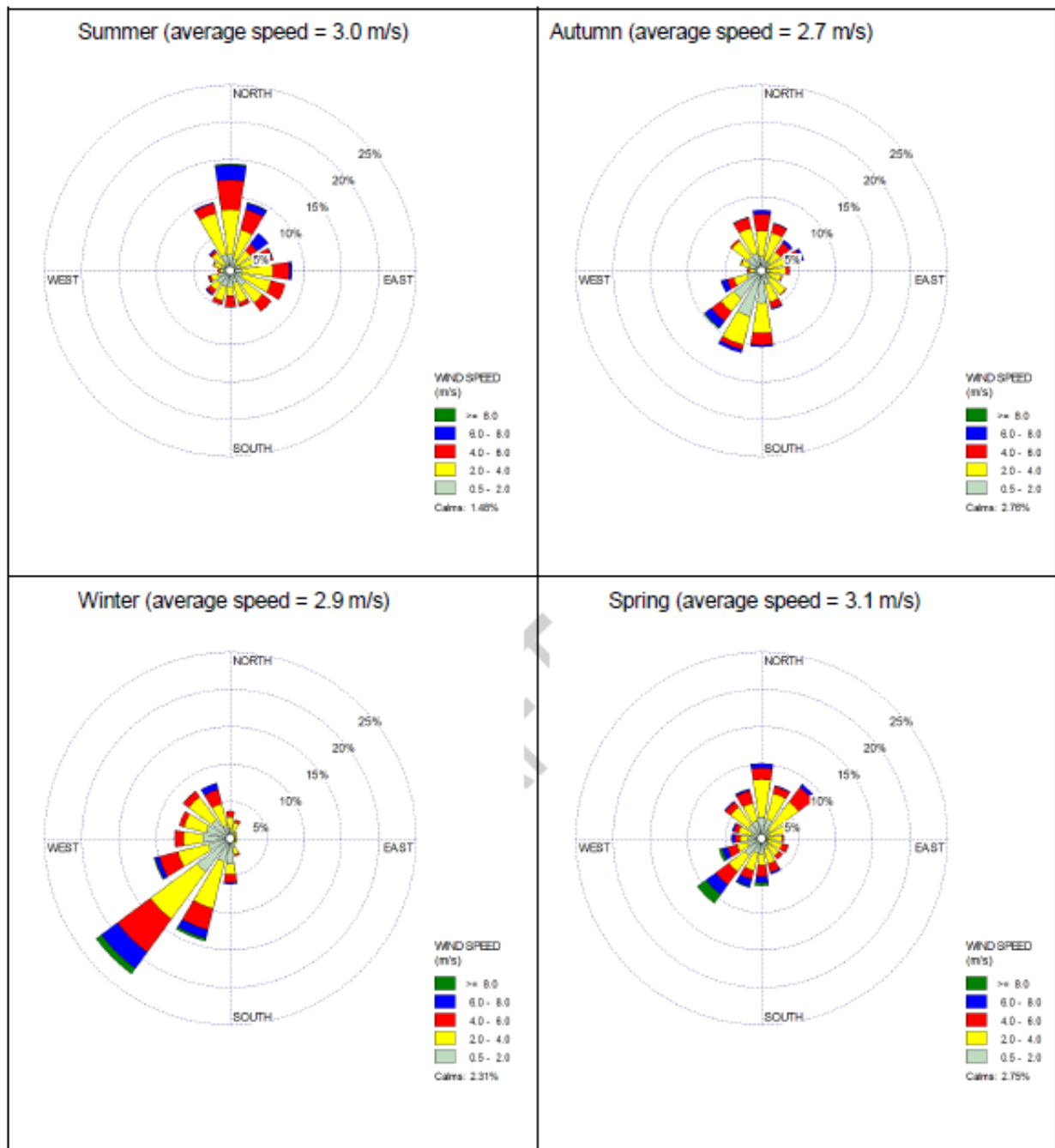


Figure 35: Seasonal wind roses (from CALMET 2009)

Annual Pattern and Seasonal Variation in Atmospheric Stability

GHD advise that "in the Pasquill/Gifford atmospheric stability scheme, stability is classified into six classes A through F. The A, B and C stability classes represent strongly, moderately and slightly unstable atmospheres respectively. Under unstable conditions dispersion of emissions from near ground sources is good due to convectively vertical turbulent mixing. The stability category D denotes neutral atmospheric conditions (strong winds in moderate temperatures or lighter winds on overcast to partly cloudy days). Categories E and F denote slightly and moderately stable atmospheres when dispersion is poorest, as vertical mixing of air is suppressed. Stable atmospheric conditions occur in the absence of strong gradient winds, and mostly on nights with clear skies. They are often associated with ground-based radiation force temperature inversions, sometimes with fog, mist or frost. Neutral stability (D class) conditions generally occur most frequently and along with the prevailing wind direction can indicate the most common direction for potential odour impact. Under night-time E and F class conditions, odour emissions from ground based sources result in a downwind plume that is detectable to a greater distance than during the day with associated neutral or unstable atmospheric conditions. It is commonly these conditions that result in odour complaints at maximum range. Figure 37 shows the stability rose for the entire data period. Neutral atmosphere (D) comprises 22.7% of incident time while the A, B and C class contribute unstable atmospheres 31.9% of the time and the stable E and F conditions contribute 43.1%. Figure 37 shows that the majority of stable winds are from the southwest".

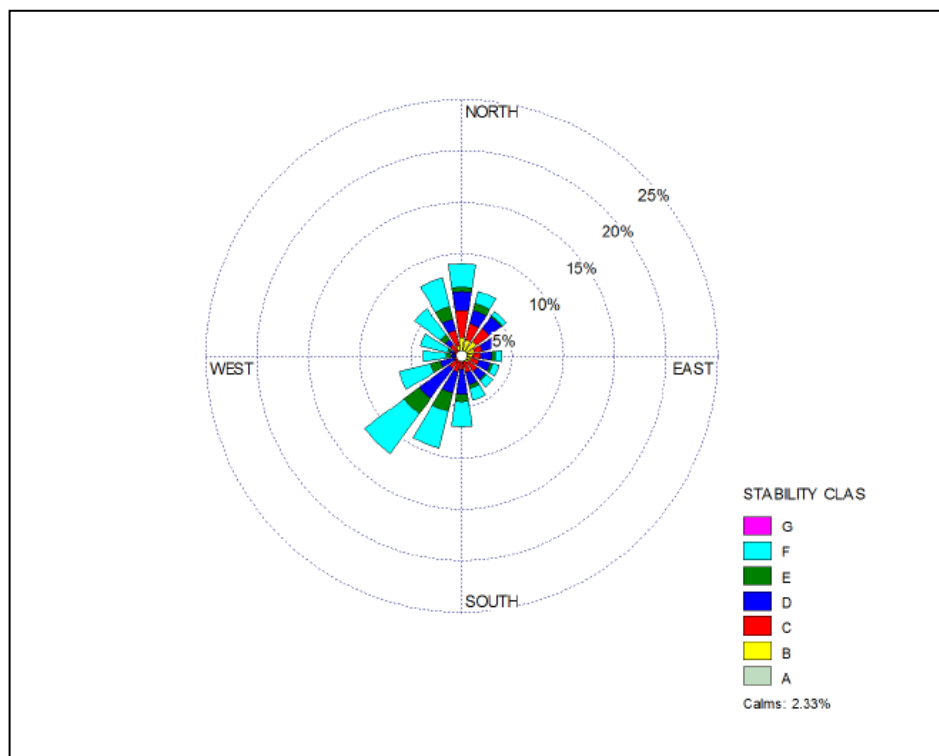
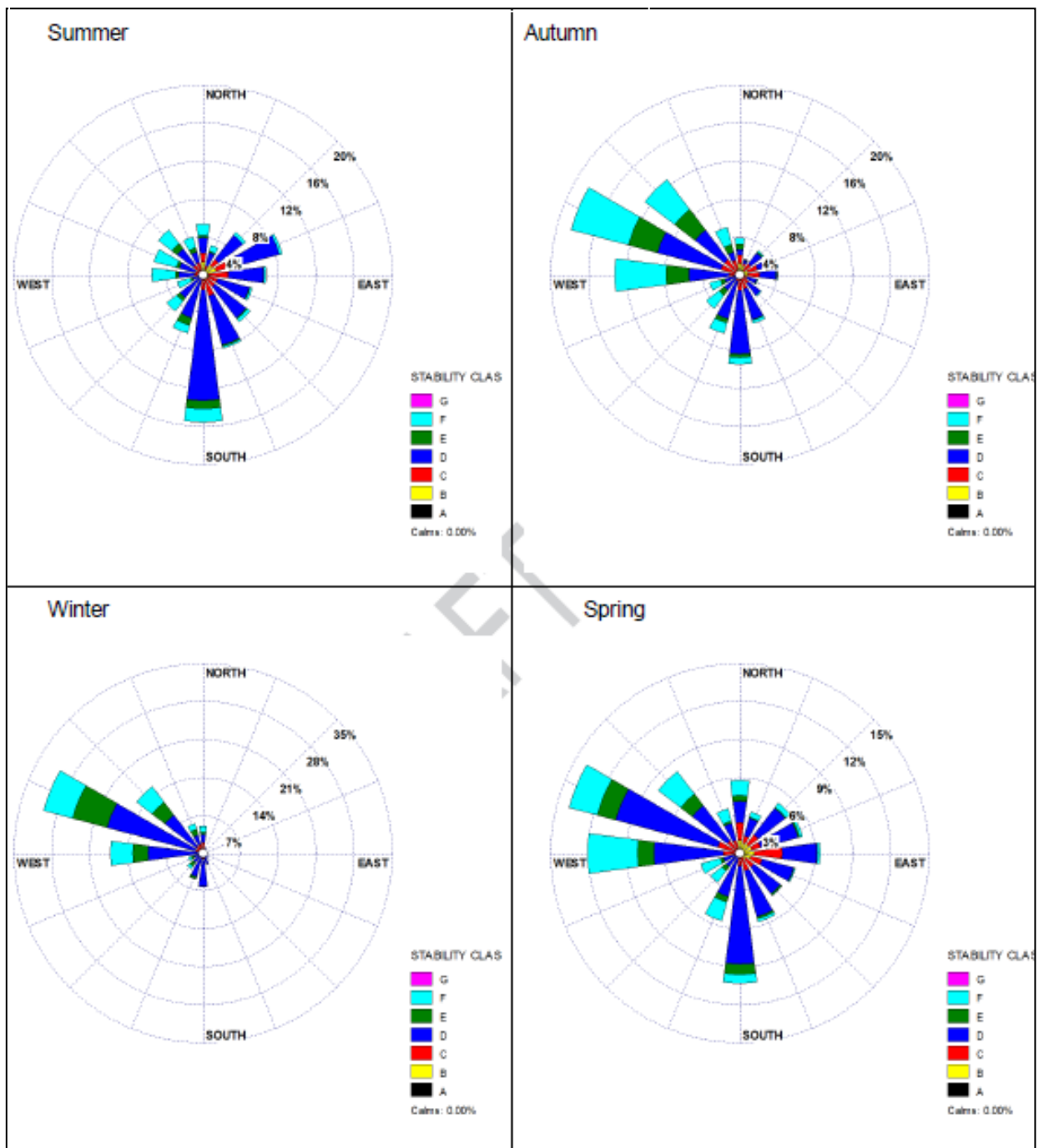


Figure 36: Annual stability rose (from CALMET 2009)

Figure 37 shows the following seasonal variation trends in atmospheric stability:

- In Summer, neutral winds predominate from the south and east and stable from the west
- In Autumn, stable winds predominate from the west to northwest
- In Winter, stable winds predominate from the west to northwest
- In Spring, stable winds predominate from the western quadrants

Figure 37: Seasonal stability rose (from CALMET 2009)



Validation of Meteorological Data

GHD compared the wind field data from the CALMET model to the Port Kembla meteorological station approximately 10km to the east of the site and confirm "that the wind roses are similar with both sites showing dominant winds from the south to southwest, and the north. The stronger coastal southerly winds at Port Kembla are more skewed from the west at the site due to the steep terrain adjacent the site that runs to the northeast.

Background Air Quality

GHD analysed data from the EPA air quality monitoring station is at Kembla Grange for the last five years (2009 to 2013) which confirmed:

- Annual PM₁₀ averages for daily mean levels, daily max levels and number of days exceeding
- the criteria for Albion Park are detailed in Table 27 and Table 28 and shown in Figure 38 and Figure 39
- The results show that the daily maximum PM₁₀ levels exceed 50 µg/m³.
- There is no PM_{2.5} data available at the EPA Kembla Grange site, and for the purpose of this assessment a ratio of PM₁₀ to PM_{2.5} was obtained from the EPA Wollongong air quality monitoring station.
- The ratio of PM₁₀ to PM_{2.5} at Wollongong from 2009 to 2013 was 3.22.
- For TSP, given a lack of measured background data, a TSP to PM₁₀ ratio of 2:1 was assumed, giving a background value (70th percentile) of 42.6 µg/m³.

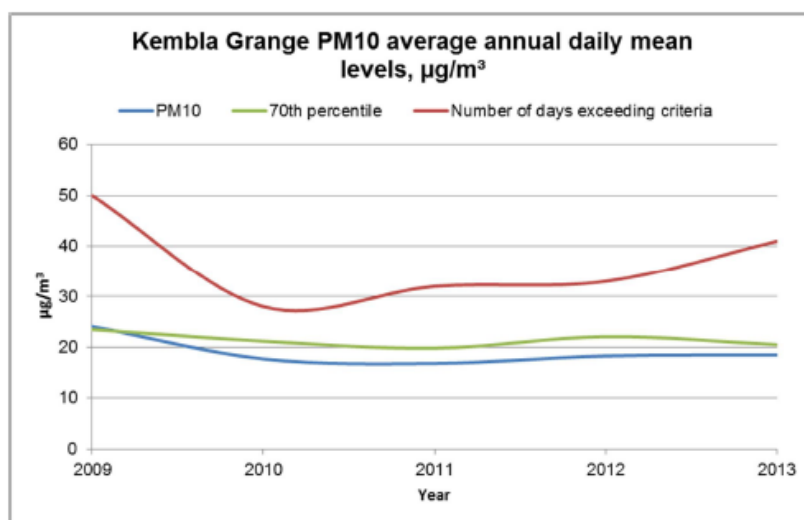
Table 27: Kembla Grange PM₁₀ and PM_{2.5} average annual daily mean levels, pg/m³

Year	Measured Annual mean PM ₁₀	Assumed Annual mean PM _{2.5}	70 th percentile PM ₁₀	70 th percentile PM _{2.5}
2009	24.1	7.5	23.5	7.3
2010	17.7	5.5	21.2	6.6
2011	16.8	5.2	19.8	6.1
2012	18.3	5.7	22.1	6.9
2013	18.5	5.7	20.5	6.4
Five yearly mean	19.1	5.9	21.3	6.7

Table 28: Kembla Grange PM₁₀ and PM_{2.5} average annual daily max levels, pg/m³

Year	Measured Annual mean PM ₁₀	Assumed Annual mean PM _{2.5}	70 th percentile PM ₁₀	70 th percentile PM _{2.5}
2009	81.5	25.3	54.7	17.0
2010	47.2	14.7	53.6	16.6
2011	45.7	14.2	48.9	15.2
2012	50.7	15.7	53.4	16.6
2013	46.0	14.3	48.2	15.0
Five yearly mean	54.2	16.8	51.8	16.1

Figure 38: Albion Park PM₁₀ average annual daily mean levels, µg/m³



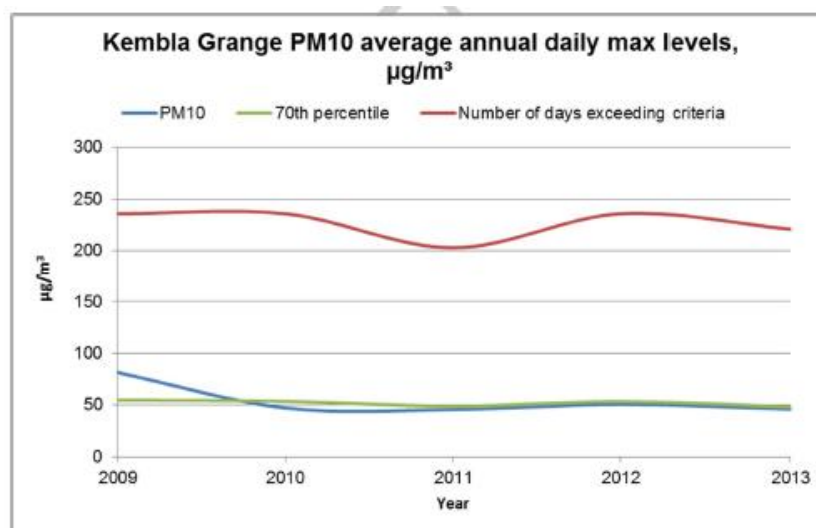


Figure 39: Albion Park PM10 average annual daily max levels, µg/m³

Other Sites Nearby:

GHD confirm that there are other sites in the vicinity which are sources of odour including the Soilco site (61 Reddalls Rd), Wollongong Waste and Recovery Park (over 500m to the north-west) and the Water Filtration Plant (potable water). Green waste composting is undertaken at the Soilco site and Wollongong Waste and Recovery Park however given the distance and the prevailing meteorology GHD confirm that "the potential for cumulative impacts at the nearby receivers is minor. Further, *"there is little chance for cumulative green waste odour impacts given that the proposal site is located to the east of these sites"*.

Air Quality Assessment Criteria

Dust

Air quality impact assessment criteria are prescribed within the NSW Office of Environment and Heritage (OEH) Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation (August 2005) (Approved Methods). To ensure that dust environmental outcomes are achieved, emissions from the site must be assessed against the assessment criteria given in Table 29.

Table 29: Assessment Criteria for PM₁₀ and TSP

Pollutant	Average Period	Criteria
PM ₁₀	24 hours	50 µg/m³
	Annual	30 µg/m³
TSP	Annual	90 µg/m³
Dust deposition	Annual	2 µg/m³/month

GHD confirm that "odour impact is a subjective experience and has been found to depend on many factors, the most important of which are:

- The Frequency of the exposure
- The Intensity of the odour
- The Duration of the odour episodes
- The Offensiveness of the odour
- The Location of the source.

These factors are often referred to as the FIDOL factors. The odour criterion is defined to take account of two of these factors (F is set at 99th percentile; I is set at from 2 to 7 OU). The choice of criterion odour level has also been made to be dependent on the population of the affected area, and to some extent it could be said that population is a surrogate for location – so that the L factor has also been considered. The relationship between the criterion odour level C to affected population P is given below:

$$[\log P - 4.5] \div -0.6 \quad \text{equation 1"}$$

Table 30 lists the values of C for various values of affected populations as obtained using equation 1.

Table 30: Odour Criteria for the Assessment of Odour (DEC, 2005)

Population of affected community	Odour performance criteria (nose response odour certainty units at 99 th percentile)
Single Residence (</=2)	7
~10	6
~30	5
~125	4
~150	3
Urban (~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".

Estimated Emissions

Dust

The individual processes that were identified by GHD as generating significant amounts of particulate matter (dust) were identified to be:

- Crushing of materials (64,500 T) including:
 - Glass
 - Plasterboard
 - Ceramics
 - Brick
 - Concrete
 - Asphalt waste
 - Cured concrete waste
 - Waste accepted under NSW EPA resource redemption
- Screening of crushed waste and soils (114,500 T).
- Vehicle induced dust emissions in site area and haul road.
- Wind erosion of exposed unstable soil surfaces and localised stockpiles..

Table 31 provides a summary of equipment used on the site. The dust emissions inventory for the site (including with mitigation) is provided in Table 32.

Table 31: On-site Equipment Summary

Equipment Type	Number of Units
Screen (Screens, conveyor)	1
Wheeled loader	2
Excavator	3
Bulldozer	1
Crusher	1
Mobile Crusher	1
Shredder (1 inside and 1 outside shed)	2
Water Truck	1
Reclaimer	1
Delivery vehicles - single truck units and truck/dogs	247
Sales vehicles - single truck units and truck/dogs	247

GHD employed the following assumptions in calculating the dust emission rates for WRF activities:

- Where there was more than one item of the same equipment, the total throughput was split between each item. For example, if there were two loaders operating at once, it was assumed that each loader would have half of the total throughput.
- The use of a water truck has been assumed not to generate dust emissions, as its use will act to suppress emissions. Therefore, the water truck has not been included in the emissions inventory.

Table 32: Dust Emission Inventory

Equipment	Default TSP Emission Factor	Default PM ₁₀ Emission Factor	Unit	Application	TSP Emission Rate (kg/hr)	PM ₁₀ Emission Rate (kg/hr)	PM _{2.5} Emission Rate (kg/hr)
Screen	0.08	0.06	kg/t	One mobile screen, 36.1 tonnes per hour per screen	2.89	2.17	0.67
Loaders	0.025	0.012	kg/t	Two loaders, 36.3 tonnes per hour per loader	0.91	0.44	0.14
Excavator	0.025	0.012	kg/t	Three excavators, 24.2 tonnes per hour per excavator	0.61	0.29	0.09
Crusher	0.2	0.02	kg/t	one crusher, 20.4 tonnes per hour per crusher	4.08	0.41	0.13
Reclaimer	0.06	0.03	kg/t	One reclaimer, 20.4 tonnes per hour	1.22	0.61	0.19
Dump Truck-dumping	0.012	0.0043	kg/t	Dumping 36.1 tonnes per hour	0.43	0.16	0.05
Dump Truck-travelling on unpaved roads	3.901	1.158	kg/VKT	Average of 20 dump trucks per hour. Haul route 400 metres. Equals 8 km per hour total travel.	31.21	9.26	2.88
Dump Truck-travelling on unpaved roads with mitigation	0.975	0.2895	kg/VKT	Average of 20 dump trucks per hour. Haul route 400 metres. Equals 8km per hour total travel	7.80	2.32	0.72
Bulldozer with mitigation	4.25	1.03	Kg/h/veh	One bulldozer 6 hours per day	2.13	0.52	0.16
Water Erosion	0.4	0.2	Kg/ha/hr	Assuming stockpiles of various located around the site	-	-	-

Odour: The following odour sources have been identified onsite:

- Raw green waste receival and shredding (outside of the building)
- Initial stage static compost pile (inside the building)
- Compost maturation windrows (inside the building)
- Compost matured product stockpiles (outside the building)
- Green waste leachate pond

GHD indicate that the two main sources of odour from the proposal are the building and the green waste maturation area, however they note that the " *initial stage static pile and maturation windrows will be housed within an enclosed building maintained at negative air pressure*".

GHD confirm that the identified odour emission sources were characterised as follows:

- Fugitive emissions and transfer points: These sources have been characterise using data from other similar composting facilities;
- Static Piles: The static piles of green waste have been characterised with reference to odour testing at an existing facility (ANL4);
- Maturation Windrows: Odour emission rate (OER) data has been obtained from testing of trial windrows that were formed from the composted product from Veolia's in-vessel facility at Dandenong, and which were set up at Veolia's Bangholme facility. The tests were conducted at different elapsed times during the 4-week maturation process, so that the combined odour emission rate from the windrow array could be quantified. The odour emission rates for windrow activities such as the formation and break apart of windrows were also characterised.

The output windrow OER from the in-vessel has been assumed to be similar to the output from the static green waste piles. The assessment is based on 6,300 tonnes of green waste being accepted to the site per annum for the purpose of composting.

Odour monitoring was conducted on various windrows including:

- Green waste with added moisture – undisturbed;
- Green waste with added moisture – disturbed;
- one month old compost pile – undisturbed;
- one month old compost pile – disturbed;
- Three month old compost pile(s) – undisturbed;
- Three month old compost pile(s) – disturbed;
- Mature compost pile- undisturbed; and
- Mature compost pile- disturbed.

Table 33 gives the SOER's for the static green waste windrows at different ages.

Table 33: Static stockpile SOERs

Green Waste-Source Description	SOER (OUm/s)
Static Windrows-1 month	2.1
Static Windrows-2month	1.4
Static Windrows-up to 4 months old	0.8

The OER's from the green waste piles and windrows plus turning contribution, fugitive and transfer point sources are summarised by GHD in Table 34 to enable a comparison of the component source contributions to the site OER. Key points from Table 10 in terms of emission sources, the appropriateness of technology and proposed practices are as follows:

- The shredder dominates emissions at 55% of the total emissions during operating hours.
- The contribution from the static windrows is 28.7%.
- During non-operating hours (when poor dispersion occurs) the site OER reduces to ~41% of daytime values. Hence, any reduction of OER from daytime-only sources will not decrease the extent of the 99th percentile contour.
- In summary, the peak off-site impact is defined almost solely by the static and maturation windrows at night."

Table 34: OER Inventory for Proposed Operations

Source Description	Emitting surface area (m ²)	SOER (OUm/s)	OER (OUm ³ /s)	Percentage of OER (%)
Operating Hours				
Green waste stockpile -Receival	92	4.0	366	3.5
Shredder		-	5,741	55.0
Static Windrows	1000	3	2999	28.7
Maturation windrows (with turning)	508	1.7	846	8.1
Matured stockpile	429	0.6	250	2.4
Leachate pond	780	0.3	234	2.2
Total			10436	100.0
Non-Operating Hours				
Green Waste stockpile -Receival	92	4.0	366	7.8
Static windrows	1000	3	2999	63.9
Maturation windrows	508	1.7	846	18
Matured stockpile	429	0.6	250	5.3
Leachate pond	780	0.3	234	5
Total			4329	100.00

Air Quality Dispersion Modelling

GHD advise that "atmospheric dispersion modelling was conducted to predict the maximum ground level concentrations of dust (TSP and PM10) resulting from emissions to air from the WRF. Dust deposition rates were also predicted. The predicted ground level concentrations (GLC) and dust deposition rates were then assessed against the relevant criteria".

GHD also confirm that "Ausplume version 6.0 is a regulatory approved dispersion model and was used in this assessment. The use of Ausplume at this site is considered very conservative, with the steep terrain and heavy vegetation between the source and nearby receivers. Dust and odour emissions would require additional energy to be dispersed up the hill and therefore in this instance the predictions to the north of the site may be conservative".

Processing and mobile equipment, such as the crushers, screens, loaders, haul trucks and an excavator have been modelled as individual 'volume' sources.

Table 35: Source Characteristics

Source	Horizontal Spread (m)	Vertical Spread (m)	Source Height (m)
Screen	2.8	3.5	5
Crusher	2.8	3.5	5
Loader	1.2	1.5	3
Excavator	1.2	1.5	3
Dump truck (dumping)	1.2	1.5	3
Reclaimer	1.2	1.5	3
Bulldozer	1.2	1.5	3

Dust deposition parameters have been set as provided in Table 36.

Table 36: Dust Deposition Parameters

Fraction No.	Mass Fraction	Particle Size (micron)	Particle Density (g/cm ³)
1	0.052	1.8	2.6
2	0.140	4.0	2.6
3	0.223	8.0	2.6
4	0.322	17.0	2.6
5	0.263	31.0	2.6

Model Configuration:

The far field peak to mean values were applied to the area and point sources at the site. The significant odour sources will be enclosed in a building maintained at negative air pressure. At this stage there is no detailed information on the ventilation system. As a conservative measure, GHD has modelled all odour sources at the building location assuming no enclosure in place. Two mitigation options were also been assessed and are as follows:

- All air from the enclosed building is released into the atmosphere via a stack
- All air within the building will be directed through an odour control system for treatment prior to being released into the surrounding environment via a stack.

Assessment of Impacts

Dust

A summary of the predicted results from dispersion modelling are presented in Table 37 for the 5 identified receivers. GHD confirm that:

- The predicted 24 hour PM₁₀ dust concentration of 59.7 µg/m³ at Receiver 1 (Fairloch Avenue) will exceed the criteria of 50 µg/m³ without mitigation.
- The predicted dust levels also exceed the criteria at receiver 3 (Church) and 5 (Fire Brigade).
- All other receivers are predicted to be within the PM₁₀ criteria.
- The predicted TSP concentrations meet the relevant criteria at all receivers.
- The predicted dust deposition levels meet the relevant criteria at all receivers.

Table 37: Maximum Predicated Dust Impact at Sensitive Receivers

Pollutant	Averaging Period	Units	Maximum Predicted Incremental Impact	Adopted Back-ground Level	Cumulative Impact	Criteria
Receiver 1: 57 Fairloch Ave, Farmborough Heights						
Pm ₁₀	24-hour	µg/m³	53.3	21.3	74.6	50
Pm _{2.5}	24-hour	µg/m³	16.6	6.6	23.2	-
Pm ₁₀	Annual	µg/m³	4.2	21.3	25.5	30
TSP	Annual	µg/m³	12.9	42.6	55.5	90
Dust deposition	Annual	g/m²/month max. total	1.3	2	3.3	4
Receiver 2: Ian McLennan Park						
Pm ₁₀	24-hour	µg/m³	24.1	21.3	45.4	50
Pm _{2.5}	24-hour	µg/m³	7.6	6.6	14.2	-
Pm ₁₀	Annual	µg/m³	1.3	21.3	22.6	30
TSP	Annual	µg/m³	3.8	42.6	46.4	90
Dust deposition	Annual	g/m²/mth max. total	0.2	2	2.2	4
Receiver 3: Macedonian Orthodox Church						
Pm ₁₀	24-hour	µg/m³	37.9	21.3	59.2	50
Pm _{2.5}	24-hour	µg/m³	11.8	6.6	18.4	-
Pm ₁₀	Annual	µg/m³	1.7	21.3	23.0	30
TSP	Annual	µg/m³	5.1	42.6	47.7	90
Dust deposition	Annual	g/m²/mth max. total	0.3	2	2.3	4
Receiver 4: Kingston Lodge						
Pm ₁₀	24-hour	µg/m³	6.8	21.3	28.1	50
Pm _{2.5}	24-hour	µg/m³	2.2	6.6	8.8	-
Pm ₁₀	Annual	µg/m³	0.4	21.3	21.7	30
TSP	Annual	µg/m³	1.2	42.6	43.8	90
Dust deposition	Annual	g/m²/mth max. total	0.05	2	2.05	4
Receiver 5 Rural Fire Service						
Pm ₁₀	24-hour	µg/m³	38.8	21.3	60.1	50
Pm _{2.5}	24-hour	µg/m³	12.1	6.6	6.6	-
Pm ₁₀	Annual	µg/m³	3.8	21.3	25.1	30
TSP	Annual	µg/m³	11.4	42.6	54.0	90
Dust deposition	Annual	g/m²/month max. total	1.1	2	2	4

In order to reduce these dust emissions, GHD assessed mitigation in the form of watering the access roads has been assessed, with Level 2 watering (>2L/m²/hr) of the access road (from the site office into the site) and truck turning/backing area. GHD also found crushing activities to be a large contributor to dust emissions and hence note that wet suppression systems (such as spray nozzles), although not assessed were recommended as a mitigation option. Predicted dust emissions with mitigation at the sensitive receivers are presented in Table 38.

Table 38: Maximum Predicted Dust Impact at Sensitive Receivers With Mitigation Measures

Pollutant	Averaging Period	Units	Maximum Predicted Incremental Impact	Adopted Back-ground Level	Cumulative Impact	Criteria
Receiver 1: 57 Fairloch Ave, Farmborough Heights						
Pm ₁₀	24-hour	µg/m ³	28.5	21.3	49.8	50
Pm _{2.5}	24-hour	µg/m ³	8.9	6.6	15.5	-
Pm ₁₀	Annual	µg/m ³	2.2	21.3	23.5	30
TSP	Annual	µg/m ³	6	42.6	48.6	90
Dust deposition	Annual	g/m ² /month max. total	0.6	2	2.6	4
Receiver 2: Ian McLennan Park						
Pm ₁₀	24-hour	µg/m ³	12.5	21.3	33.8	50
Pm _{2.5}	24-hour	µg/m ³	4	6.6	10.6	-
Pm ₁₀	Annual	µg/m ³	0.7	21.3	22.0	30
TSP	Annual	µg/m ³	1.8	42.6	44.4	90
Dust deposition	Annual	g/m ² /month max. total	0.1	2	2.1	4
Receiver 3: Macedonian Orthodox Church						
Pm ₁₀	24-hour	µg/m ³	19.3	21.3	40.6	50
Pm _{2.5}	24-hour	µg/m ³	6.1	6.6	12.7	-
Pm ₁₀	Annual	µg/m ³	0.9	21.3	22.2	30
TSP	Annual	µg/m ³	2.4	42.6	45.0	90
Dust deposition	Annual	g/m ² /month max. total	0.2	2	2.2	4
Receiver 4: Kingston Lodge						
Pm ₁₀	24-hour	µg/m ³	3.5	21.3	24.8	50
Pm _{2.5}	24-hour	µg/m ³	1.2	6.6	7.8	-
Pm ₁₀	Annual	µg/m ³	0.2	21.3	21.5	30
TSP	Annual	µg/m ³	0.5	42.6	43.1	90
Dust deposition	Annual	g/m ² /month max. total	0.02	2	2.02	4
Receiver 5 Rural Fire Service						
Pm ₁₀	24-hour	µg/m ³	20.6	21.3	41.9	50
Pm _{2.5}	24-hour	µg/m ³	6.5	6.6	13.1	-
Pm ₁₀	Annual	µg/m ³	2	21.3	23.3	30
TSP	Annual	µg/m ³	5.2	42.6	47.8	90
Dust deposition	Annual	g/m ² /month max. total	0.5	2	2.5	4

Figure 40 shows the maximum predicted 24-hour PM₁₀ ground level concentration (GLC) contours for WRF operations with mitigation and Figure 41 shows the maximum predicted annual TSP ground level concentration (GLC) contours for WRF operations with mitigation.

Figure 40: Predicted – Cumulative PM₁₀ 24-hour Average Concentration (with mitigation)

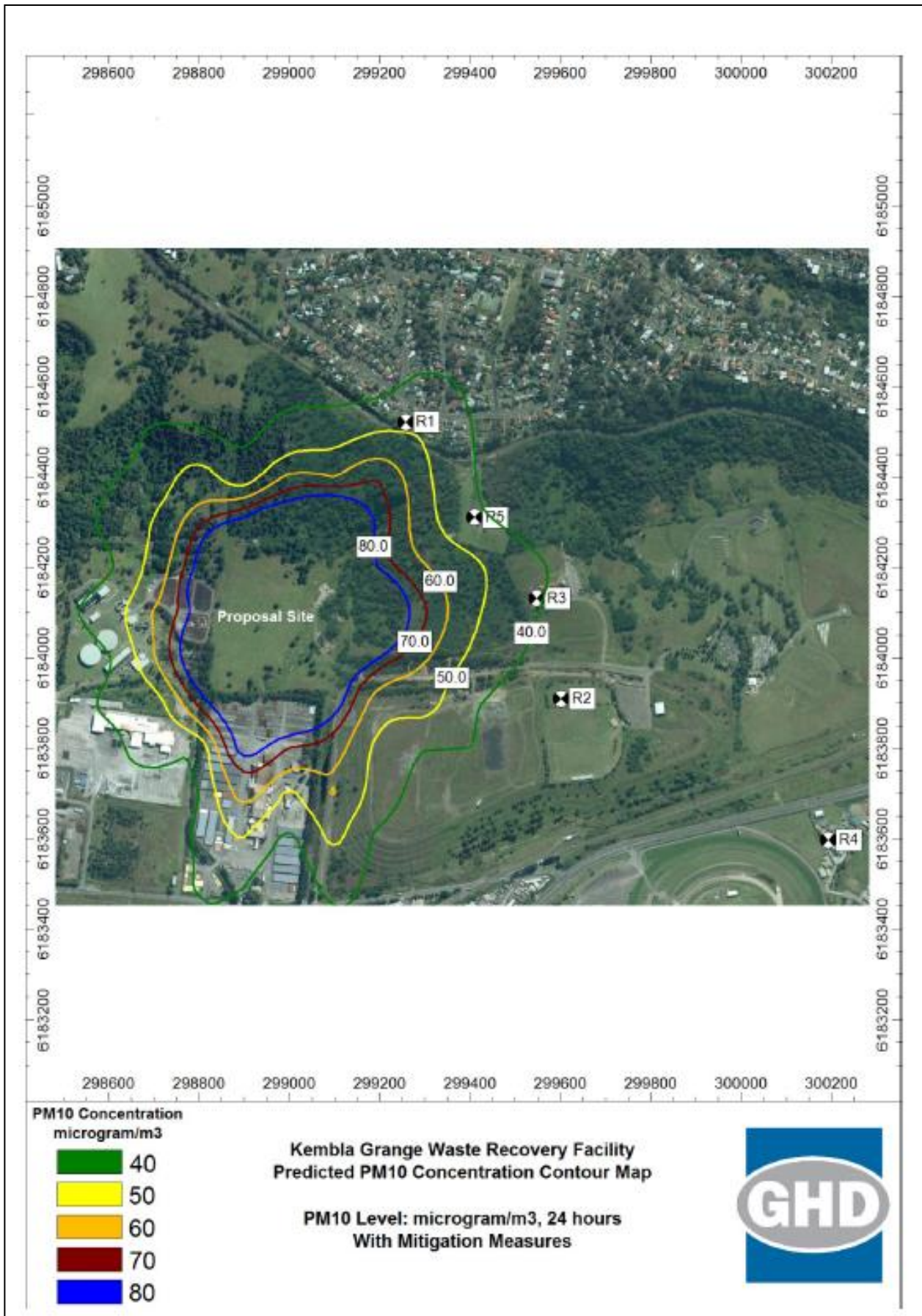
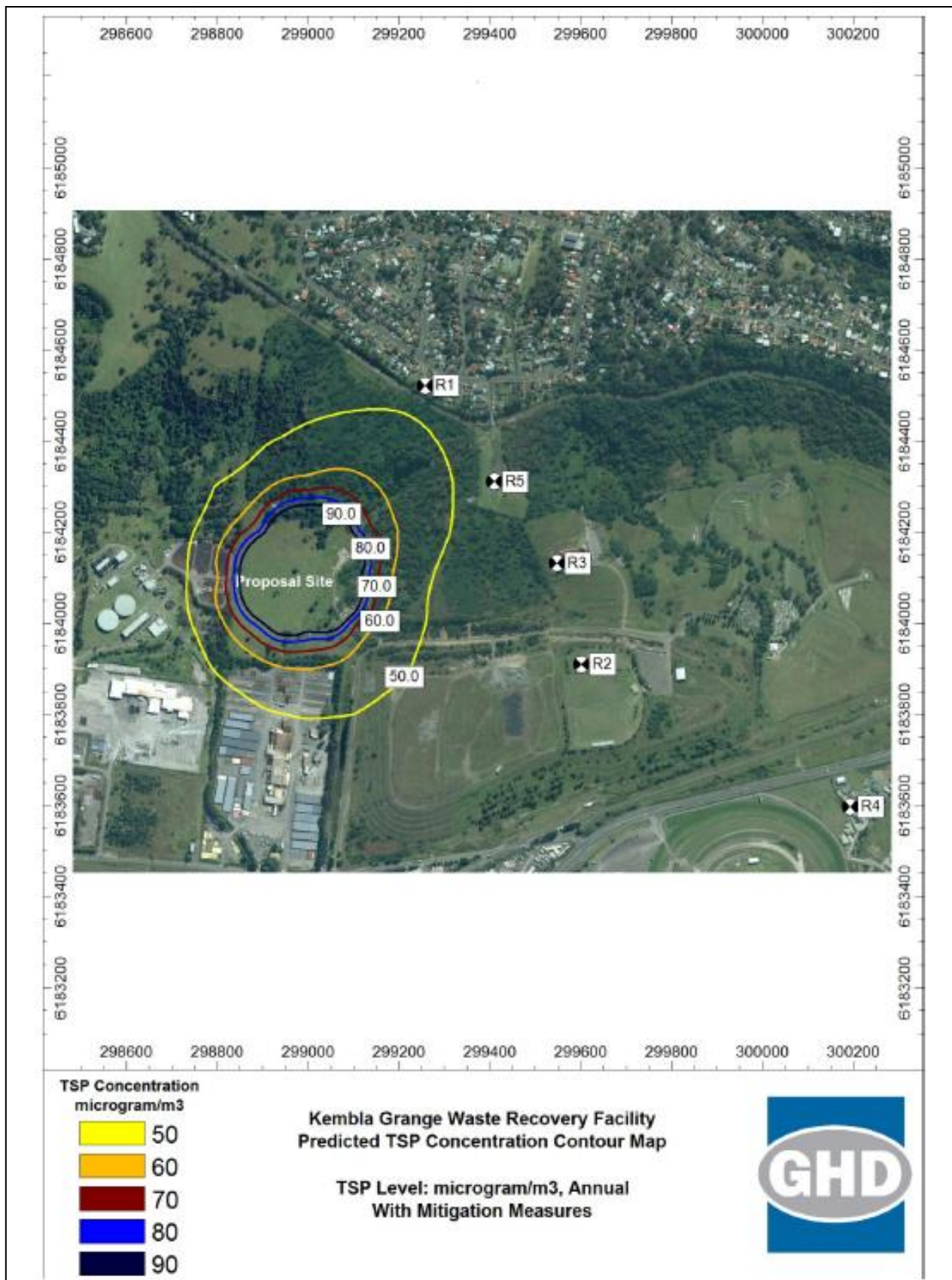


Figure 41: Predicted – Cumulative TSP Annual Average Concentration (with mitigation)



Assessment of Impacts - Odour

The assessment was conducted by GHD with no building ventilation or emission controls in place. This is considered a worst-case scenario.

For the nominated discrete receptors near the site i.e. closest residents on Fairloch Avenue Road and church on Wyllie Road GHD assessed the predicted peak 99th percentile (1-hour average) odour levels. GHD confirm that "the highest predicted concentrations are at 57 Fairloch Avenue which is approximately 400 m from the proposal. Slightly lower concentrations would be expected at the church on Wyllie Road. The compliance to the 2 OU criterion is to be taken as the 88th highest value in the top 100 values for the receptor. The 88th highest value for each receptor is given in Table 39. The predicted odour impact at all other receivers are lower and significant odour impacts are not predicted to occur due to the proposal. The predicted levels at the receivers on Fairloch Avenue are considered conservative considering the ground based emission sources and the heavily vegetated hill behind the site".

Table 39 :Predicted peak odour impact at receptors (OU) - no mitigation

Residence	R1	R2	R3	R4	R5
Proposal (OU)	2.55	1.08	1.48	0.42	2.1
Criteria (OU)	2	2	2	2	2

A plot of the predicted peak 99th percentile odour impact from the site is shown in Figure 42.

Odour Mitigation

the report concludes that "odour emissions from the site are predicted to exceed the NSW assessment criteria without mitigation. The largest odour contributors from the site are the activities proposed to be enclosed within the building. The following two scenarios have been assessed by GHD:

- All air from the ventilated enclosed building is released untreated into the atmosphere via a stack
- All air within the building will be directed through an odour control system for treatment prior to being released into the surrounding environment via a stack.

GHD has assumed that "the total air flow rate through the WRF ventilation system would be approximately 45,000 m³ per hour. This represents three building air exchanges (approximate building volume is 15,000m³) that flow through the odour control system and then exhaust stack or directly through an exhaust stack". The parameters assumed in this assessment are presented in Table 39A.

Table 39A: Odour Control System Parameters

Parameter	AWT Building
Building height	10m
Stack height above roof line	2m
Exit velocity	6.25 m/s
Exit temperature	35 degrees C
Stack diameter	2m
Building dimensions	30 m x 50 m
Building downwash algorithm	PRIME
Odour control system efficiency	90%

Tables 39B and 39C contain the odour emission inventory for the two mitigation scenarios.

Figure 42: Odour Level: 99th Percentile P/M60 No Mitigation Measures

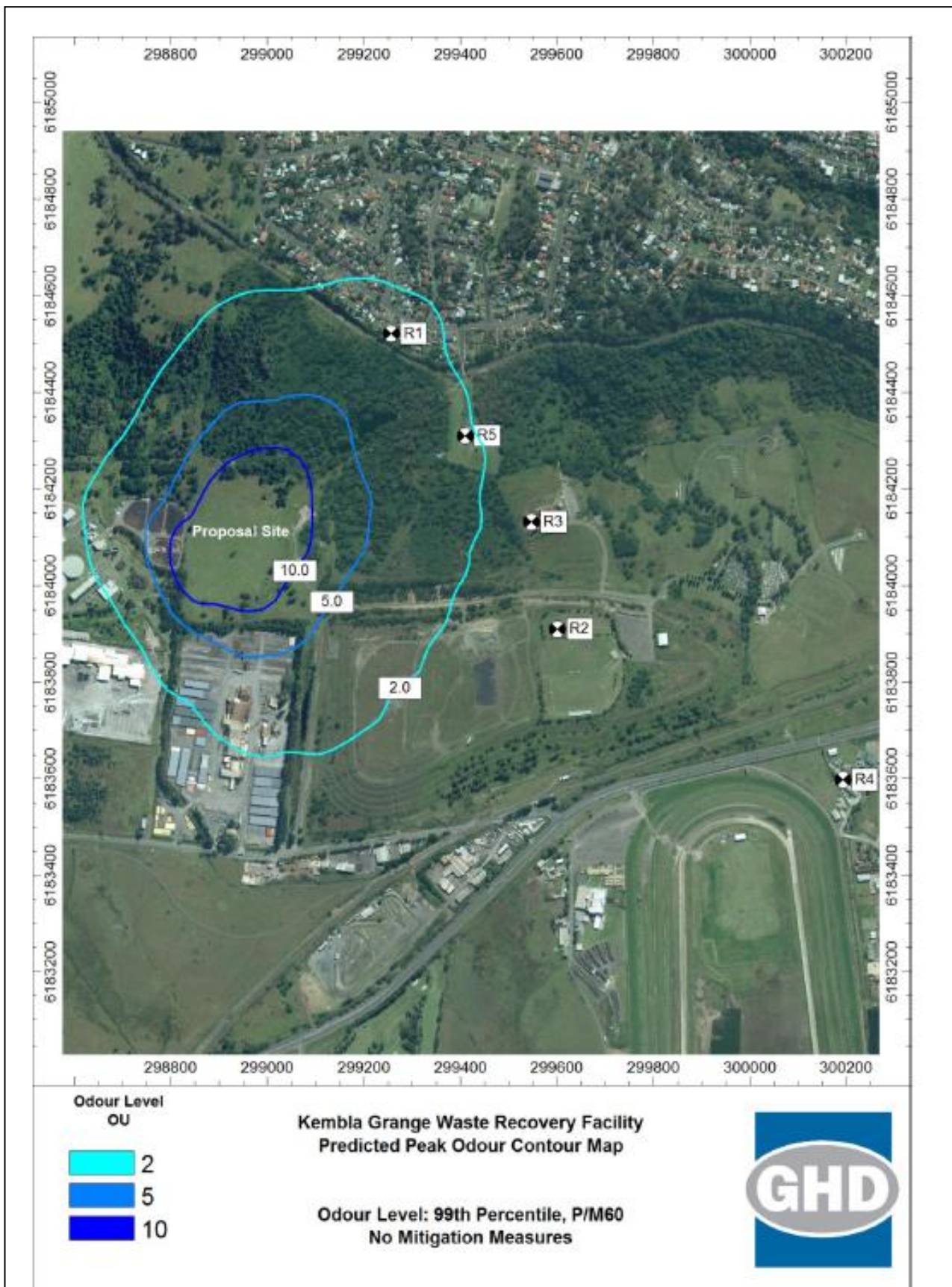


Table 39B: Emission Inventory for Building with exhaust stack for untreated air

Source Description	Emitting surface area (m ²)	SOER (OUm/s)	OER (OUm ³ /s)	Percentage of OER (%)
Operating Hours				
Green waste stockpile -Receival	92	4.0	366	3.5
Shredder		-	5,741	55.0
Matured stockpile	429	0.6	250	2.4
Leachate pond	780	0.3	234	2.2
Building stack			3845	36.8
Total			10436	100.0
Non-Operating Hours				
Green Waste stockpile -Receival	92	4.0	366	7.8
Matured stockpile	429	0.6	250	5.3
Leachate pond	780	0.3	234	5
Building Stack			3845	81.9
Total			4329	100.00

Table 39C: Emission rate inventory for building with odour control system

Source Description	Emitting surface area (m ²)	SOER (OUm/s)	OER (OUm ³ /s)	Percentage of OER (%)
Operating Hours				
Green waste stockpile -Receival	92	4.0	366	5.2
Shredder		-	5,741	82.3
Matured stockpile	429	0.6	250	3.6
Leachate pond	780	0.3	234	3.4
Odour control system (90% efficiency)			385	5.5
Total			10436	100.0
Non-Operating Hours				
Green Waste stockpile -Receival	92	4.0	366	29.6
Matured stockpile	429	0.6	250	20.2
Leachate pond	780	0.3	234	19
Odour control system (90% efficiency)			385	31.2
Total			4329	100.00

The predicted odour impact at receivers for the two scenarios is presented in Table 39D. The results assume that the building is maintained at negative air pressure with all untreated air being released through a stack on the roof. Results show compliance with the criteria at all receivers. Odour contours are provided in Figure 43.

Table 39D: Predicted peak odour impact at receptors (OU) - with building ventilation system

Residence	R1	R2	R3	R4	R5
Proposal (OU)	1.06	0.56	0.67	0.28	0.92
Criteria (OU)	2	2	2	2	2

The results in Table 39E "assume that the building is maintained at negative pressure and all air is directed through an odour control system for treatment prior to being released into the surrounding environment". GHD confirms that results show compliance with the criteria at all receivers. Odour contours are provided in Figure 44. Further, the assessment concludes "given that the predicted odour impact complies with the criteria without treatment of ventilated air, an odour control system may only be required if the measured odour levels once operational exceed the predicted odour levels".

Table 39E: Predicted peak odour impact at receptors (OU) - with ventilation and biofilter

Residence	R1	R2	R3	R4	R5
Proposal (OU)	0.54	0.27	0.35	0.12	0.49
Criteria (OU)	2	2	2	2	2

Figure 43: Predicted peak odour contour map, OU, with building ventilation

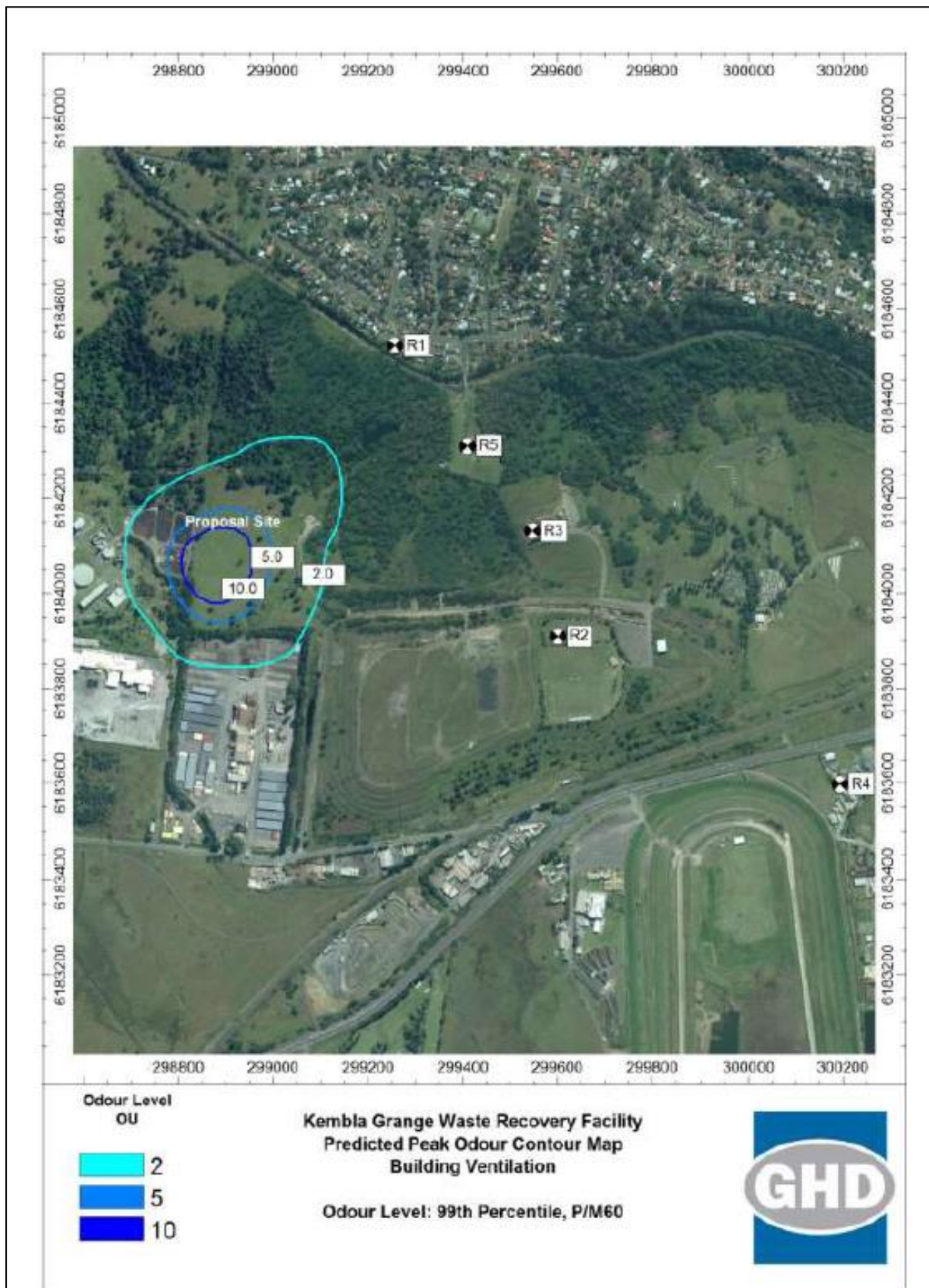
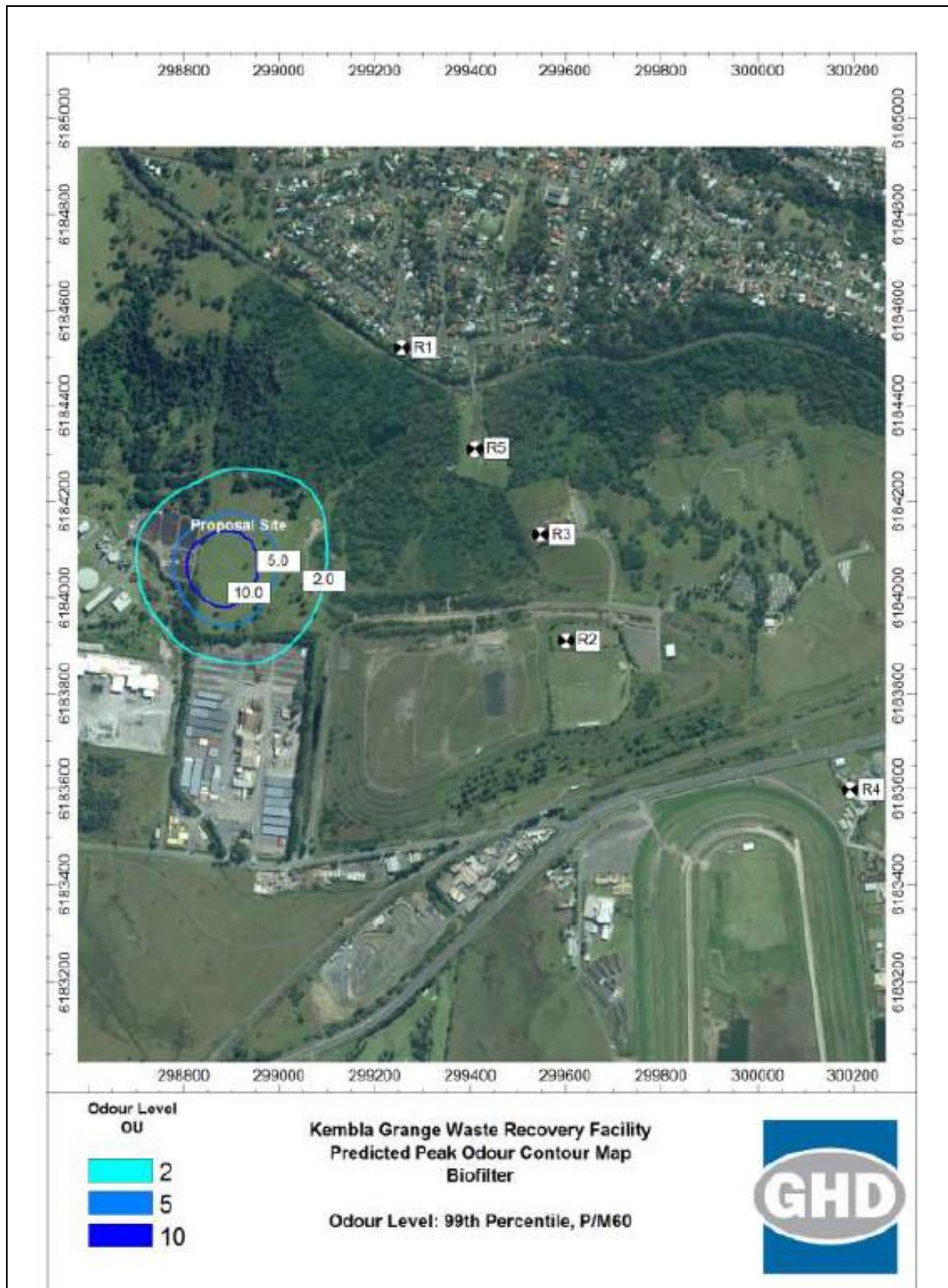


Figure 44: Predicted peak odour contour map, OU, with building ventilation and biofilter



Management and Mitigation

GHD recommend the following **general dust mitigation** measures:

- Dust dispersion modelling identified trucks operating on unsealed surfaces are the primary source of dust. In order to control the primary source of dust, and to meet the project criteria, Level 2 (>2L/m²/hr) water spraying should be undertaken on the unsealed access road from the site office into the site. This should be undertaken during daytime weather conditions that assist dust dispersion (dry and windy) towards receivers.
- While general site operations are not expected to exceed air quality goals at nearby private receptors, the following mitigation measures are recommended.
 - Water material prior to it being loaded for haulage, where appropriate.
 - Aim to minimise the size of storage piles where possible.
 - Limit cleared areas of land and clear only when necessary to reduce fugitive dust emissions.
 - Control on-site traffic by designating specific routes for haulage and access and limiting vehicle speeds to below 25 km/hr.
 - All trucks hauling material should be covered before exiting the site and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer.
 - Material spillage on sealed roads should be cleaned up as soon as practicable.
 - A rumble-strip at the interface of the sealed road and the unsealed access road should be considered.
 - Excavating operations conducted in areas of low moisture content material should be suspended during high wind speed events or water sprays should be used.

The odour modelling shows that odour emissions from the site without odour controls in place have the potential to exceed the 2 OU odour criteria at the nearby sensitive receivers. The report assessed two options for odour management onsite, and recommends *"that a ventilation system be designed that keeps the building under negative pressure at all times during operation. The air should be discharged in a manner that suitably disperses odour. One suitable option to further reduce the odours from the site is an odour control system that is designed to treat all air from the building ventilation system. The flow rate and stack properties dictate how the odour will disperse once discharged. The odour control systems assessed in Section 6.4 demonstrate compliance with the 2 OU criterion at all receivers."*

Hence, GHD recommend the following **odour mitigation** measures:

- Design and installation of an appropriate building ventilation system at negative pressure at all times during operation.
- A site odour management plan be developed prior to commissioning.
- Validation sampling of odour from any key odour discharge points after commissioning.
- If required, treat all air in an odour control system prior to discharge.

Conclusion

GHD conclude that:

- Based on the assumptions made in this assessment, predicted odour levels from proposed green waste composting without mitigation do not comply with the 2 OU criteria.

- Based on the assumptions made in this assessment, predicted odour levels from the proposed green waste composting will comply with the criteria if the WRF building is kept at negative pressure and all air is released into the atmosphere via a stack.
- Design and implementation of an odour control system will further reduce odour emissions from the building and any discharged odours will be less offensive than untreated emissions.
- Based on the assumptions made in this assessment, 24-hour PM10 concentration levels from site operations are expected not to comply with the adopted criteria at private Receivers R1. Annual average PM10 and TSP concentration levels, as well as monthly deposition rates are expected to readily comply with the adopted dust criteria.
- Dust mitigation measures in the form of Level 1 water sprays on the access road and wet suppression systems for crushing are predicted to reduce dust emissions resulting in compliance with the adopted criterion at all private receivers.
- Weather conditions that cause maximum dust impact are generally consistent winds in the direction of the nearest sensitive receivers throughout the daytime period outside of rain events.
- Trucks on unsealed surfaces were identified as the most significant source of dust emissions on the site and provide the greatest contribution to off-site dust impact. Therefore, during times of consistent adverse weather conditions (dry and winds), operations of these items should be reduced, or water sprays should be used in order to minimise potential impacts.
- The application of standard dust mitigation measures will also assist to minimise potential impacts from general site operations.

10.5 Acoustic Impacts

The revised "Noise Assessment" which was prepared by GHD in June 2014 undertook an assessment of potential noise impacts associated with the construction and operation of the facility to identify potential impacts on nearby receivers and also to provide details of the proposed noise management and monitoring measures. This assessment includes consideration of the current noise levels of the existing facility, estimates the noise levels compared with background levels, identifies sensitive noise receptors, determines if noise levels are excessive or offensive, and recommends any strategies for noise compliance. The following provides a summary of the information contained in this report.

Scope

GHD confirm that the noise assessment involved the following tasks:

- Key environmental noise catchment areas and noise sensitive receivers were identified from aerial imagery surrounding the site.
- Information provided by the client was reviewed to identify the likely principal noise sources from the WRF. A dataset of sound power levels was compiled for noise generating equipment at the site.
- Unattended noise monitoring was undertaken for a period of one week at two locations.
- Attended noise measurements were undertaken at the noise monitoring locations to supplement the unattended measurements and assess existing industrial noise levels in the area.
- Noise data was assessed and filtered to remove extraneous noise or adverse weather conditions.
- Noise monitoring data was used to establish operational and construction noise criteria based on the INP and the ICNG. Weather data over the monitoring period was obtained from the nearest Bureau of Meteorology Automated Weather Station (AWS) (Albion Park).
- Construction noise impacts were assessed with consideration of the ICNG and included:

- Construction noise modelling to predict impacts at sensitive receivers.
- Assessment of noise impacts against the construction noise criteria.
- Operational noise impacts were assessed with consideration to the INP and included:
 - One operational noise modelling scenario to predict the impacts at the sensitive receivers from the existing and proposed operations.
 - Assessment of impacts against the operational noise criteria.

Sensitive Receivers and Land Uses

The report identifies that a water treatment facility is located to the west of the site, together with other heavy industrial uses such as 24 hour pipe coating operations, and steel manufacturing. Other uses sited to the west of the site include a substation and storage facilities and the Wollongong Waste and recovery Park (formerly known as the Whytes Gully Tip). To the east is the Macedonian Orthodox Church, vacant land, open space and the Wollongong Lawn Cemetery. Both adjacent uses are accessed via Wyllie Road. To the north, buffered by bushland, is the residential neighbourhood of Farmborough Heights. The residences located to the north of the site are sited on an elevated rock shelf that is approximately 15-30 metres up slope above the proposed development site. The nearest residences are approximately 500 m from the proposed area of working. A vegetated buffer separates the closest residences to the north from the proposed development site. To the south of the site opposite the Princes Highway is located residential housing of Kembla Grange, approximately 1000 m from the proposal. Sensitive noise receivers surrounding the facility are shown in Figure 45 and Table 40. Noise monitoring was undertaken by GHD over 2 days at two location as shown in this figure.

Table 40: Noise Sensitive Receivers

Receiver	Receiver ID	Receiver Address
Macedonian Orthodox Church	01	11 Wyllie Rd, Kembla Grange
Houses on Fairloch Ave, Farmborough Heights	02	Fairloch Ave, Farmborough Heights
Kingston Lodge	03	14A Kingston Town Dr, Kembla Grange
Ian McLennan Park	04	Access off Wyllie Rd



Figure 45: Location of noise sensitive receivers

Unattended Noise Monitoring Results

A summary of calculated background LA90 and ambient LAeq (day, evening and night) noise levels for the monitoring periods are provided in Table 41 and Table 42 respectively.

Table 41: Site Boundary Summary of Noise Monitoring Results, dB(A)

Date	Rating background level 90 th percentile LA90(15min)			Ambient noise levels, LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
17/02/2014	40.8	40.4	36.2	47.2	46.1	43.1
18/02/2014	36.6	37.4	37.5	47.2	51.0	47.6
19/02/2014	36.8	39.3	34.9	48.6	50.3	44.2
20/02/2014	36.0	36.7	34.0	45.7	43.7	40.9
21/02/2014	37.5	41.9	33.7	48.2	49.9	43.0
22/02/2014	35.4	37.9	32.9	49.6	49.7	41.8
23/02/2014	37.1	37.1	34.7	48.1	46.7	43.0
24/02/2014	34.3	37.7	32.9	46.1	50.0	43.5
25/02/2014	37.7	37.6	33.5	47.9	51.6	40.9
26/02/2014	36.5	37.8	35.5	46.8	59.5	44.8
27/02/2014	43.8	39.4	34.2	49.7	48.5	44.7
28/02/2014	-	-	-	-	-	-
Overall RBL and Leq	36.8	37.8	34.2	47.9	52.0	43.8

Table 42: Bardess Crescent summary of noise monitoring results, dB(A)

Date	Rating background level 90 th percentile LA90(15min)			Ambient noise levels, LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
17/02/2014	31.5	31.6	32.1	56.1	43.2	42.9
18/02/2014	33.3	36.5	34.4	51.7	48.1	47.2
19/02/2014	32.4	34.5	32.3	51.3	44.5	44.4
20/02/2014	34.9	36.1	32.8	51.0	53.8	48.3
21/02/2014	33.9	33.7	30.9	49.8	50.7	52.5
22/02/2014	30.4	31.2	31.1	53.4	57.5	56.4
23/02/2014	30.4	32.0	31.6	54.1	53.7	49.4
24/02/2014	34.3	35.6	33.2	53.2	50.0	50.6
25/02/2014	33.1	37.0	35.2	49.7	41.8	49.3
26/02/2014	31.3	32.6	37.1	51.3	51.6	53.5
27/02/2014	32.7	32.5	32.9	50.3	52.6	52.6
28/02/2014	-	-	-	-	-	-
Overall RBL and Leq	32.7	33.7	32.8	52.4	51.9	51.2

Attended Noise Monitoring Results

Attended noise monitoring was also undertaken during site visits to supplement the unattended noise monitoring data. Noise levels at the boundary of the site with the church were observed by GHD to include general industrial noise from the surrounding area, road traffic noise from Princes Highway and birds and insects.

Noise levels at Bardess Crescent were observed to consist of general suburban noise, birds and insects and also some noise from the native fern nursery. The noise monitoring site was adjacent the rail line however a large noise barrier is situated between the line and all of the houses in Farmborough Heights. GHD are of the opinion that this would mitigate train noise as well as other noise coming from industry in Kembala Grange including the proposal.

Attended noise monitoring was also undertaken of key noise generating activities onsite – the crusher and screen operating. The derived sound power levels from these activities are presented Table 43.

Table 43: Derived sound power levels from site measurements dB(A)

Source/Hz	31.5	63	125	250	500	1000	2000	4000	8000	SWL
Terex 400S Crusher	72	95	100	101	109	110	108	103	92	115
Fintec 542 Screen	72	93	96	98	107	107	106	102	93	112

Construction Noise Criteria

The ICNG guideline recommends standard hours for construction activities as Monday to Friday: 7 am to 6 pm, Saturday: 8 am to 1 pm and no work on Sundays or public holidays. The ICNG acknowledges that limited delivery of oversized plant, emergency works or non noise generating works have justification to be undertaken outside the recommended standard construction hours assuming mitigation measures are implemented.

Tables 44 and 45 detail the ICNG construction noise management levels at sensitive land uses and residences, respectively.

Table 44: Construction noise management levels at sensitive land uses

Land use	Management level $L_{Aeq}(15min)$ (When in use)
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65dB(A)
Passive reaction areas (characterised by contemplative activities that generate little noise and where benefits are comprised by external noise intrusion, for example, reading, meditation)	External Noise level 60 dB(A)
Industrial premises	External noise level 75 dB (A)
Offices and retail outlets	External noise level 70 dB(A)

Table 45: Construction noise management levels at residences

Time of day	Management level $L_{Aeq}(15min)$	How to apply
Recommended standard hours: <ul style="list-style-type: none"> Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays 	Noise affected	The noise affected level represents the point 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	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, relevant authority (consent,

Time of day	Management level $L_{Aeq}(15min)$	How to apply
	75 dB(A)	<p>determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account.</p> <ul style="list-style-type: none"> • 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. • If the community is prepared to accept a longer period of construction in exchange for restrictions on construction time's
Outside recommended standard hours	Noise affected Rating background level plus 5 dB(A)	<p>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 5dB(A) above the noise affected level, the proponent should negotiate with the community.</p>

Operational Noise Criteria

GHD confirm that the INP provides guidance on the assessment of operational noise impacts. The guidelines include both intrusive and amenity criteria that are designed to protect receivers from noise significantly louder than the background level and to limit the total noise level from all sources near a receiver. The INP also provides guidance on sleep disturbance impacts. The INP noise criteria are planning levels and are not mandatory limits required by legislation however the noise criteria will assist the determining authority to assess operational noise impacts. Where noise criteria are predicted to be exceeded, feasible and reasonable noise mitigation strategies should be considered. Feasible and reasonable noise mitigation measures should consider the economic, social and environmental costs and benefits of the development against the noise impacts.

The intrusive noise criteria controls the relative audibility of operational noise compared to the background level at residential receivers. The amenity criteria limits the total level of extraneous noise for all receiver types. Both sets of criteria are calculated and, in the case of continuous noise sources, the lower of the two in each time period normally apply. For noise sources with intermittent characteristics both noise criteria should be assessed independently.

The intrusive criteria are determined by a 5 dB(A) addition to the measured (or adopted) background level with a minimum of 35 dB(A). The INP recommends that the intrusive noise criteria for the evening period should not exceed the daytime period and the night-time period should not exceed the evening period. The intrusive noise criteria are only applicable to residential receivers.

The amenity criteria are determined based on the overall acoustic characteristics of the receiver area, the receiver type and the existing level of industrial noise. Residential receiver areas are characterised into 'urban', 'suburban', 'rural' or other categories based on land uses, the existing level of noise from industry, commerce, and road traffic. Amenity criteria are also provided for other sensitive land uses such as schools, hospitals, places of worship and recreational areas. The amenity criteria aim to limit continual increases in noise levels from industrial noise sources and apply to all industrial noise sources at the receiver location, rather than just the noise source from the proposed development. To prevent cumulative noise level increases above the amenity

criteria, the INP provides adjustments to the amenity criteria to set a target level for the proposed development. The INP amenity criteria are provided in Table 46.

Table 46: INP Amenity Criteria

Type of receiver	Noise amenity area	Time of day	Recommended $L_{Aeq}(\text{period})$ Noise level, dB(A)	
			Acceptable	Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
		Day	55	60
		Evening	45	50
		Night	40	45
		Day	60	65
		Evening	50	55
		Night	45	50
		Day	65	70
		Evening	55	60
		Night	50	55
School classroom	All	When in use (highest 1 hour period)	35(internal)	40(internal)
Hospital ward	All	When in use (highest 1 hour period)	35(internal) 50(internal)	40(internal) 55(external)
Place of worship	All	When in use	40(internal)	45(internal)
Passive recreation	All	When in use	50	55
Active recreation	All	When in use	55	60
Commercial	All	When in use	65	70
Industrial	All	When in use	70	75

The Noise Assessment prepared by GHD confirms the manner in which meteorological conditions (wind conditions and temperature inversions) have been included in the assessment and confirms the modifying factor adjustments required to be incorporated by the INP if the noise sources contain tonal, low frequency, intermittent or impulsive characteristics. Modifying factor adjustments are shown in table 47.

Table 47: INP Modifying Factor Adjustments

Factor	Assessment/ Measurement	When to apply	Correction ^{1,2}
Tonal noise	One-third octave or narrow band analysis	Level of on-third octave band exceeds the level of the adjacent bands on both sides by: <ul style="list-style-type: none"> 5 dB or more if the centre frequency of the band containing the tone is above 400 Hz 8 dB or more if the centre frequency of the band containing the tone is 160 to 400 Hz inclusive 15 dB or more if the centre frequency of the band containing the tone is below 160 Hz 	5 dB (A) ²
Low frequency noise	Measurement of C-weighted and A-weighted level	Measure/access C and A weighted levels over the same time period. Correction to be applied if the difference between the two levels is 15 dB or more	5 dB (A) ²
Intermittent noise	Subjectively assessed	When the night-time noise level drops to that of the background noise level with a noticeable change in noise level of at least 5 dB(A)	5dB(A)

Factor	Assessment/ Measurement	When to apply	Correction ^{1,2}
Impulsive noise	A-weighted fast response and impulse response	If the difference in A-weighted maximum noise levels between fast response and impulse response is greater than 2 dB.	Apply the difference in measured noise levels as the correction up to a maximum of 5 dB(A)

Construction Noise

The construction noise criteria for the proposed construction activities during recommended standard hours and outside of the recommended standard hours are provided in Table 48 for each sensitive receiver.

Table 48: Proposal Specific Construction Noise Criteria, dB(A)

Receiver	Construction noise management level, $L_{Aeq}(15min)$					Sleep disturbance criteria L_{Amax} (external) ²
	During standard recommended hours		Outside of standard recommended hours ¹			
	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 10pm to 7 am, Monday to Saturday; 10pm to 8 am Sunday & Public Holidays	Night 10 pm to 7 am, Monday to Saturday; 10pm to 8 am Sunday & Public Holidays
	Noise affected	Highly noise affected				
01 Macedonian Orthodox Church	55 (external) ²	-	-	-	-	-
02 Houses on Fairloch Ave, Farmborough Heights	43	75	38	38	38	48
03 Kingston Lodge	47	75	42	42	39	49
04 Ian McLennan Park	60	-	-	-	-	-
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: Assuming open windows provide a 10 dB(A) reduction in noise from outside the building to inside the church.						

Operational Noise

The operational noise criteria at the residential receivers surrounding the proposal site are provided in Table 49. The noise criteria for Kingston lodge and other houses in this area have been developed using the noise monitoring data adjacent the church. GHD advise that noise levels at Kingston Lodge "would be a lot higher due to the proximity to the Princes Highway, therefore the criterion is considered conservative".

Table 49: Proposed Specific Operational Noise Criteria

Receiver	Time period	Amenity Criteria (acceptable noise level) ^{1,2} LAeq(period)	RBL, LAeq(15min)	Intrusive criteria ^{1,2} LAeq(period)	Proposal specific noise criteria (external)	Sleep disturbance criteria LAmax (external)
01 Macedonian Orthodox Church	When in use	50 (external) ³	-	-	50LAeq(period)	-
02 Houses on Fairloch Ave, Farmborough Heights	Day	55	33	338	38LAeq(day)	
	Evening	45	34	38	38LAeq(evening)	48LAmax
	Night	40	33	38	38LAeq(night)	
03 Kingston Lodge	Day	55	37	42	42LAeq(day)	
	Evening	45	38	42	42LAeq(evening)	49LAmax
	Night	40	34	39	39LAeq(night)	
04 Ian McLennan Park	When In use	50	-	-	50LAeq(period)	-
<p>Note 1: With consideration to the INP 'noise amenity area' classification, the residential receivers surrounding the site have been classified as 'suburban'.</p> <p>Note 2: When night and evening RBLs are greater than daytime RBLs, the INP recommends that the daytime RBL be used for assessment purposes.</p> <p>Note 3: Assuming open windows provide a 10 dB(A) reduction in noise from outside the building to inside the church.</p>						

Construction Noise Impact Assessment

The report notes that the construction noise impact assessment is based previous noise impact assessments for similar sites in NSW. Construction of the proposal is expected to take 12 to 18 months to complete. 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 standard construction hours, as specified in the ICNG.

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 35 with the corresponding noise level. Noise levels of construction equipment have been obtained from Australian Standard, AS 2436 – 2010 'Guide to Noise Control on Construction, Maintenance and Demolition Sites' and other available data. The equipment used to construct the proposal would be confirmed during the pre-construction phase.

Table 50: Typical construction equipment noise levels, dB(A)

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

Predicted Construction Noise Levels

Predicted construction noise levels at sensitive receivers during the day-time period are provided in Table 51. GHD confirm that *"the results indicate that all noise sensitive receivers are predicted to be below the construction noise affected management levels"*, with noise mitigation measures to be implemented where feasible and reasonable.

Table 51: Predicted Construction Noise Levels, dB(A)

Receiver	Criteria	Predicted level
Macedonian Orthodox Church	55	30
Residences on Fairloch Ave, Farmborough Heights	43	35
Kingston Lodge	47	37
Ian McLennan Park	60	40

Operational Noise Impact Assessment

GHD advise operational noise sources on site are expected to be the WRF building, C&D drop-off area, and vehicles on the site. Noise data has been sourced from attended equipment measurements undertaken at the existing facility, a similar facility as part of the Kimbriki Resource Recovery Project Noise Assessment (GHD, January 2011), Bulls Hill Noise Impact Assessment (Don Fox Planning, 2001), AS 2436 – 2010 'Guide to Noise Control on Construction, Maintenance and Demolition Sites' and British Standards BS5228-2009 Code of practice for noise and vibration control on construction and open sites Part 1: Noise. A summary of expected equipment and noise levels on site are provided in Table 52. All equipment is expected to be operational during the operating hours (6 am to 6 pm Monday to Saturday, 8am to 4pm Sundays and no work on public holidays).

Table 52: Existing Landfill Noise Sources, dB(A)

Equipment	Sound power level (dB(A))	Source
Bulldozer	108	AS2436 Table A1
Dumptruck	107	BS 5228, Table C2#30
Excavator	107	AS2436 Table A1
Loader backhoe	96	BS 5228, Table C2#8
Truck	107	AS2436 Table A1
Crusher	115	Site measurement
Screen	112	Site measurement
C&D dropoff area	103	Kimbriki
WRF building	Day-time operations: 90 (internal)	Kimbriki
Heavy vehicle on weighbridge	104	Kimbriki

Predicted Operational Noise Levels

The predicted noise levels for site operations during the day-time periods are shown in Table 53 and a noise contour plot shown in Figure 46.

Table 53: Predicted Day Time Operational Noise Levels, dB(A)

Receiver	Criteria	Predicted level
Macedonian Orthodox Church	55	33
Residences on Fairloch Ave, Farmborough Heights	38	35
Kingston Lodge	39	36
Ian McLennan Park	60	38

Assessment of Operational Noise Levels

GHD confirm that "the predicted existing day time and night time noise levels at all receivers comply with the relevant INP noise criteria. Due to the topography of the site predicted noise levels at Farmborough Heights and the nearby Macedonian Orthodox Church are well within the criteria. Predicted noise levels during operation at Kingston Lodge and other receivers in Kembla Grange are also well below the criteria".

Mitigation Measures

GHD advise that "the modelling results indicate that the construction noise management levels will not be exceeded at any receivers. Construction noise impacts will be limited to during the standard construction hours". The following general noise mitigation measures are suggested by GHD to mitigate construction noise impacts:

- All engine covers should be kept closed while equipment is operating.
- As far as possible, materials dropping heights into or out of trucks should be minimised.
- Vehicles should be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes should be eliminated, where practicable.
- Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made.
- 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.
- The constructor would provide a phone number at the site entrance detailing the 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.
- All 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:
 - Avoid the use of loud radios.
 - Avoid 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.
 - Keep truck drivers informed of designated vehicle routes, parking locations and delivery hours.
 - Minimise reversing.
 - Avoid dropping materials from height and avoid metal to metal contact on material.
 - All engine covers would be kept closed while equipment is operating.

Operational Mitigation Measures

GHD confirm that *"the modelling results indicate that the operational noise criteria will not be exceeded at any sensitive receiver. Once the design for the WRF facility has been finalised, a review should be undertaken to check that noise levels do not exceed the assumed levels in this assessment. Based on the information provided in this assessment, specific operational mitigation measures are not required"*.

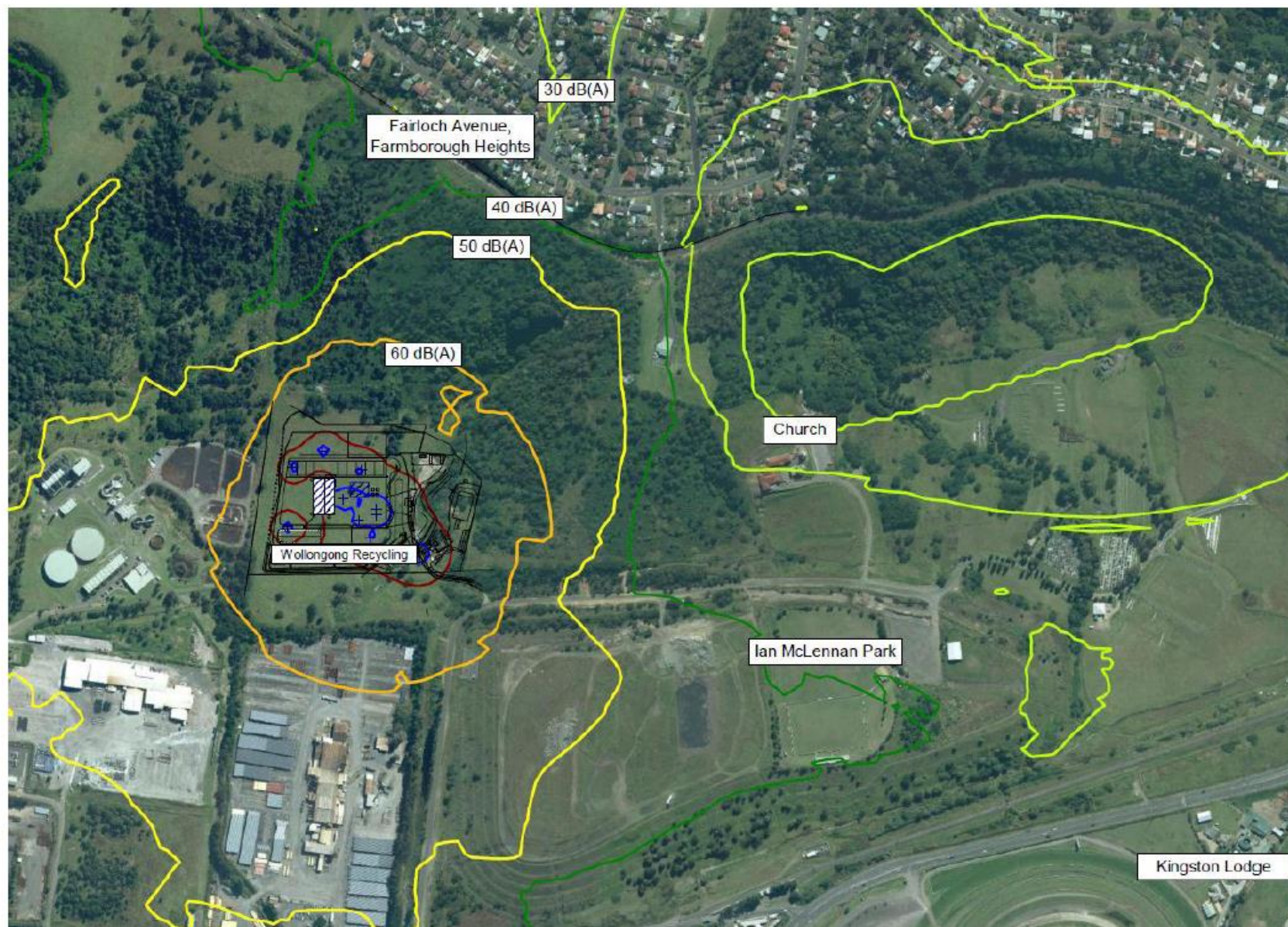


Figure 46: Predicted Day Time Operational Noise Contours

10.6 Geotechnical Considerations

The Cut and Fill Plan (Ref KF110816 Drawing C28) diagrammatically demonstrates the extent of cut and fill which is proposed to be undertaken on the site.

The 'Geotechnical Investigation report' dated June 2014 was prepared by Benviron Group to assess the existing site and subsurface conditions in order to provide recommendations from a geotechnical viewpoint on the proposed scheme comprising buildings, roads and storage areas in the proposed Resource Recovery facilities at Kembla Grange. Consideration was also given to Chapter E12 of the Wollongong DCP 2009.

The report outlined that the site is underlain by Budgong Sandstone. Hawkesbury sandstone typically consists of medium to very coarse grained quartz sandstone with minor laminated shale and siltstone lenses. Upon weathering this rock forms fine to medium (sometimes coarse) grained sands/ clayey sands and silty/ sandy clays. The fieldwork which was conducted on 21 December 2012 and included six drilled boreholes and one test pit excavated for laboratory testing. Figure 37 details the location of these boreholes and pits.

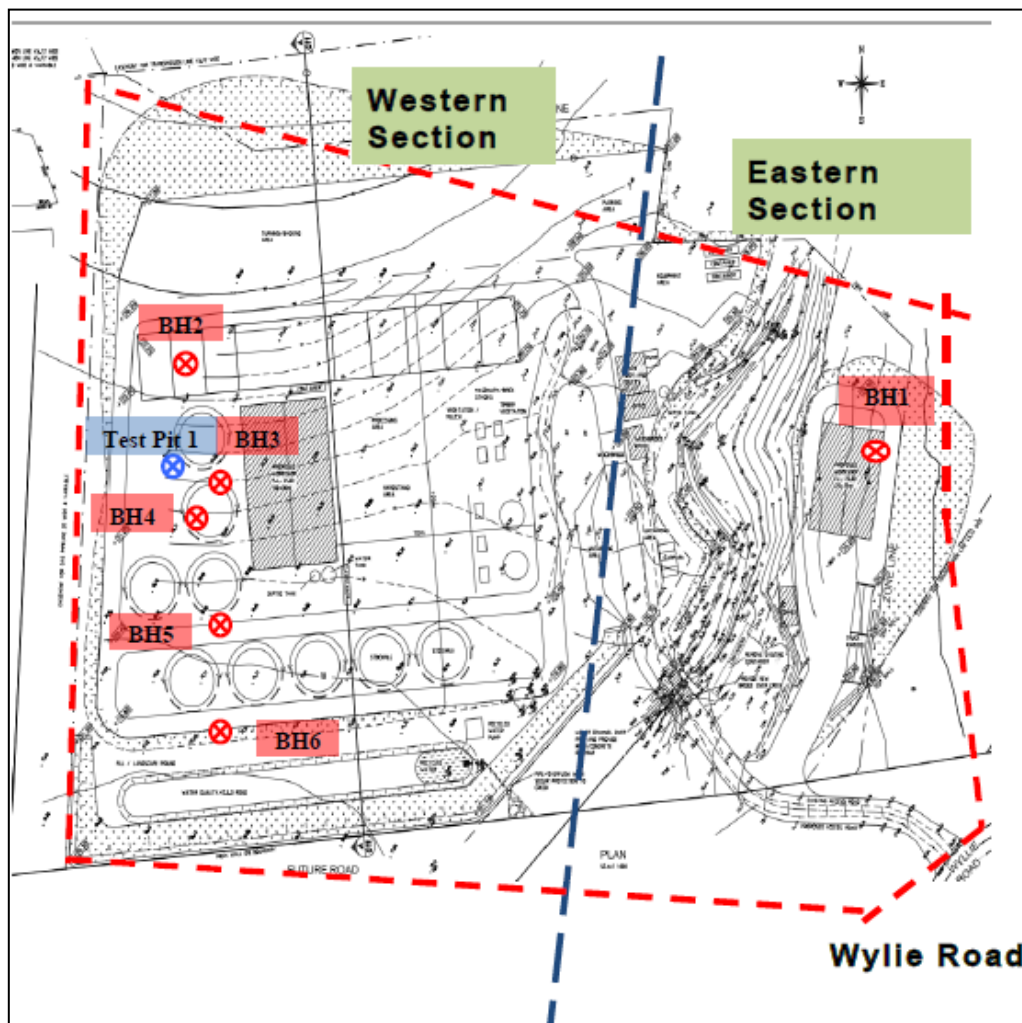


Figure 47: Location of Geotechnical Boreholes and testpits

Fieldwork Results

Based on information gathered and observations made during fieldwork the report indicates that:

- It can be inferred that it is likely the subsoil profile comprises topsoil, which overlies the residual material of varying degree of weathering ranging between a Clayey SAND to a more predominant sandy/CLAY matrix that sits on top of the Sandstone Bedrock.
- The subsurface soil profile in the eastern section and within BH1 indicated predominantly a brownish yellow very stiff to stiff sandy CLAY from ground surface (Approximately at +29mAHD) to a depth of 3 meters. Underlying this layer is a medium dense SAND .
- The subsurface soil profile along the westernmost platform edge as observed from BH2 is a predominant brown medium plastic CLAY for the top 1 meter below existing ground surface at approximately +24mAHD. Subsoil observations from BH3 and BH4 indicated a Clayey silty SAND for the first 1 meter below existing ground surface at approximately +21mAHD. Further southwards in the vicinity of BH5 and BH6, the subsoil material is a dark brownish CLAY of medium plasticity.
- A test pit (TP1) was excavated between BH 4 and BH5. It was observed that it is predominantly a medium plastic CLAY and samples were collected for laboratory testings.
- Groundwater or seepage was not encountered in the boreholes during drilling. However, it should be noted groundwater levels may be subject to seasonal fluctuations, rainfall, prevailing weather conditions and also future developments of the areas and land forms.

Laboratory Test Results

The sample collected in test pit 1 (TP1) was in the sandy clay layer underlying topsoil for the determination of the Atterberg limits (Liquid and Plastic limits) and Plasticity Index. The test results are shown in Table 54.

Table 54: Atterberg Limits Tests Result

Sample ID	Location	Depth	Plastic Limit	Liquid Limit	Plasticity Index
1	Test Pit 1	0.6-1.0m	34	60	26

Risk Areas

Benviron confirm that the site can be divided into two sections, being the flat ground comprising the western site area, and the eastern hilly site area. The report concludes that the flatter western area where the proposed storage areas and building platform is located would be a low hazard to landslide instability, given the subsurface condition and slope of less than 10 degrees. Based on an assessment against the Australian Geomechanics Society guidelines, risk was assessed to be "very low to low".

The eastern area of the site comprises a western platform with some proposed storage areas and building platform. Based on the assessment of subsurface conditions and the slope angle of approximately 35 degrees, the site was assessed to be of medium to high hazard area for landslide instability, and a "Moderate" risk against an assessment of the AGS guidelines. Therefore, consideration will need to be given to the foundation loadings to ensure there is minimal impact on slope stability or the development should provide retaining structures designed to withstand the imposed loadings.

Retaining Structures and Foundations

The report notes that excavations may be required for the construction of retaining structures within the development compound, however, should any excavation be considered or planned in the final stages of the development design, the following should be considered.

- It is expected materials encountered during excavation are likely to comprise stiff to hard clays. Excavation of soil-based materials and extremely to highly weathered sandstone may be achieved using conventional earthmoving equipment such as backhoes or tracked excavators. Heavy ripping and/or vibratory rock breaking techniques are not likely to be required.
- Site earthworks should be properly drained to minimise the effects of wetting up and softening of exposed, natural subgrade soils, which may be caused by extraneous water sources and climatic variations. Trafficability across the site may be restricted to tracked plant during and following periods of wet weather and the trafficking of wet subgrades with any plant would be expected to result in significant subgrade damage. Should possible bulk excavation be terminated within the silty clay or clay layers, it is considered the natural materials at the base of such excavations may be trafficable under favourable climatic conditions and lack of groundwater presence. However, similar trafficability problems, as outlined for site subgrades, may be anticipated where "wetting" may occur.
- Consideration be given to the placement of a granular layers to provide convenient working platforms and improve site trafficability. Such a layer would also significantly assist in reducing potential drying out of reactive soil subgrades. Where such platforms are to be utilised for the support of heavy machinery or plant, it may be appropriate to design these platforms to such loads and if necessary have these confirmed and inspected by a geotechnical engineer.

Groundwater Management

Groundwater or seepage was not encountered in the boreholes during drilling, however the report notes that the presence of groundwater could be confirmed if construction is undertaken during or following adverse weather or if there is a significant time lapse between the investigation and construction. Accordingly recommendations are provided to address groundwater or surface seepage if encountered during construction including:

- Groundwater presence or levels should be confirmed if construction is undertaken during or following adverse weather or if a significant time period elapses between this investigation and construction.
- Should groundwater or surface seepage be encountered during excavation, it is possible foundations excavations may be dewatered using appropriate drains and sump pits with a suitable pumping system.
- A groundwater monitoring programme may be adopted prior to construction to confirm the groundwater regime and determine the design of appropriate drainage measures should groundwater presence be identified as problematic to construction or ongoing performance of structures.

Temporary Batter Slopes

Benviron conclude that temporary batter slopes may be appropriate for possible excavations or cut slopes provided excavations or cut slopes are set back sufficiently from common site boundaries to facilitate the formation of the recommended safe temporary batters as outlined in Table 55.

Table 5: Minimum Temporary Batter Slopes

Materials	Temporary (Horizontal: Vertical)
Stiff CLAY	3.0:1.0
Very Stiff/Hard Silty Clay	2.0:1.0
Distinctly Weathered Sandston	1.0:1.0

Temporary surface protection against erosion may be provided by covering the batter with plastic sheets or other applicable methods. It is considered that plastic sheeting, if adopted, should extend at least 1.5m behind the crest of the cut face or at least up to the common site boundaries. Plastic sheeting should be positioned and fastened to prevent water infiltration into or onto the batter which may lead to softening and possible instability. All stormwater run-offs should be directed away from all temporary and permanent slopes.

Retaining Structures

Bnviron advise that in the long term, the excavation faces must be retained by engineered retaining structure in particularly along the eastern hilly section of the site and that "these structures should be designed to withstand the applied lateral pressures of the soil/rock layers, the existing surcharges in their zone of influence; including existing structures, and construction related activities, and also hydrostatic pressures (if it is appropriate)". The parameters as recommended by the report are contained in Table 56.

Table 56: Geotechnical Design Parameters

Materials	Unit Weight (kN/m ³)	Active Earth Pressure Coefficient (k_a)	At Rest Earth Pressure Coefficient (k_o)	Passive Earth Pressure Coefficient (k_p)
Stiff/very stiff silty clay and clay	18	0.40	0.57	2.46
Hard silty clay	20	0.33	0.50	3
Extremely weathered sandstone (Class V or IV)	20	0.25	0.4	200kPa
Distinctly weathered sandstone (Class IV or III)	22	0.15	0.25	400kPa
Slightly weathered to fresh sandstone (Class III/II)	23	NA	NA	750kPa

Foundation System

Bnviron provide the following recommendations with respect to the foundation system:

- Depending on proposed structures, associated structural loadings, tolerable settlements and cost-benefit considerations, foundation systems founded on very stiff to hard clays or silty clay may be applicable. Possible foundation systems for various structures founded within the soil profile may consist of shallow pad and strip footings and piled rafts.
- Shallow foundation systems or piles, with minimum length of 3.0m, founded within the very stiff clay may be designed adopting an allowable end bearing pressure of 200 kPa with this value being increased to 500 kPa for systems founded within the hard clay-based materials.
- End bearing piles founded within low strength, Class IV sandstone may be designed with a maximum allowable end bearing pressure of 1000 kPa. A minimum socket length of 0.5m is considered appropriate.
- In case piles are to be founded on clay layers, potential total and differential settlements should be evaluated under service loadings and be considered in the structural design. Long-term creep/consolidation settlements should also be taken into account.

- Ground slabs founded on stiff clays or medium dense sands may be designed using an allowable bearing capacity of 150 kPa.
- Foundation systems associated to independent structures should be founded on similar foundation materials to minimise possible differential settlements.
- Should groundwater flow or surface runoff be encountered within excavated footings, footing excavations should be dewatered and be clean and free of loose debris and wet soils prior to concrete placement or correct underwater placement techniques should be adopted. An experienced geotechnical engineer or engineering geologist should inspect foundation excavation at the time of excavation and prior to reinforcement placement and construction to ensure suitable bearing materials satisfying design criteria have been achieved.
- "Geotechnical Strength Reduction Factor" of piled foundations can be determined in accordance with AS2159-2009 Cl.4.3.1. In absence of loading test of the piles, the factor can be determined based on risk ratings associated to Site, Design and Pile Installation; based on available information it could vary between $\phi_g = 0.45-0.60$ for low redundancy systems and $\phi_g = 0.53-0.70$ for high redundancy systems.

Site Classification

The geotechnical assessment report confirms that the site is classified as Class M (moderately reactive) in accordance with the requirements of AS 2870-2011 (Ref 2). Benviron note that the classification must be reassessed should the ground profile changes significantly in areas by adding fill or removing soil.

Preliminary Pavement Design

Benviron note that observation at the boreholes indicate that subgrade materials for the proposed pavements across the site are likely to be stiff to hard silty sandy clay/ clayey sand with SPT numbers ranging from 13 to over 20. Hence they suggest a minimum CBR of 3.5% for these materials, which is chosen as design CBR for the preliminary pavement design. Further, they assume a design traffic load of 5x10⁵ ESA for this preliminary pavement design considering a design life of 25 years for pavements, however recommend that this be confirmed before construction considering the vehicle types accessing the site and frequency of their access.

Benviron also recommend that based on the assumptions contained in the report that the pavement should comprise the following layers:

- 40 mm thick dense grade asphalt AC14 on 7-10mm primer seal coat,
- 120 mm thick DGB20 Base Course compacted to 98% Standard Compaction Ratio, and
- 330 mm thick DGS40 Sub-base Course in two equal layers compacted to 98% Standard Compaction Ratio.

Recommendations:

Benviron recommend that the following comments be considered in the design and construction of the proposed structures and pavements:

- Some variability in subsurface condition must be anticipated within the site;
- Additional site investigations (confirmatory holes and pits) may be required at critical locations (eg on steeply sloping ground) to ensure that the local and regional stability are assessed with respect to the proposed engineering elements and design performances.
- As part of site preparation prior to construction works, all vegetation, topsoil and any uncontrolled fill shall be removed;

- All footings are recommended to be found on some bearing stratum;
- The base of all footing excavations are to be inspected by a qualified geotechnical engineer to ensure footing will found in competent materials as designed;
- Should variation in descriptions in soil types, colour or depths be discovered during construction, a geotechnical engineer should be notified so that the potential influence on the footing as it may be affect surrounding engineering elements may be assessed; and
- Consideration be given to the CSIRO sheet BFT-18 '*foundation maintenance and footing performance.*'

Conclusions

The site is classified M (moderately active) at the time of the field works, and a stability assessment has made reference to Chapter E12 of the Wollongong DCP 2009. The report concludes that the proposed development is feasible on this site subject to the recommendations presented in the report.

10.7 Salinity Impacts

A Salinity Assessment was carried out by Benviron Group dated August 2013 (Ref E449/7). The assessment has sought to identify salinity issues and provide recommendations for management resulting from the processing capacity of the site.

Topography and Geology

The report confirms that the site:

- is situated in a sloping area ranging from approximately 15-30 metres above sea level. The majority of the site sloping towards Wyllie Road and also is intersected by an onsite creek. with the surrounding topography being gently undulating. Site stormwater runoff is expected to be either captured for reuse within the onsite-retention dams or is expected to flow via stormwater drains and site surfaces into the onsite creek within the site.
- The Geological Map of Wollongong (Geological Series Sheet S1 56-9, Scale 1:250,000, 1966), published by the Department of Mineral Resources indicates the residual soils within the site to be underlain by Shoalhaven Group geological profiles, comprising red, brown and grey lithic sandstone.
- The site covers only one soil landscape area and is confirmed by the similar soil profile in each of the boreholes that were augured at different locations within the site.

In general, the following sub-surface soil profile was encountered across the site:

Table 57: Sub-surface Soil profile

Topsoil	Silty Sandy Clay. Med-high plasticity, brown, moist with some organic materials
Natural Soil	Silty Sandy Clay, high plasticity, brown, moist
Bedrock	Shale, weathered, dark brown/grey. Weak (maximum depth of drilling)

Soil Salinity Assessment Criteria

The assessment confirms that "the *Environmental Planning and Assessment Regulation 1994* defines saline soils as soil profiles or layers (within the upper 2m of soil) with an Electrical Conductivity (ECe) of Saturated Extracts greater than 4dS/m". The classes of saline soils as used by the Department of Conservation and Land Management publication "Dryland Salinity – Introductory Extension Notes - 1991" is shown in Table 58.

Table 58: Classes of Saline Soils

Classification	EC _e (dS/m)
Non saline	<2
Slightly saline	2-4
Moderately saline	4-8
Very saline	8-16
Highly saline	>16

The DNR 2002 publication "Site Investigations for Urban Salinity" provides guidance for assessing and managing the impacts of salinity on development sites and recommends determination of a number of soil and/or water chemical and physical properties, such as:

- Permeability
- Cation Exchange Capacity
- Sodidity
- Corrosivity (pH, sulphate, chloride)
- Salinity (electrical conductivity)

Once the chemical and physical parameters of the soil and/or water are obtained, the DNR publication suggests reference to the following:

- Australian Standard AS3600-2001: Concrete Structures
- Australian Standard AS3700-2001: Masonry Structures
- Australian Standard AS2159-2009: Piling – Design and Installation
- Australian Standard AS2870-1996: Residential Slabs and Footings - Construction

For the purpose of the assessment the aggressivity classifications of soil and groundwater applicable to iron and steel, in accordance with Australian Standard AS2159-2009, are as follows.

Table 58: Aggressivity Classifications of Soil and Groundwater applicable to Iron and Steel

Chloride		PH	Resistibility (ohm)	Soil Condition A *	Soil Condition B#
In Soil (ppm)	In Water (ppm)				
<5000	<1000	>5.0	>5000	Non-aggressive	Non-aggressive
5000-20000	1000-1000	4.0-5.0	2000-5000	Mild	Non-Aggressive
20000-50000	10000-20000	3.0-4.0	1000-2000	Moderate	Mild
>50000	>20000	<3.0	<1000	Severe	Moderate

*Soil Condition A= high permeability soils (e.g. sands and gravels) which are below groundwater

#Soil Condition B= low permeability soils (e.g. silts and clays) and all soils above groundwater

The aggressivity classifications of soil and groundwater applicable to concrete, in accordance with Australian Standard AS2159-2009, are given below.

Table 59: Aggressivity Classifications of Soil and Groundwater applicable to Iron and Steel

Sulphate expressed as SO ₄		PH	Chloride in Water (ppm)	Soil Condition A*	Soil Condition B#
In Soil (ppm)	In Groundwater (ppm)				
<5000	300-1000	>5.5	6000	Mild	Non-aggressive
5000-10000	1000-2500	4.5-5.5	6000-12000	Moderate	Mild
1000-20000	2500-500	4.0-4.5	12000-30000	Severe	Moderate
>2000	>5000	<4.0	>30000	Very Severe	Severe

Approximately 100ppm of SO₄=80ppm of SO₃

*Soil Condition A= high permeability soils (e.g. sands and gravels) which are below groundwater

#Soil Condition B= low permeability soils (e.g. silts and clays) and all soils above groundwater

Benviron confirm that *the appropriate site condition for predominant soils at the site is assessed to be "Condition B"*.

Fieldwork and Laboratory Analysis

Benviron recovered representative soil samples from near surface and at depth, as recommended in the Environmental Planning and Assessment Regulation 1994 and the DNR 2002 publication "Site Investigations for Urban Salinity". The soil samples were analysed for Electrical Conductivity (EC); pH; Chloride; Sulphate; and Exchangeable Sodium. The location of the sampling is shown in Figure 47.

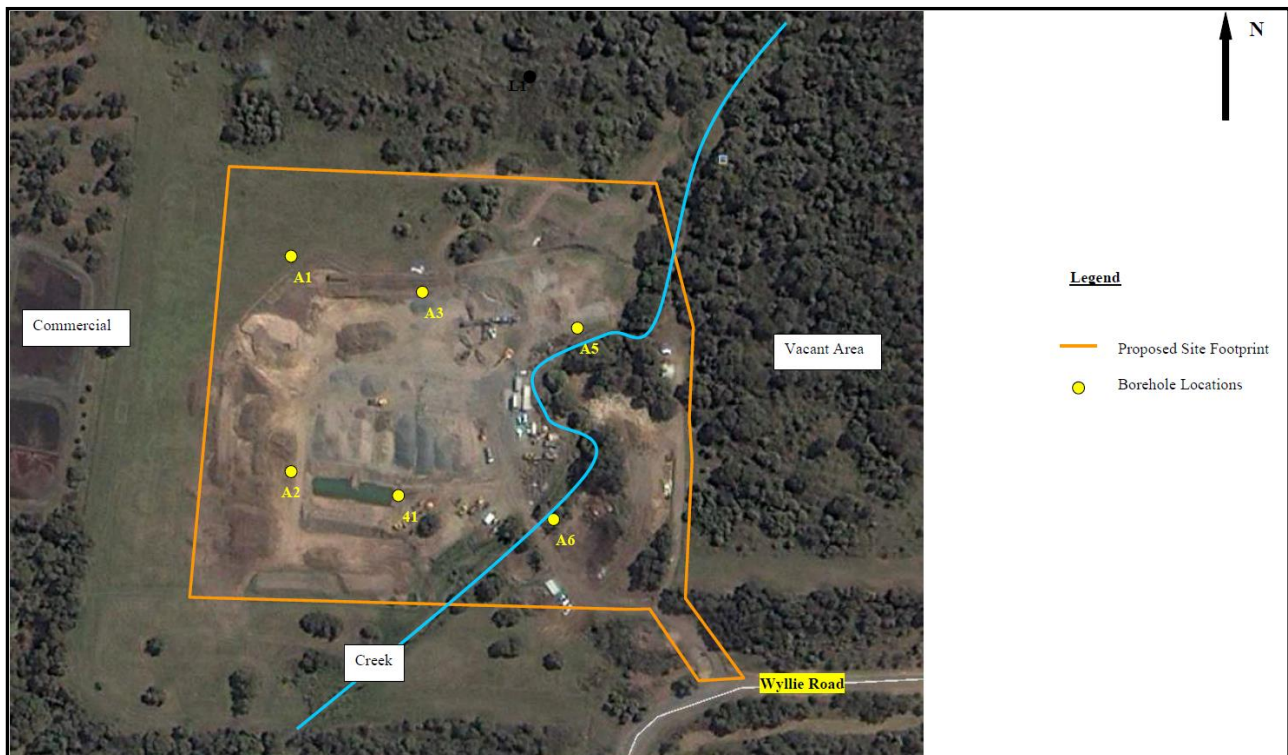


Figure 47: Location of Boreholes for Salinity Testing - Benviron

Laboratory Results and Assessment

The soil electrical conductivity test results are presented in Table 60 Benviron confirm that *"with reference to NSW Department of Natural Resources "Site Investigations for Urban Salinity" – 2002", the soils are considered to be generally non saline"*.

Table 60: Electrical Conductivity Test Results

Sample Location	Depth (m)	Electrical Conductivity (dS/m)Ec	Multiplication Factor	Electrical Conductivity of Saturated Extract (dS/m) EC _e	Soil Type
Surface soils					
A1	0.5	0.096	7	0.67	Silty sandy clay, med-high plasticity
A2	0.6	0.093	7	0.65	Silty sandy clay, med-high plasticity
Soil Horizon 0.7-2.0m BGL					
A1	1.5	0.11	7	0.77	Silty sandy clay, high plasticity
A2	1.8	0.079	7	0.55	Silty sandy clay, high plasticity
A3	1	0.087	7	0.64	Silty sandy clay, high plasticity
A4	0.9	0.12	7	0.84	Silty sandy clay, high plasticity
A5	1.3	0.087	7	0.61	Silty sandy clay, high plasticity
A6	1.2	0.096	7	0.67	Silty sandy clay, high plasticity
Environmental Planning & Assessment Regulation 1994 Dryland Salinity (1993)				Saline at 4 dS/m Non-saline <2dS/m Slightly saline 2-4 dS/m Moderately saline 4-8 dS/m Very saline 8-16 dS/m Highly saline>16dS/m	

The soil pH, chloride, and sulphate test results are presented in Table 61. Benviron confirm that "with reference to AS2159-2009 'Piling-Design and Installation', the soils are considered to be generally non-aggressive to concrete and steel"

Table 61: pH, Chloride, Sulphate, Resistivity Test Results

Sample Location	Depth(m)	pH	Chloride in Soil (m g/kg)	Sulphate in Soil (mg/kg)
Surface soils				
A1	0.5	5.4	58	34
A2	0.6	5.2	58	37
Soil Horizon 0.7-2.0m BGL				
A1	1.5	5	84	43
A2	1.8	5.3	52	41
A3	1	5.2	53	34
A4	0.9	5.7	37	56
A5	1.3	5.2	45	31
A6	1.2	5.2	60	36
AS2159-2009				
Piling-Design and Installation				
Reinforced Concrete Piles				
<u>High Permeability Soils</u>				
Non-aggressive		>5.5		>5000
Mild		4.5-5.5		5000-10000
Moderately aggressive		4-4.5		10000-20000
Severely aggressive		<4		>20000
<u>Low Permeability Soils</u>				
Non-aggressive		>5		.5000
Mild		4.5-5		5000-10000
Moderately aggressive		4-4.5		10000-20000
Severely aggressive		<4		>20000
Steel Piles				
<u>High Permeability Soils</u>				
Non-aggressive		>5	<20000	
Mild		4.0-5.0	20000-50000	

Moderately aggressive	3.0-4.0	20000-50000	
Severe	<3	>50000	
<u>Low Permeability Soils</u>			
Non-aggressive	>5	<20000	
Non-aggressive	4.0-5.0	20000-50000	
Mill	3.0-4.0	20000-50000	
Moderately aggressive	<3	>50000	

The soil exchangeable sodium percentage test results are presented in Table 62. Benviron confirm that "with reference to NSW Department of Natural Resources "Site Investigations for Urban Salinity" – 2002", the soils are considered to be generally non sodic.

Results from field observations and laboratory analysis of soil testing revealed that the soils likely to be disturbed through the development are generally non-saline, non aggressive to steel and concrete piles, and non-sodic. Benviron conclude based on this analysis that "from a salinity consideration, the site is suitable for the proposed development with minimal concerns".

Table 62: Exchangeable Sodium Percentage Test Results

Sample Location	Depth(M)	Exchangeable Sodium Percentage (ESP)	Soil Type
Surface Soils			
A1	0.5	2	Silty sandy clay, med-high plasticity
A2	0.6	2	Silty sandy clay, med-high plasticity
Soil Horizon 0.7-2.0m BGL			
A1	1.5	3	Silty sandy clay, high plasticity
A2	1.8	3	Silty sandy clay, high plasticity
A3	1	2	Silty sandy clay, high plasticity
A4	0.9	2	Silty sandy clay, high plasticity
A5	1.3	2	Silty sandy clay, high plasticity
A6	1.2	2	Silty sandy clay, high plasticity
Dryland Salinity (introductory Extension Notes)			
Non-sodic		<5	
Marginally sodic		5-10	
Highly sodic		>10	
Sodic Soils (Distribution, Properties, Management, and Environmental Consequences)			
Sodic		>15	

10.8 Acid Sulphate Soil Impacts

An Acid Sulphate Soils Assessment was also prepared by Benviron dated March 2014 to determine the presence of acid sulphate soils on the site using soil sampling, and field analysis. Six boreholes were excavated to a depth of 2m. Reference was made within the assessment to the NSW Department of Land and Water Conservation 'Acid Sulphate Soils Risk Maps (Edition Two, Dec 1997, Scale 1:250,000). Such maps confirm that there is 'no known occurrence ' within the soil profile.

Assessment Criteria

Benviron used the following soil indicators to determine if ASS are actually present on site:

- field pH less than or equal to 4 in soils;

- presence of shell;
- any jarosite horizons or substantial iron oxide mottling in auger holes, in surface encrustations or in any material dredged or excavated and left exposed. Jarosite is not always found however in actual acid sulphate soils.

The following soil indicators were used by Benviron to determine if PASS are actually present on the site:

- waterlogged soils, unripe muds;
- presence of shell;
- soil pH usually neutral but may be cid-positive Peroxide test.

Soil Sampling and Boring

Samples were collected from 6 boreholes to a depth of 2.0m below ground level in the location as shown in Figure 39. Samples were collected at intervals between 0.5m and 2.0m BGL. Field analysis was performed on the collected samples for pH_f and pH_{ox} on accordance with the required sampling techniques of the ASSMAC (1998) Assessment Guidelines [ASSMAC (1998) Field pH and peroxide test protocol].



Figure 48: Location of Boreholes for Acid Sulphate Soil Testing - Benviron

Soil Observations

Based on the information from all boreholes the surface and subsurface profile across the site is generalised as follows;

- NATURAL, Silty Sandy Clay high plasticity, brown, moist with some organic materials.
- NATURAL, Shaley Clay, low plasticity, dark brown/grey weathered.

Groundwater seepage was not encountered at a depth of approximately 0.5m in boreholes/s (A1) during the drilling process, with the maximum depth of drilling at one borehole location being 2.0m. No unusual colouring or shells were detected in the soil suggesting the presence of pyrite (iron sulphide) or Jarosite was unlikely.

Field pH Results

The results of the field tests are presented in Table 63.

Table 63: Summary of Field Analysis Results

Sample	Depth (m)	pH -F	pH-FOX	Reaction Strength	Change in pH (pH _f – pH _{fox})
A1	0.5	5.2	3.7	Low	1.5
A1	1.5	5.0	4.3	Low	0.7
A2	0.6	5.1	3.7	Low	1.4
A2	1.8	5.1	4.2	Low	0.9
A3	1.0	5.2	3.5	Medium	1.7
A4	0.9	5.4	3.7	Medium	1.7
A5	1.3	5.1	3.9	Low	1.2
A6	1.2	5.1	3.5	Medium	1.6

Notes:

- pH_f refers to pH field (soil and distilled H₂O).
- pH_{fox} refers to pH field oxidised (soil and peroxide).
- Change in pH refers to pH field minus pH field oxidised.
- - refers to a more acidic change in pH
- + refers to a more alkali change in pH
- **Bold** refers to detection.

To investigate the pH of the soils (pH_{fox}) water was added to the soil samples and Benviron confirmed that the pH_f of the investigated samples was well above 4. This indicates the soils from which the samples were collected did not contain actual ASS.

To investigate the presence of PASS, 30% peroxide (H₂O₂) was added to soil samples and the resulting pH was measured. Benviron confirm that the "pH of the soil peroxide solution (pH_{fox}) did not decrease below 3 at varying intervals, however there was a significant change in some of the pH values that decreased more than 1 pH unit and the strength of the reaction was medium within some soil samples. All remaining samples had no other indicators of acid sulphate soils indicating the lack of unoxidised sulphates. Based on this result it can be seen that soils may contain potential acid sulphate soils at depths of 0.5m- 2.0m. Based on the results of the field testing it was recommended that further analysis for SPOCAS be undertaken".

SPOCAS Testing (Suspended Peroxide Oxidation Combined Acidity and Sulphate)

The soils were assessed against the guidelines set out in Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998) Acid Sulphate Soils Assessment Guidelines. The action criteria selected was based on if there

will be between 1 to 1,000 tonnes of soils disturbed within the site. The results are assessed against two available criteria, those being:

- Sulphur Trail (S_{pos}) = 0.03% - Course Texture
= 0.06% - Medium Texture
= 0.1% - Fine Texture
- Acid Trail (TPA) = 18 mol H^+ /tonne - Course Texture
= 36 mol H^+ /tonne - Medium Texture
= 62 mol H^+ /tonne - Fine Texture

The laboratory analysis results are presented in Table 64.

Table 64: Laboratory Results SPOCAS Test Results

Sample	Depth (m)	S-POS (%) (sulphur trail)	TAA (mol H^+ / tonne)	TPA (mol H^+ / tonne) (acid trail)	TSA (mol H^+ /tonne) (acid trail)
A1	0.5	<0.02	140	150	14
A3	1.0	<0.02	150	170	20
A4	0.9	<0.02	130	150	20
A5	1.3	<0.02	150	250	100
ASSMAC Guidelines		0.1	-	62	62

Notes:

- Guidelines follow the ASSMAC "Acid Sulphate Soils Assessment Guidelines 1998".
- Criteria based upon clay content of >40%
- Criteria based upon more than 1000 tonnes disturbed
- Bold values exceed ASSMAC guidelines

Benviron advise that the results suggest that based on the soils described above it is considered that they most closely resemble the "*Fine Texture Medium to Heavy clays and silty clays*" described in Table 4.4, Assessment Guidelines of the NSW Acid Sulphate Soil Management Advisory Committee (ASSMAC) "*Acid Sulphate Soil Manual*" (August 1998).

The report confirms that the percentage of oxidisable Sulphur (SPOS) was below the relevant action criteria. However, the acid trail (TPA/TSA) was noted to exceed the relevant action criteria in all the samples tested. Based on the TPA/TSA results it is indicated that the soil material has already generated some acid potential within the soil matrix. Based on the results of the SPOCAS testing it was recommended that further analysis for Chromium Reducible Sulphur be undertaken

Chromium Reducible Sulphur

The report indicates that Chromium Reducible sulphur method calculates the potential acidity from analysis of sulphide content. This method does not include sulphur from organics and sulphates (e.g. gypsum) and detects as low sulphide content and is therefore suitable to determine potential interferences caused by naturally occurring acidity within the soils. The laboratory results are presented in Table 65:

Table 65: Laboratory Chromium Reducible Sulphur Test Results

Sample	Depth	Chromium Reducible Sulphur (%)
A1	0.5	<0.02
A2	0.9	<0.02
A3	1.3	<0.02

Benviron advise that the results indicate that no a lack of oxidisable sulphur compounds were detected within the soil on site.

Conclusion

Benviron conclude that "the results of the SPOCAS testing indicated that the existing acid trail is greater than the relevant action criteria. However, the observed soil profile, local geology and topography and the results of samples (chromium test suite) indicates the potential for naturally occurring acidity. Therefore based on the above assessment it has been determined that the site is not impacted by acid sulphate soils in samples taken from the maximum depths tested".

10.9 Groundwater and Contamination Impacts

In order to assess the existing groundwater conditions and any potential for contamination to migrate from the site a Groundwater Assessment was conducted by Benviron in June 2014. The primary objectives of this report were to:

- Assess the nature and extent of any potential groundwater contamination at the site by providing a baseline groundwater contamination status of the site;
- Investigate on and off site groundwater concentration levels and flow directions; and
- Provide background information for the site.

The assessment involved the installation of seven monitoring wells using a truck mounted drilling rig. The wells were designated GW1 TO GW7 (groundwater well) and drilled to depths ranging from 8.0 to 10m BGL. These monitoring wells were situated in locations that would maximise the likelihood of intercepting groundwater across the site (refer Figure 28). During the investigation, ground water seepage was only detected in four wells ranging between 7.0m to 8.0m, with no ground water seepage encountered at GW5-GW7 during the installation.

The Groundwater Assessment confirms that "based on a review of the proposed development and the depths to groundwater it is not expected that the development will intercept any natural groundwater flows within the site including the On-site detention basins (OSD Basin A and B). However it is to be noted that groundwater may be discovered during construction if undertaken during adverse weather or if a significant period lapses between the investigation and construction. Should this happen then further assessment should be undertaken and the Office of Water will be notified and an accurate quantification of the likely take of groundwater will be provided to allow for authorisation from the Office of Water."

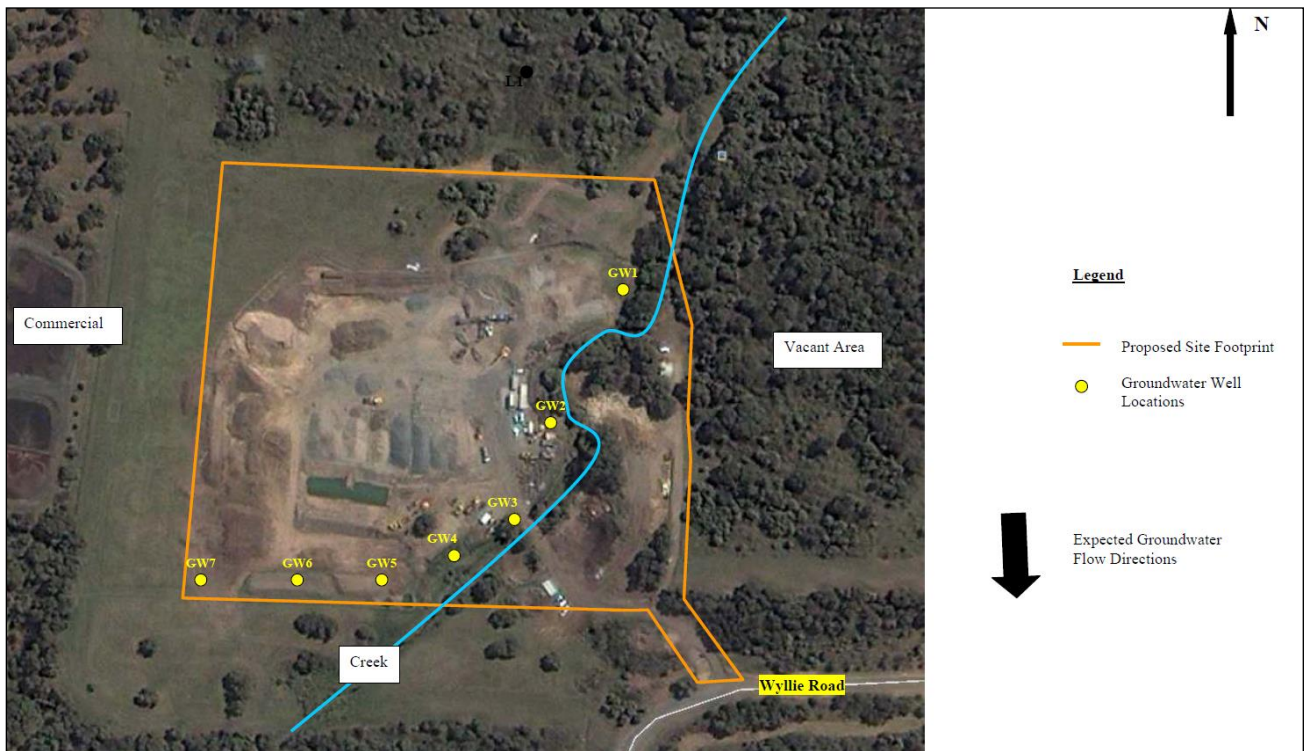


Figure 49: Location of monitoring wells for groundwater assessment purposes

Benviron also note:

- Laboratory results were generally lower than the relevant regulatory guideline criteria adopted with the exception of copper in groundwater wells GQ1-GW4. However the results are not seen to be cause for concern for the following reasons.
- The heavy metal concentrations exceeding the guidelines within the recovered groundwater samples could be expected to be regional water quality as metal results from both samples are similar.
- The attenuation of the sandstone bedrock, being of low permeability, would minimise any impact of the copper contamination;

Hence, the assessment concludes that 'it is considered that the potential for significant contamination of soil and groundwater from current and previous activities within the site is low. However, there is potential for minor contaminant concentrations or localised surface soil contamination in the future during the operation of the site.

Off-site impacts of contaminants in soil are generally governed by the transport media available and likely receptor(s). The most common transport medium is water, whilst receptors include uncontaminated soils, groundwater, surface water bodies, humans, flora & fauna. Migration of soil contaminants to the deeper soils or groundwater regime would generally be via leaching of contaminants from the surface soil or fill, facilitated by infiltration of surface water.

Surface water run-off from within the site would generally be deposited in the stormwater drainage pits and potentially the nearby creek within the site. Based on this reason and the proposed development the potential for migration of contamination via surface runoff is moderate, however, as the site geology is mostly heavy clay any infiltration of contaminants is expected to be low. The potential for significant impact of site soils, if contaminated, on the water bodies collecting surface water run-off from the region is considered low."

Benviron therefore concluded that "the risks to human health and the environment associated with soil and groundwater contamination at the site are low in the context of the proposed use of the site". The site can therefore be considered suitable for the proposed development subject to the following recommendations:

- Development of a Soil and Water Management plan to minimise the amount of surface runoff and potential migration of contamination.
- Engineering of the development working platform to minimise the infiltration of any contaminants into the underlying soils.
- Quarterly testing of the ground water on site to identify any future trends and characterise the ground water within the local area.

Benviron also advise that *"if during any potential site works, significant odours and/or evidence of gross contamination, not previously detected are encountered, or any other significant unexpected occurrence, site works should cease in that area, at least temporarily, and the environmental consultant should be notified immediately"*.

10.10 Analysis of Flood Impacts update

KFW confirm within the Flood Analysis Review (incorporating WSUD) dated June 2014 (Appendix 14) that the area covered by the proposed development is approximately 4.68ha, which represents about 0.6% of the Mullet Creek Catchment. The site is bisected by a watercourse but "other than the immediate area of the watercourse, the site can be classified as flood free". They confirm that the site is not within the floodplain and hence excavation or filling on site will have no impact on flood characteristics within the Mullet Creek Floodplain.

Hydrological Analysis

The critical burst 100 year ARI flood and PMF hydrographs were determined by KFW using WBNM. The rainfall data for Kembla Grange which was obtained from the Bureau of Meteorology is presented below:

- Intensity 2 year 1 hour 46.21 mm/hr
- Intensity 2 year 12 hour 10.24 mm/hr
- Intensity 2 year 72 hour 3.17 mm/hr
- Intensity 50 year 1 hour 97.91 mm/hr
- Intensity 50 year 12 hour 23.01 mm/hr
- Intensity 50 year 72 hour 7.54 mm/hr
- Geographical factor F2 4.28
- Geographical factor F50 15.8
- Regional Skewness factor G 0.00

The report notes that:

- The catchment has an area of 46.9 ha and was determined to be 55% impervious.
- The 90 minute storm burst was found to generate the greatest discharge for the 100 year ARI flood.
- The 15 minute storm burst was found to generate the greatest discharge for the PMF.
- The peak discharge for each ARI is summarized in Table 66.

Table 66 :Peak Discharge Summary

ARI	Critical Duration	Flow Rate (m ³ /s)
100year	90 min	23.45
100 year w/climate change	90 min	31.08
PMF	30 min	59.39

Hydrographs for the 100 year ARI flood, 100 year ARI flood with climate change and PMF are presented in Figure 50. The time series data was used as the inflow boundary conditions for the hydraulic model.

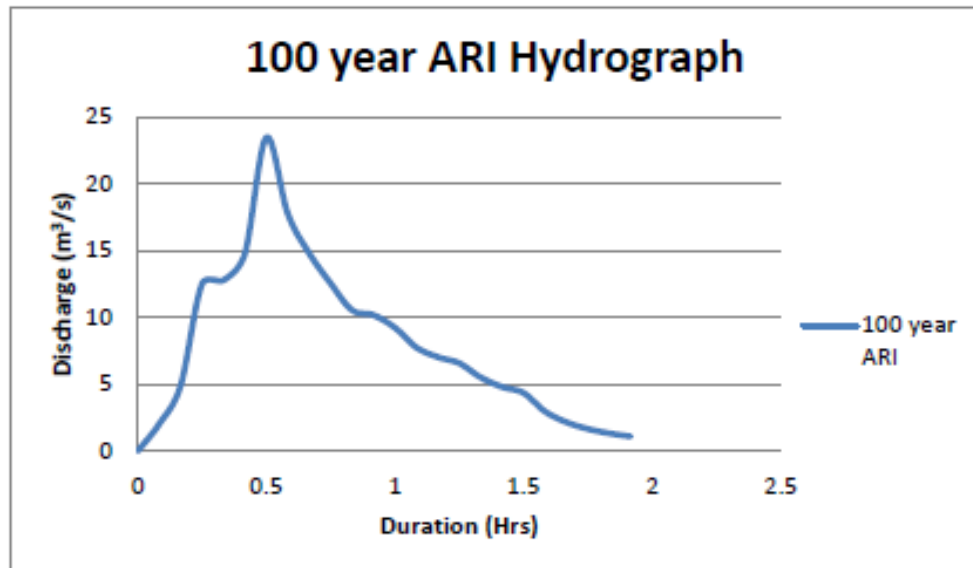


Figure 2.1 – 100 year ARI Hydrograph

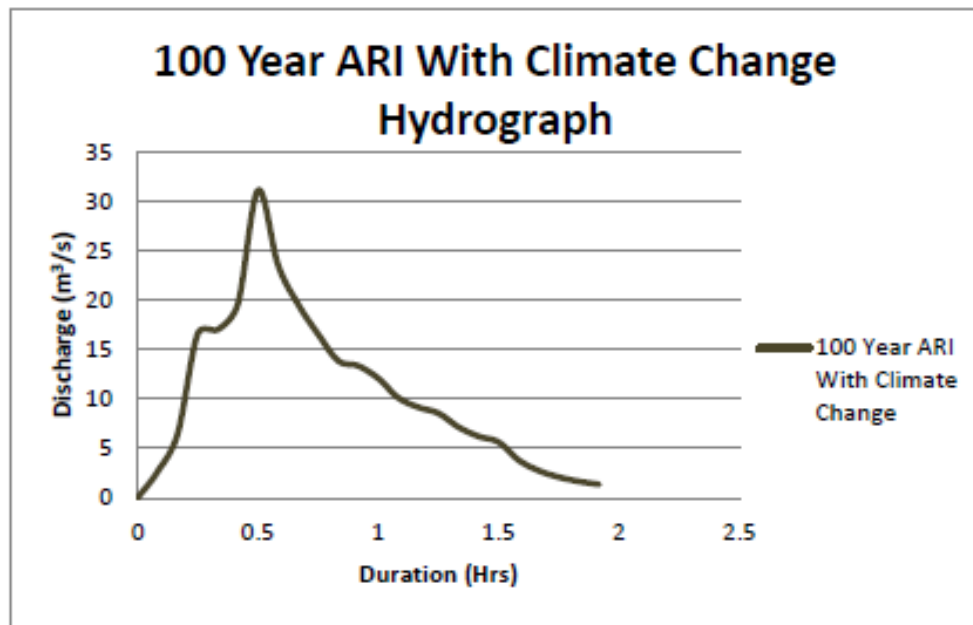


Figure 2.2 – 100 year ARI with Climate Change Hydrograph

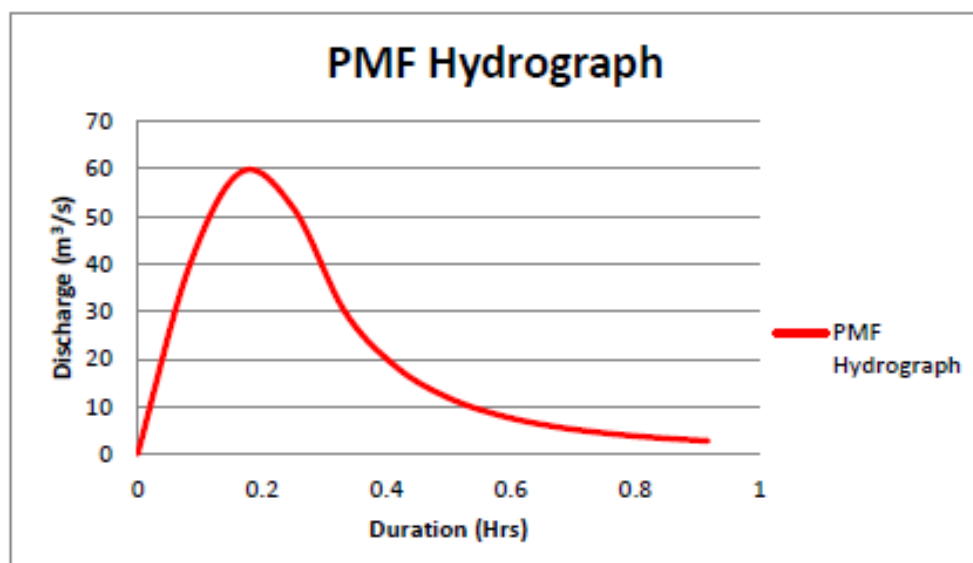


Figure 50: PMF Hydrograph

Hydraulic Analysis

KFW confirm that hydraulic analysis was undertaken using a 2D hydraulic model with a dynamically linked 1D network. Modelling was undertaken using the numerical model TUFLOW. A 3D model of the surface was generated using survey data and is shown in Figure 51. The boundary of the 2D domain is shown as a red line. A 0.5m grid based on the 3D surface was adopted by KFW for the study.

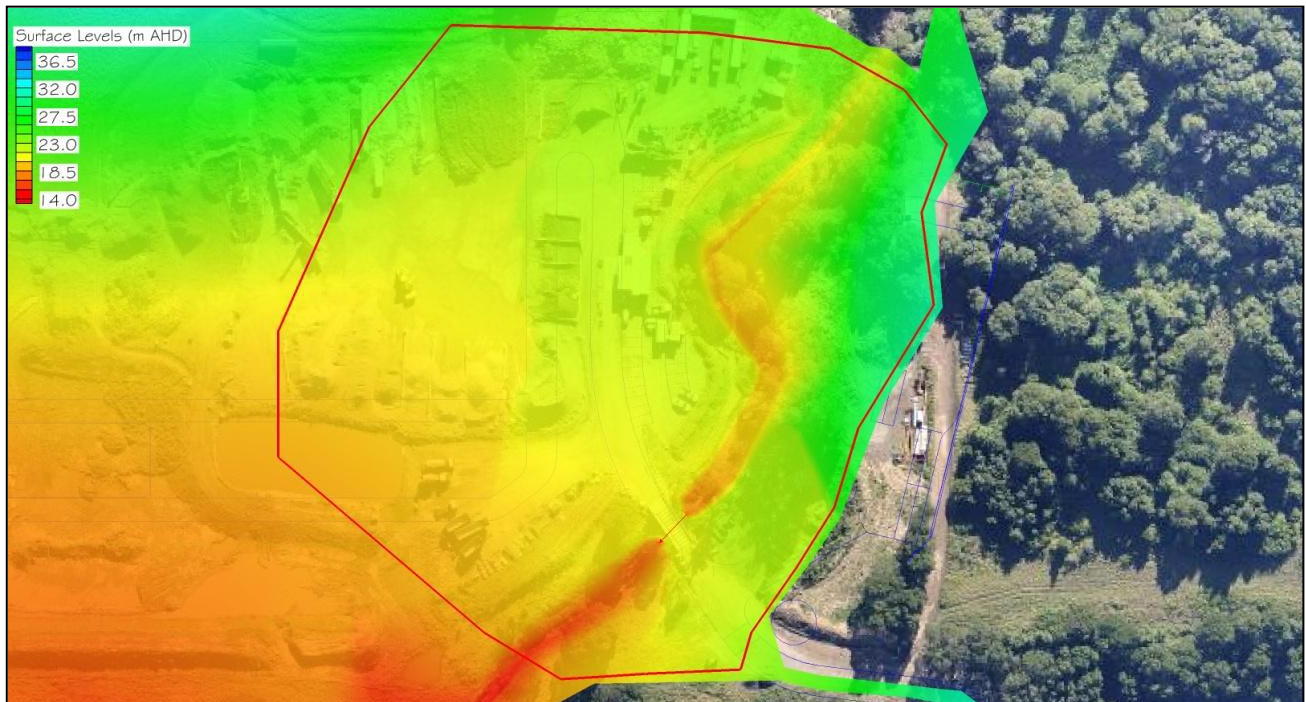


Figure 51: Site Survey and Model Boundary

Manning 'n' values allocated to each material type by KFW are presented in Table 67. Land not allocated to a material was given the default manning 'n' value.

Table 67: Mannings Roughness Values

ID	Coverage	Manning 'n' Value
1	Grass (default)	0.035
2	Channel	0.045
3	Buildings & Storage Areas	0.080
4	Roadways	0.020

The model area has been divided into material types. Material allocations are presented in Figure 51A. The 2D model extent is shown as a red line. There is a natural watercourse traversing the site. The watercourse is moderately vegetated. A manning's value of 0.045 has been adopted by KFW for the channel. The tail water boundary condition has been set as a water surface elevation to flow relationship based on a downstream water surface slope of 1%

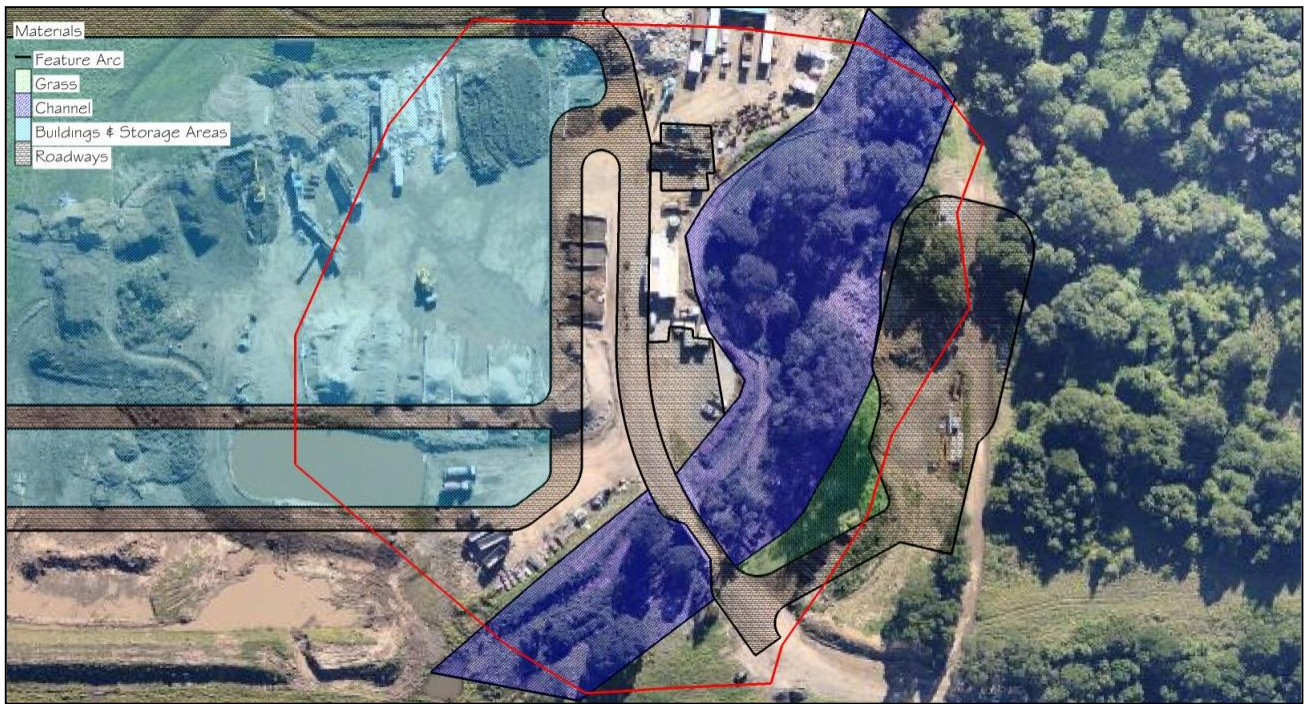


Figure 51A: Material Coverage

Results

KFW confirm that "the flood waters are contained within the channel for the 100 year unblocked scenario. In the 100 year blocked scenario, water will overtop the access road to the south east of the bridge. The overflow is within safe limits and will not cause a hydraulic hazard. The 100 year blocked scenario maintains a safe access to the site. The PMF overtops the banks of the channel upstream of the bridge. Parts of the access road and internal road network experience a high hydraulic hazard during the PMF. The northern portion of the site is flood free for the PMF. The equipment area, indoor processing shed and green waste shredding area are all above the PMF level. Workers who may be on site can seek refuge in these locations until the PMF subsides. It is noted that operations on site are weather dependent and it is unlikely the site will be occupied during extreme weather ..."

Flood Levels

The flood levels are shown in Table 68.

Table 68: Flood Study Comparison (Unblocked)

Section	Flood Study Results Comparison			Comment
	100yr ARI			
	KFW 2009	KFW 2013	KFW 2014	
1	22.79	22.78	22.45	
2	21.11	20.83	21.44	
3	20.21	20.96	20.98	
4	20.22	20.75	20.77	
5	20.01	20.74	20.76	U/S of brdg
6	19.30	18.86	18.72	D/S of brdg

A sensitivity analysis was performed by KFW to determine the effects climate change could have on flooding within the site in the 100 year ARI flood. The rainfall data used to determine the critical 100 year ARI hydrograph has been increased by 30%, in accordance with the Practical Consideration of Climate Change (DECC 2007), to determine what impact this has on flood levels. Table 69 presents the increase in flood water surface levels at certain locations as a result of possible climate change effects.

Table 69: Effects due to Climate Change on Flood Water Surface Levels

Section	100 year ARI Flood Level (Blocked) (m AHD)	100 year ARI Flood Level with Climate Change (Blocked) (m AHD)
1	22.45	22.62
2	21.35	21.73
3	21.39	21.75
4	21.32	21.67
5	21.32	21.67
6	19.22	19.27
7	17.56	17.67

Review

The flood study has applied a 2D analysis with a dynamically linked 1D network and more accurately represented the flooding regime within the site as it uses a digital terrain model. The extent of the 100 year ARI flood and PMF have been compared to flood maps produced for Council's Mullet Creek Extension Flood Study (Bewsher 2011). The Mullet Creek Extension Flood Study is based off a coarse survey grid and is a regional model of flood inundation for Mullet Creek and its tributaries. KFW advise that notwithstanding, the flood mapping produced as part of this flood study is generally in accordance with the Mullet Creek Extension Flood Study flood mapping. This flood study is based off finer survey data and is a more realistic plot of the critical 100 year ARI flood. Similarly, the report confirms that the PMF results presented in this flood analysis are generally in accordance with the PMF results presented in the Mullet Creek Extension Flood Study.

The analysis confirms the following:

- The PMF affects the south eastern portion of the site.
- Part of the stockpile area is inundated during the PMF event. The part of the stockpile that is affected by the PMF is to be used to store material with a minimum particle size of 75mm (refer plan C33 prepared by KFW contained in Appendix 2). The velocity of the PMF is insufficient to affect the stock pile and convey parts of the stockpile downstream. This velocity of the flood water is in the order of 0.25m/s to 0.5m/s within the area of the stockpile.
- The operational area affected by the PMF represents approximately 22% of the site. A relatively narrow section adjacent to the water course is subject to a high hydraulic hazard. The remainder of the site affect by the PMF is a low hydraulic hazard.
- The site provides opportunity for safe refuge and shelter on site well away from PMF affected areas.
- Operations on site are weather dependent. It is therefore highly unlikely that employees or other persons will be on site during a PMF. Safe refuge on site is a satisfactory option.

- The site management plan should ensure that in the event of extreme rainfall all mobile plant and equipment are stored outside the PMF area.
- The Climate Change analysis shows that increasing the rainfall intensity by up to 30% caused the flood level to overtop the channel to the north of the bridge. The overtopping results in minor localised flooding that does not affect the operation of the site nor isolate the site from main roads. The localised section of the entrance road that floods experiences a VxD of less than 0.4 m²/s and is safe for pedestrians and vehicles to cross. The development will not be affected by possible future climate change increases in rainfall intensity. Flooding within the site will not significantly change.

Conclusion

The results of the review confirm that the 2D analysis supports the flood levels utilised in the 1D approach and that climate change has been determined to have insignificant effects on the overall peak after surface elevation during the 100 year ARI flood. The site has safe access during the 100 year ARI flood in both the blocked and unblocked scenarios and provides safe refuge for employees during the PMF. KFW conclude that the proposed development is not affected by flooding up to an including the 100 year ARI as flooding is contained within the existing watercourse in the culvert unblocked condition. Minor overtopping occurs during the culvert blocked condition however KFW confirm that flood waters are within safe limits for pedestrians and vehicles in accordance with the NSW Floodplain Development Manual.

10.11 Water Quality Impacts

A Flood Analysis Review (incorporating WSUD) was prepared by KFW in June 2014 to determine the stormwater detention storage requirements and the water quality treatment required for the development and to determine water sensitive urban design measures which can be implemented. This report notes that the site will contain:

- 2,230m² of buildings;
- 36.088m² of recycled concrete pavement. The pavement will not present as 100% impervious and will allow infiltration;
- 4,662m² of grass;
- 3,428m³ water quality/reuse pond;
- 3 x 100,000 litre rainwater tanks;
- 1,953m³ detention pond (western precinct);
- 235m³ detention basin (eastern precinct).

The report notes that the site is not located in the flood plain and that flooding within the site is confined to and within the watercourse.

Water Sensitive Objectives, Constraints and Opportunities

Wollongong City Council DCP 2009 outlines the following WSUD objectives:

- *To sustainably integrate natural systems with urban development.*
- *To integrate stormwater drainage treatments into the landscape.*
- *To ensure water sensitive urban design treatment measures are incorporated in new developments taking into account stormwater management and floodplain management issues.*

- *To improve the potential for urban run-off reuse.*
- *To minimise the volume of stormwater run-off.*
- *To protect the quality of water run-off from urban development.*
- *To reduce run-off and peak flows from urban developments by local detention basins and minimising impervious areas, wherever practicable.*
- *To preserve, restore and enhance riparian corridors as natural systems.*
- *To minimise the drainage infrastructure cost of development.*

KFW confirms the following in relation to compliance of the stormwater management system in relation to compliance with Chapter E14 of Wollongong DCP 2009:

The site has the following constraints:

- Proximity to existing industrial development,
- Hillside catchment surrounded by existing development which limits the available discharge points.
- The requirement to maintain the 'pre-developed' site discharge.

The site offers the following opportunities:

- Opportunity for rain water harvesting and use for on-site use such as washing equipment, dust suppression, toilet flushing. A combination of 100,000 litre rainwater tanks and a permanent pool will be used.
- Opportunity to use shallow subsoil drainage to enhance rainwater harvesting
- Opportunity to use recycled crushed concrete for road pavement and hard stand areas. Recycled crushed concrete will promote infiltration
- Opportunity to use batter drains to intercept runoff from forested RE2 zone and direct this runoff to the watercourse to eliminate the potential for clean water to be contaminated and reduce the load on SQIDs.

WSUD and Water Conservation measures

Details of the water balance model (MUSIC#) and Water Sensitive Urban Design details are presented in the WSUD Report by KFW dated 17 July 2013. KFW confirm that the proposed development will incorporate the following WSUD Measures.

Measure 1 – Rainwater Capture and Use

Up to three 100,000 litre rainwater tanks will be installed to collect roof water from the larger buildings (workshop and processing shed). The rainwater captured may be used for toilet flushing, dust suppression and equipment washing.

Rainwater from the 100,000 litre tanks can be plumbed into toilets and decanted to the site water tanker for dust suppression. Captured water may be used in the crusher to maintain moisture content and reduce dust.

In addition to three rainwater tanks a permanent pool will be constructed. The permanent pool will have a storage volume of 3,248 m³. The permanent pool is the last 'carriage' in the 'treatment train' and will provide opportunity to use the captured water for dust suppression.

The daily dry weather demand for dust suppression and other site operations is in the order of 40,000 litres/day.

The stormwater system will be designed to divert discharge equal to 25% of the 1 in 1 year flow into the permanent pool.

The results from modelling water reuse in MUSIC# (1963 – 2009) indicate that re-use demand will be met as follows:

Rainwater tanks: meets 82% of demand (500 l/day from each tank site)

Permanent Pond: meets 62% of demand (40,000 l/day)

WSUD Objectives met:

- Urban runoff reuse
- Minimise volume of stormwater runoff
- Reduce run off peak flows
- Minimise drainage infrastructure cost

Measure 2 – Infiltration

Infiltration will be encouraged by use of recycled crushed concrete in road pavements and hardstand areas. Recycled crushed concrete is about 80% impervious and will thus promote a limited amount infiltration and reduce the volume of surface runoff.

WSUD Objectives are met by:

- Minimising volume of stormwater runoff
- Protecting quality of water run off
- Reducing run off peak flows
- Preserving, restoring and enhancing riparian corridors as natural systems by contributing to base flow.

Measure 3 – OSD Systems

Two OSD basins are proposed:

Basin #A will be constructed on the western side of the watercourse and will serve the largest part of the operational area within the site. The volume of Basin #A will be 1,953 m².

Basin #B will be constructed on the eastern side of the watercourse. The volume of Basin #B will be 235 m². OSD Basin #B may be landscaped with trees which have clean trunks in order to ensure continuous riparian vegetation.

The stormwater management system including pits, pipes and OSD capacity generally complies with WCC DCP E14.

WSUD Objectives are met by:

- Minimising volume of stormwater runoff
- Reducing runoff peak flows
- Minimising drainage infrastructure cost

Measure 4 – Hydrocarbon Capture

Two Rocla downstream defenders will be installed in order to capture hydrocarbons (eg oils & grease). One DD1200 unit will be installed immediately upstream of Basin #B in order to treat runoff from the workshop and

truck parking areas. The other DD1200 unit will be installed immediately downstream of the equipment storage area in order to treat runoff from the equipment storage area.

A Humeceptor will be installed immediately upstream of the permanent pool in order to remove hydrocarbons from the operational area. A control pit will be constructed to ensure that discharge up to and including 25% of the 1 in 1 year critical duration storm burst are routed through the Humeceptor.

WSUD Objectives are met by:

- Minimising volume of stormwater runoff
- Reducing runoff peak flows
- Minimising drainage infrastructure cost

Stormwater Management

Details of the stormwater management system are provided in Drawing C31 prepared by KFW. This plan demonstrates the following:

- The development of the site will result in an overall increase in pervious area.
- The proposed OSD system will maintain the post-developed site discharge at or below the pre-developed discharge.
- The OSD system has been analysed using runoff routing methods in order to determine the volume of storage required to maintain site discharge to the pre-developed discharge.
- The proposed OSD system will provide approximately 1,871 m³ of detention storage.
- The OSD system will reduce the post developed site discharge such that the pre-developed discharge is not exceeded.
- The main OSD basin is immediately south of the main operations area. The smaller OSD basin is adjacent to the watercourse.

Groundwater Management

KFW confirm the following in relation to groundwater management:

- Based on the groundwater report dated March 2014 by Benviron, the depth to the groundwater table is 6.5 m.
- The purpose of the sub-soil drainage is to intercept shallow groundwater in order to ensure the operational and working surfaces do not become saturated and untrafficable.
- Groundwater management will involve installing shallow perforated polyethylene sub-soil drainage pipes which will be installed at the invert level of the stormwater drainage collection system.
- The shallow sub-soil drainage system will be installed at a depth typically less than 1.5 m deep.
- The invert level of OSD basin A (Dry Basin) is approximately 1.15 m below the existing surface level and is unlikely to intercept groundwater, other than that which infiltrates through the shallow subsoil drainage mentioned above.
- Runoff entering water quality/recycling pond will be treated by Humeceptor device which will remove oils & grease and sediment. The quality of the water retained will be suitable for processing

and dust control on site. The water quality/recycling pond will contribute to base flow in the watercourse downstream of the site.

- The stormwater system will have no adverse impact on groundwater.

Leachate Management

A Leachate Management Plan for the proposed development has been prepared and is contained in Appendix 2. This plan demonstrates the proposed measures which will be implemented as part of the proposed development to prevent waste leachate and contamination of underlying soils and groundwater at the site. A summary of the proposed measures which will be incorporated into the development is as follows:

Table 70: Summary of Measures to be Implemented to Prevent Waste Leachate

Item	EPA Goal	Minimum Design Requirement
Working Surfaces	To ensure storage areas, active composting surfaces, and associated access roads are constructed to prevent the pollution by leachate of subsoil, groundwater and surface water bodies and to allow all-weather vehicular access to any part of the processing site that needs to be reached by vehicles.	<p>The green waste shredding area will have an impervious concrete or asphalt concrete layer to prevent infiltration from the shredding surface.</p> <p>The green waste shredding area has a perimeter drain to collect and direct runoff to the green waste runoff collection pond.</p> <p>Composting and storage will be undertaken in a weatherproof shed which will have a concrete floor.</p>
Leachate barrier system	To prevent the pollution by leachate of subsoil, groundwater and surface water bodies over the period of time that raw organics or products remain on the premises, beyond the closure of the facility, and until the premises has ceased to pose potential environmental threats.	<p>The green waste shredding area has an impervious layer to prevent infiltration from the shredding surface. The impervious layer will be concrete or asphalt cement (AC) pad of a thickness of at least 100 mm is to be constructed</p> <p>The concrete or AC pavement will be designed for a traffic loading of 1 x 105 ESA. Assuming a CBR of 5, the pavement thickness will be in the order of 340 mm including a minimum of 100 mm concrete or AC thickness.</p> <p>A 100mm concrete or AC layer will withstand the loads from all machines, vehicles and equipment that are required to operate the facility.</p>
Leachate collection system	To ensure that leachate is collected efficiently at the composting and related processing facility for further management, thereby avoiding water pollution and/or odour problems.	<p>The composting process will occur under cover in a weather-proof building and will produce no or at worst a small volume of leachate.</p> <p>The composting process shed will have a concrete floor underlain by a polyethylene membrane in order to prevent leachate infiltration into the groundwater.</p> <p>The compost process leachate collection system will consist of the following:</p> <ul style="list-style-type: none"> - A primary concrete tank with a volume of 5,000 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness. - A secondary concrete tank with a volume of 2,500 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness. <p>The secondary tank will be connected to the primary tank at the level where the primary tank is at 4,000 litre storage (80%) capacity.</p> <p>The primary collection tank will be fitted with a sensor to indicate 75% capacity (ie 3,750 litres. At this point the site manager shall arrange to have the primary tank pumped out by a liquid waste tanker and disposed of at an appropriate treatment facility.</p>

Item	EPA Goal	Minimum Design Requirement
Leachate storage system	To ensure that leachate is stored efficiently at the composting and related processing facility for further management, thereby avoiding water pollution and/or odour problems.	<p>The compost process leachate collection and storage system will consist of the following:</p> <ul style="list-style-type: none"> · A primary concrete tank with a volume of 5,000 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness. · A secondary concrete tank with a volume of 2,500 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness. · The secondary tank will be connected to the primary tank at the level where the primary tank is at 4,000 litre storage (80%) capacity. · The primary collection tank will be fitted with a storage level sensor to indicate 75% capacity (ie 3,750 litres). At this point the site manager shall arrange to have the primary tank pumped out by a liquid waste tanker and disposed of at an appropriate treatment facility. <p>A weekly inspection of the level in the leachate storage tank is to be performed.</p> <p>Six monthly testing of the storage level sensor is to be performed.</p> <p>It is noted that above ground tanks are preferred, however underground tanks are proposed in this case because the composting area is within a weather proof shed which will mean that the generation of leachate will be nil or very small.</p> <p>The composting process will be undertaken in a weatherproof shed. There will therefore be no need to make provision for rainwater inflow to the leachate storage system. It is noted that rainwater from the weatherproof shed will be harvested for use on site for dust suppression.</p>
Surface water controls	To avoid the generation of excessive leachate and to prevent any sediment or pollutants from being carried off the premises.	<p>The surface water controls must at least meet the following requirements:</p> <p>For composting and storage, prevention of surface water mixing with organics will be achieved by undertaking the composting process within a weatherproof building. The building will effectively prevent surface water mixing with the composting material.</p> <p>For green waste shredding prevention of surface water mixing with organics will be achieved by:</p> <ul style="list-style-type: none"> - elevating the green waste shredding area above the internal road system in order to ensure that surface water does not run onto the green waste shredding area. - the internal road and stormwater system is designed to collect and divert surface water away from the green waste shredding area. The internal road has a central V drain in order to ensure that surface water runs away from the shredding area. <p>For composting contamination of runoff will be prevented by undertaking the composting process and storage within a weatherproof building. The building will effectively prevent surface water mixing with the composting material.</p> <p>For green waste shredding handling - treatment of leachate will be achieved by:</p> <ul style="list-style-type: none"> - elevating the green waste shredding area above the internal road system in order to ensure that surface water does not run onto the green waste shredding area. - the internal road and stormwater system is designed to collect and divert surface water away from the green waste shredding

Item	EPA Goal	Minimum Design Requirement
		<p>area. The internal road has a central dish-drain in order to ensure that surface water runs away from the shredding area.</p> <p>For composting the management of surface water generated from the design of a 1-in-10 year, 24-hour-period storm event will not be required because the composting operations are within a weatherproof building. The building will effectively prevent surface water mixing with the composting material.</p> <p>For green waste shredding management of surface water generated from the design of a 1-in-10 year, 24-hour-period storm event will be achieved by minimising the area of green waste exposed to rainfall and ensuring the shredding leachate pond has sufficient volume. As runoff will not be heavily loaded with organic matter, water retained in the green waste shredding pond may be used as a supplementary supply for dust suppression on site.</p> <p>The internal road and stormwater system is designed to collect and divert surface water away from the green waste shredding area. The internal road has a central V drain in order to ensure that surface water runs away from the shredding area.</p>

10.12 Water Balance

The site currently contains a single pond which provides for ODS requirement and for runoff storage. Figure 52 shows the location of the existing pond. The existing pond will be decommissioned as the site is developed and after the new permanent pond is fully or partially constructed. The proposed new permanent pond will be constructed near the southern boundary of the site.



Figure 52: Aerial photo of subject site showing location of existing OSD pond (Source KFW)

The WSUD strategy for the site incorporates a permanent pond together with rainwater tanks to harvest rainwater runoff for use on site. The permanent pond is at the lower end of the site and will store surface runoff from the western portion of the site which has been captured by the pit and pipe system and conveyed to the permanent pond. Overflow from rainwater tanks will be conveyed to the permanent pond via pits and pipes.

In order to remove oils and grease surface runoff will be treated by Downstream Defender units and Humeceptor unit prior to entering the permanent pond. It is noted that a Downstream Defender unit will treat surface runoff from the eastern part of the site. The Humeceptor is immediately u/s of the permanent pond and will treat flow rates up to 25% of the 1 in 1 year ARI discharge (approx 230 l/s). Flow rates exceeding 230 l/s will be diverted directly to the detention basin.

Rainwater captured/stored by the rainwater tanks will have very low concentration of suspended solids and be used for:

- a. Site hygiene (eg toilets, hand washing)
- b. dust suppression
- c. vehicle washdown
- d. water for control of dust in the crusher
- e. reserve of water for dry periods

Runoff stored by the permanent pond will have a low – moderate level of suspended solids and will be used for dust suppression on the site. The applicant estimates 40,000 litres/day will be used for dust suppression.

The Flood Analysis Review prepared by KFW (Appendix 14) confirms that the development of the site will result in an overall increase in pervious area. The OSD system proposed will maintain the post-developed site discharge at or below the pre-developed discharge. The OSD system has been analysed using runoff routing methods in order to determine the volume of storage required to maintain site discharge to the pre-developed discharge. The proposed OSD system will provide approximately 1,871 m³ of detention storage.

Table 71 and Table 72 demonstrate that the proposed OSD system will reduce the post developed site discharge such that the pre-developed discharge is not exceeded.

Table 71: Basin #1 Performance Details

Basin Outflow Details					
ARI Yr	Q _{pre} l/s	Q _{post} l/s	Q _{basin}	Q _{total}	Comments
5	1,790	2,547	1,020	1,730	Critical storm 2h
10	2,180	3,022	1,130	2,010	
100	3,590	4,620	1,400	2,930	

Table 72: Basin #2 Performance Detail

Basin Outflow Details					
ARI Yr	Q _{pre} l/s	Q _{post} l/s	Q _{basin}	Q _{total}	Comments
5	489	496	436	436	Critical storm 2h
10	574	587	511	511	
100	887	953	767	767	

10.13 Biodiversity Assessment

Study Aims:

A Biodiversity Assessment Report was prepared by Conacher Environmental Group in March 2014 (Ref 4039, refer Appendix 16). Consideration was given to environmental impacts associated with water quality degradation, noise and vibration, dust and pollution, groundwater contamination and cumulative impacts. This report also provides an assessment of the potential impacts on native vegetation, riparian habitats and groundwater dependent ecosystems.

Methodology:

A review of literature was conducted and data base searches were undertaken together with site surveys. Flora surveys included the application of the following standard survey methodologies:

- Sampling of 400m² quadrats;
- Sampling of 100m long transects; and
- Targeted meander searches.

Surveys for vertebrate fauna species included the application of the following standard methodologies:

- Diurnal Habitat Search and Area Searches;
- Night Habitat Search and Spotlighting;
- Nocturnal Call Playback surveys;
- Night Watercourse Searches;
- Stag watching;
- Arboreal Elliot Trapping;
- Terrestrial Elliot Trapping;
- Wire Cage Trapping;
- Searches for Scats and Signs;
- Ultrasonic Call Recording; and
- Opportunistic Observation and/or Call Recognition surveys.

Initial walkover surveys identified the presence of three distinct vegetation communities over which flora surveys were stratified. It is considered that further surveys during the flowering period for locally occurring cryptic flora species is not required as the site does not provide suitable habitat for locally occurring cryptic threatened species, such as orchids, which are only identifiable at certain times of the year. The locations of fauna field surveys are shown in Figure 53.

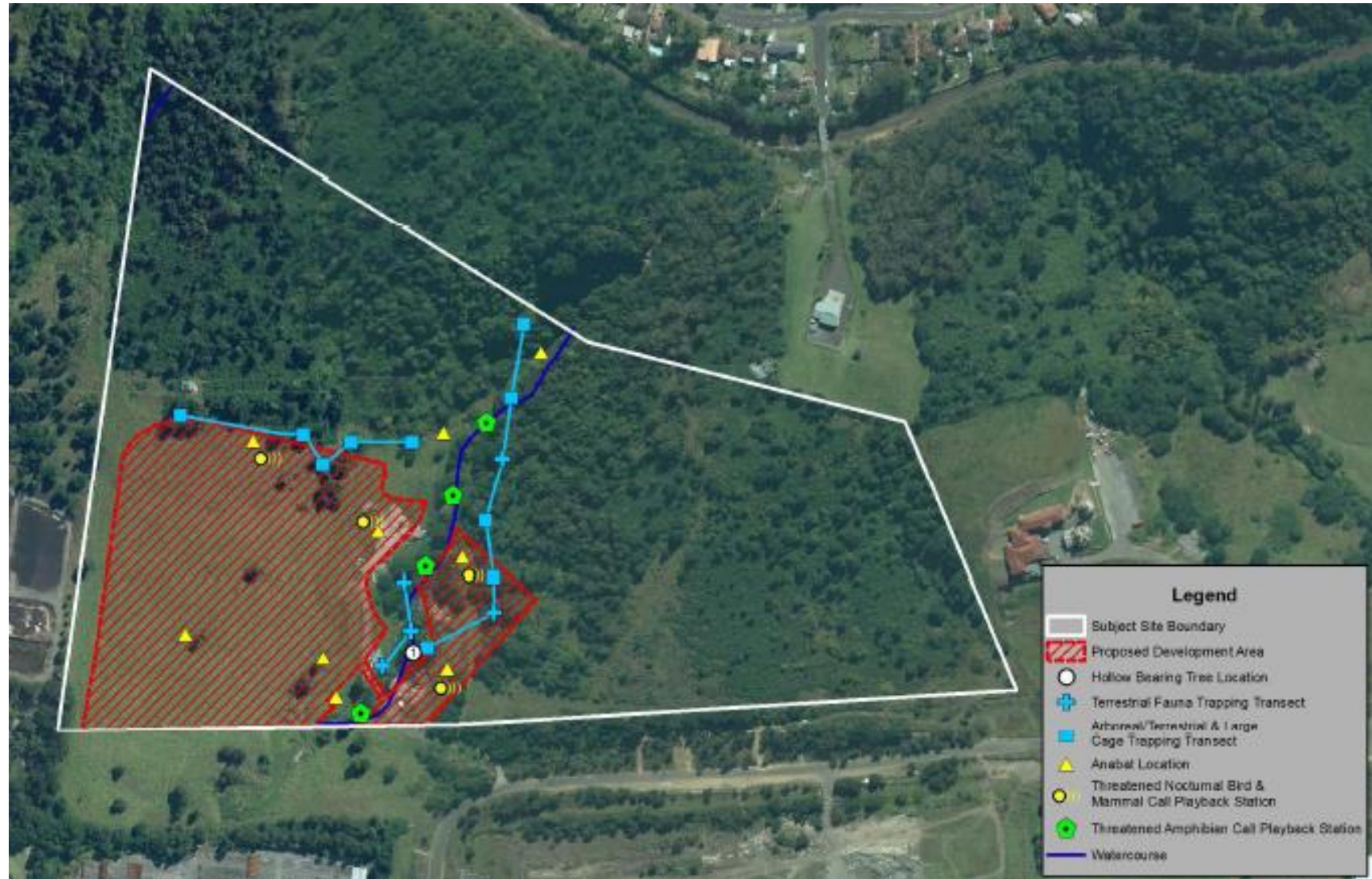


Figure 53: Fauna Survey Locations

The report confirms that the following vegetation communities were observed within the subject site during surveys:

- Regrowth Acacia and Exotic Shrubs: This community occurs within 12.5 hectares of the site within the area which have historically been cleared of vegetation, as shown in Figure 29. This vegetation community is present within the proposed development footprint, including one small patch within the northern section of the footprint area and along the watercourse, which intersects the site. This vegetation community does not correspond to any endangered ecological communities listed within the TSC Act 1995 or EPBC Act.
- Disturbed Subtropical Rainforest, which is listed within the TSC Act (1995) as an endangered ecological community: This community occurs as three small remnant patches of vegetation and occupies approximately 1.5 hectares as shown in Figure 30. A small remnant patch of this community occurs within the proposed development footprint area. The remnant community within the southern section of the site contains one large canopy tree (*Ficus macrophylla*) over a small remnant patch of rainforest type shrubs.
- Disturbed Red Gum Forest: This community occur as one 0.5 hectare remnant patch within the northern section of the site. The distribution of this community is shown in Figure 29. This vegetation community does not occur within the proposed development area. This vegetation community corresponds to the Illawarra Lowlands Grassy Woodlands in the Sydney Bioregion endangered ecological community listed within the TSC Act 1995.
- Cleared Land: Cleared and occurs extensively throughout the proposed development footprint area. But does not correspond to any endangered ecological communities listed within the TSC Act 1995 or EPBC Act.

Vegetation Community locations are shown in Figure 54 :

Fauna Habitats:

The Grey-headed Flying-fox (*Pteropus poliocephalus*), was observed during surveys, this species is listed as threatened within the EPBC Act (1999) and the TSC Act (1995). The Black-faced Monarch (*Monarcha melanopsis*), was observed during surveys, this species is listed as migratory within the EPBC Act (1999). All fauna species observed are considered by Conacher Environmental to be relatively common within the local area. Fauna habitat locations are shown in Figure 55.'

Threatened Biodiversity:

Basin Bioregion and Illawarra Subtropical Rainforest in the Sydney Basin Bioregion, were observed within the subject site during surveys. The Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion EEC corresponds to the Disturbed Red Gum Forest community and the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC corresponds to the Disturbed Subtropical Rainforest vegetation community. The EEC's observed within the subject site are shown in Figure 56.

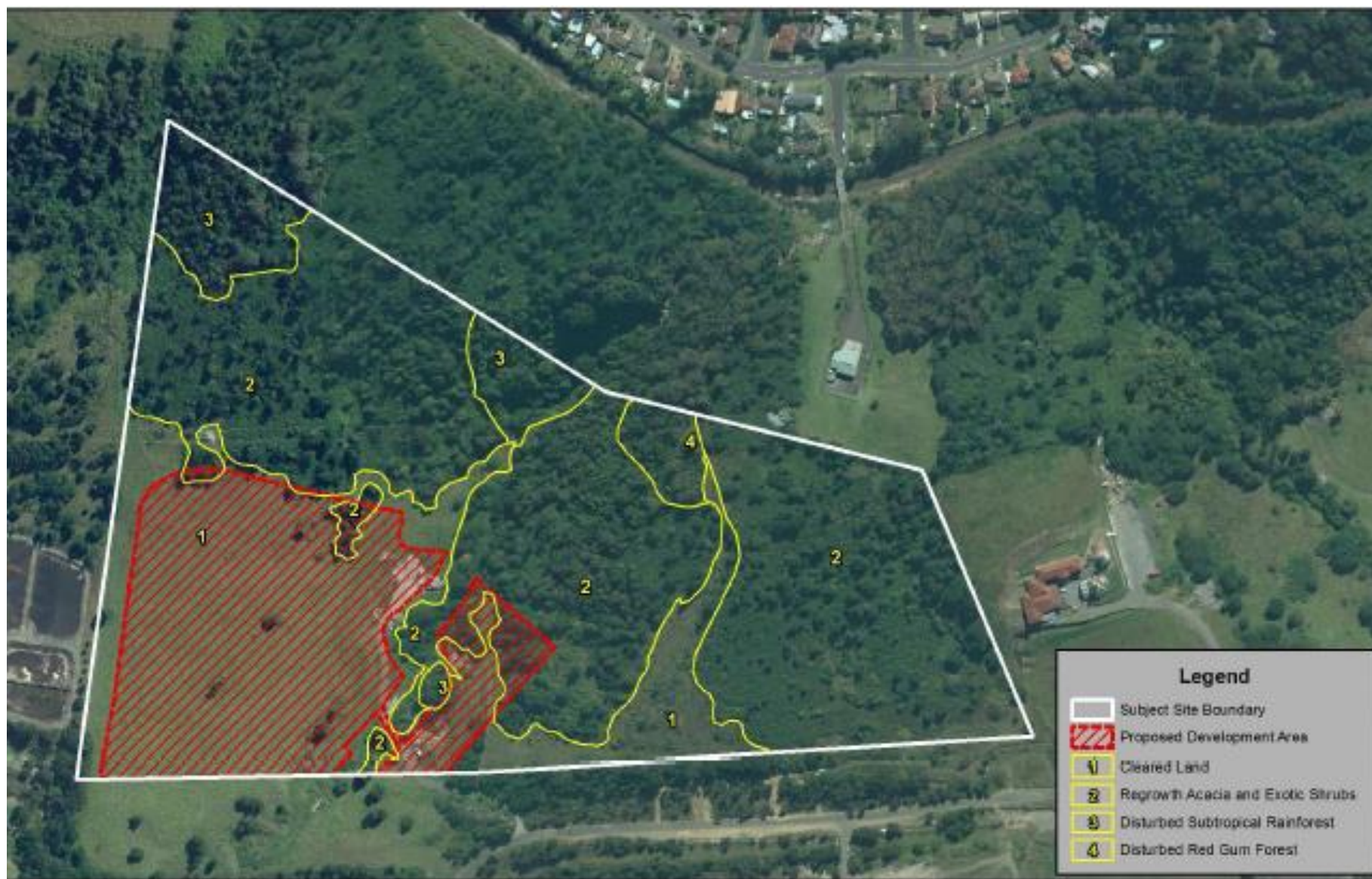


Figure 54: Vegetation Community Locations



Figure 55: Fauna Habitat Locations

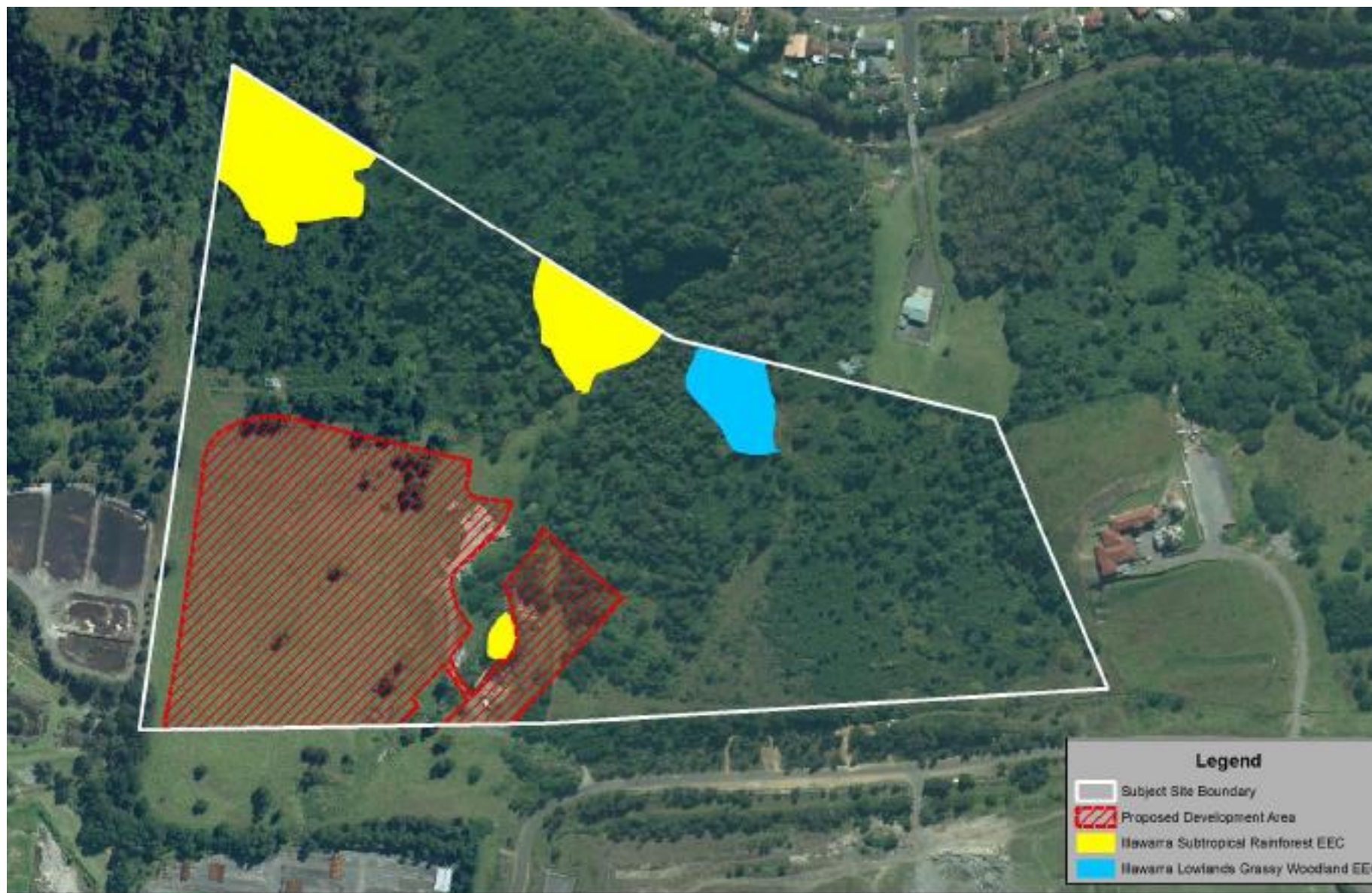


Figure 56: Endangered Ecological Community Locations

Threatened Flora Species

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2014) was undertaken to identify records of threatened flora species located within 10km of the site. No threatened flora species were observed within the subject site during surveys. Two threatened flora species, *Cynanchum elegans* and *Zieria granulata*, have been recorded adjacent to the northern boundary of the subject site on the Bionet Atlas of NSW Wildlife (NSW OEH 2014). These species were not observed within the subject site during targeted surveys.

The threatened flora species which are considered to have suitable or sub-optimal habitat within the subject site are assessed under the 7-part test of significance by Conacher Environmental.

Threatened Fauna Species

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2014) was undertaken to identify records of threatened fauna species located within 10km of the site. The threatened fauna species known to occur or with suitable or sub-optimal habitat present within the subject site are assessed under the 7-part test of significance by Conacher Environmental. The endangered populations known to occur within the local government area are:

- *Chorizema parviflorum* in the Wollongong and Shellharbour Local Government Areas;
- *Lespedeza juncea* subsp. *sericea* in the Wollongong Local Government Area; and
- Woronora Plateau population of *Callitris endlicheri*.

These species were not observed on the subject site. Conacher therefore determine that no endangered population is present on the subject site.

Critical Habitats

The subject site does not contain or adjoin an area classed as critical habitat within the provisions of the Threatened Species Conservation Act (1995).

Listed Migratory Species

The Black-faced Monarch (*Monarcha melanopsis*), was observed within the Disturbed Rainforest Habitats within the central northern areas of the site during surveys. This species was assessed by Conacher in the significance assessments.

Habitat Linkages

Conacher Environmental confirm Identified wildlife habitat linkages which are shown in Figure 57. They also confirm that the "Wollongong Draft Biodiversity Strategy has mapped an expansive biodiversity corridor known as the Escarpment Moist Forests Corridor along the escarpment range and immediately adjacent foothills within the locality. This site and adjoining vegetation however is not included within this area. The site occurs as part of a larger patch of vegetation which extends to the north, north-east and west. These habitat patches are fragmented from habitats further to the north by the Moss Vale Unanderra Railway and adjacent residential development at Farmbrough Heights and by cleared rural-residential and industrial lands to the south. Tenuous connectivity is present to the Illawarra Escarpment, however the width of the vegetation linkage is constricted along the northern boundary of the landfill site which occurs to the west of the site. While the site is connected to larger areas of vegetation associated with the Illawarra Escarpment, the site does not provide a wildlife linkage between substantial habitat patches within the locality. Riparian connectivity is facilitated by the un-named tributary of Gibsons Creek which intersects the site. This tributary is flanked by

cleared land and highly disturbed vegetation, however is likely to provide some freshwater habitat connectivity to Gibsons Creek."

Riparian and Aquatic Vegetation

Conacher confirm that very low levels of in-stream aquatic vegetation occur within the site; aquatic species observed included *Typha orientalis* and *Persicaria decipiens*. High levels of exotic species including *Pennisetum clandestinum*, *Lantana camara* and *Ageratina adenophora* were observed.

Freshwater Fish Species within the Locality

The report also confirms that one protected species, the Australian Grayling, has potential to occur within the locality, no threatened freshwater fish species listed within the FM Act (1994) have been identified as occurring within the locality. Four fish species, the Long-finned Eel, Australian Smelt, Flathead Gudgeon and Striped Gudgeon were observed during fauna surveys.

Groundwater Dependand Ecosystems

The site is located within the region covered by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Source 2011. No high priority groundwater dependent ecosystems are identified within the plan as occurring within 5 km of the subject site. Conacher advise that the following groundwater dependent ecosystem types have potential to occur within 5km of the site:

- Terrestrial vegetation dependant on shallow surface water flows;
- Base flow in streams; and
- Lowland wetlands reliant on groundwater seepage.

Groundwater investigations undertaken within the site identified that the minimum depth to groundwater within the site was approximately 5 metres within the vicinity of the watercourse which intersects the site. Groundwater Dependand Ecosystems within and surrounding the subject site identified on the Groundwater Dependand Ecosystems Atlas (Australian Government Bureau of Meteorology 2014) are shown in Figure 58. Conacher Environmental confirm that "*The Australian Government Bureau of Meteorology (2014) include small patches of South Coast Grassy Woodlands vegetation, commensurate with the Disturbed Forest Red Gum vegetation type. These occur within and adjoining the northern section of the site and have a low to moderate potential for sub-surface groundwater interaction. It is also likely that the Disturbed Subtropical Rainforest community identified within the site has low to moderate potential for subsurface groundwater interaction, as identified within areas further to the north of the site. Areas of South Coast Lowland Swamp Woodland and Coastal Freshwater Lagoon / Floodplain Swamp Forest reliant on sub-surface groundwater and Wetlands reliant on surface expression of groundwater also exist further to the south of the site.*"

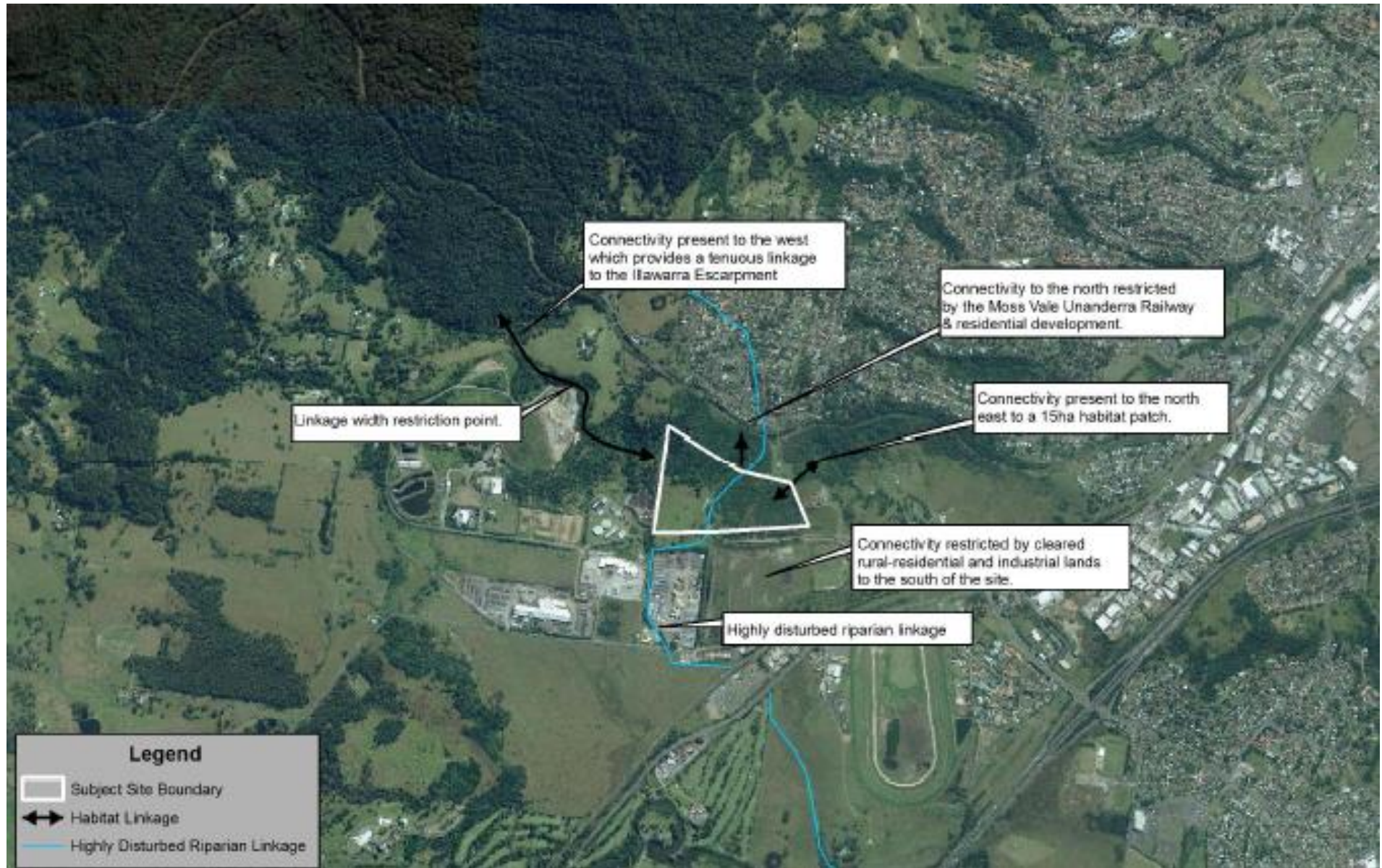


Figure 57: Habitat Linkages

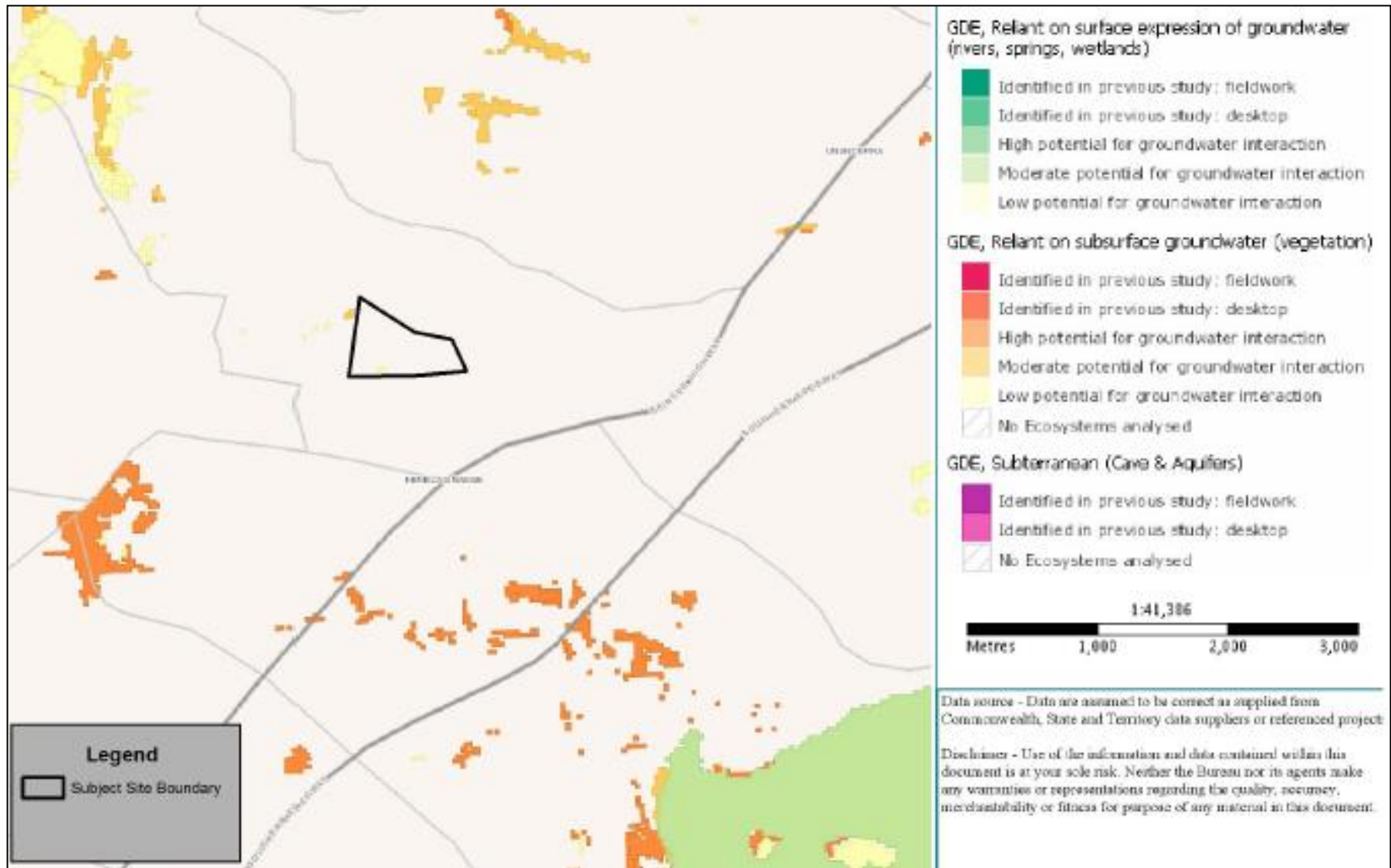


Figure 58: Groundwater Dependent Ecosystems

Evaluation of Biodiversity Impacts

Conacher Environmental confirm the following with respect biodiversity impacts:

- **Loss of Vegetation/Habitats:** The proposed development will occupy the existing disturbed areas of the site within areas which contain Cleared Land and a relatively small area of Regrowth Acacia with Exotic Shrub vegetation. The occurrences of Disturbed Subtropical Rainforest and Disturbed Red Gum Forest present will be retained within the site. A summary of the proposed vegetation clearing is provided in Table 73.

Table 73: Summary of Proposed Vegetation Clearing

Summary of Proposed Vegetation Clearing				
Vegetation Community	Total Area	Area to be cleared (ha)	TSC Act	EPBC Act
Disturbed Subtropical Rainforest	1.5	0	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	Not listed
Disturbed Red Gum Forest	0.5	0	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Not listed
Regrowth Acacia and Exotic Shrubs	12.05	0.45	Not listed N/A	Not listed N/A
Cleared Land	2.4	4.9	Not listed N/A	Not listed N/A

- **Habitat Fragmentation and Isolation:** The proposal is not likely to significantly alter connectivity for wildlife within the subject site or locality as the development footprint will be located within mostly existing cleared areas. The existing level of connectivity along the watercourse which intersects the development site will be maintained and improved in accordance the Vegetation Management Plan prepared for the site by Southern Habitat (2013).
- **Fauna Injury and Mortality:** There is potential for injury or mortality to fauna species to occur during site clearing and operation from collisions with vehicles and plant machinery. Injury and mortality to fauna species during the site clearing phase will be minimised through the retention of hollow bearing trees within the site. Potential fauna injury and mortality impacts during the site operation phase are likely to be only minor and mostly unavoidable.
- **Exotic Flora Species:** The site currently contains high levels of weed species. It is considered that the proposal is not likely to significantly increase the presence of distribution of weeds within the site, however there is potential for weeds to be spread by earth moving machinery entering and leaving the site during the construction / site clearing and site operational phases. Cleaning of plant machinery will be undertaken prior to entering or leaving the site. Exotic flora will be management within the riparian areas of the site in accordance with the Vegetation Management Plan prepared for the site by Southern Habitat (2013).
- **Pests and Pathogens:** Introduction of pests and pathogens is not likely to occur as a direct result of the proposed development. If pests or pathogens are inadvertently introduced to the site the will be management in accordance with industry best practice guidelines.

- Hydrology and Aquatic Habitats: Without suitable management measures the proposal has potential to result in the following impacts to the existing hydrological conditions and associated aquatic habitats; Increased sedimentation of aquatic habitats; Contamination and pollution of aquatic habitats; and Modification of the existing water flow regimes. These impacts are proposed to be managed through rapid revegetation and/or stabilisation of disturbed areas, compaction of the works areas, diversion of stormwater and runoff from the processing and stockpile areas of the site to a water quality / recycling pond and provision of chemical spill kits to prevent and minimise pollutants contaminating aquatic habitats. A 10 metre vegetated riparian corridor will also be retained and managed as a buffer between the development and the watercourse which intersects the site.
- Groundwater Dependent Ecosystems: The Groundwater Dependant Ecosystems Atlas (Australian Government Bureau of Meteorology 2014) has identified that small patches of South Coast Grassy Woodlands vegetation, commensurate with the Disturbed Forest Red Gum vegetation type observed within and adjoining the northern section of the site has low potential for sub-surface groundwater interaction. Areas of South Coast Lowland Swamp Woodland and Coastal Freshwater Lagoon / Floodplain Swamp Forest reliant on sub-surface groundwater and Wetlands reliant on surface expression of groundwater also exist further to the south of the site. Groundwater investigations undertaken identified that the minimum depth to groundwater within the site was approximately 5 metres within the vicinity of the watercourse which intersects the site. The proposal will not require direct clearing of groundwater dependant ecosystems and is not likely to result in extraction or contamination of available groundwater. To prevent potential infiltration of groundwater with contaminants, the works area will consist of a base of compacted road base over compacted clay and chemical spill kits will also be utilised on the site.
- Noise, Vibration and Light: The site and surrounding area is currently subject to noise and vibration associated with the current use of the site as a resource recovery facility. These impacts will continue to be managed through the use of machinery that complies with noise and / or vibration standards and restriction of works to standard working hours. Light impacts are likely to be limited to existing highly disturbed edge habitat areas. Light impacts from vehicles will generally be restricted to working hours.
- Dust and Pollution: The generation of dust and pollution has potential to affect the metabolic function of native vegetation and suitability of the habitats for and health of fauna species present. There is potential for dust and pollution generation during the construction and operational stages of the proposed development. Dust and pollution impacts will be limited by suppressing raised dust through compaction of the works area surface and installation of a sprinkler system to dampen and suppress dust. Revegetation and/or stabilisation of disturbed areas following construction and the maintenance of all machinery to meet emission standards will also be undertaken. There is also potential for the contamination and degradation of natural areas of the site with gross pollutants and liquid pollutants during the construction / site clearing phase and the operation phase of the proposed development. Suitable management measures such as the provision of spill kits and prevention and removal of wind-blown rubbish will be undertaken

Cumulative Impacts

Conacher Environmental confirm that *"the proposal is likely to have a minor contribution to the cumulative loss and/or modification of vegetation and fauna habitats within the local area, however the site is currently*

utilised as a resource recovery facility, and the expansion of these activities within the site is considered not likely to have a substantial cumulative impact within the region or locality". The following key amelioration and impact avoidance measures are proposed:

- Retention of remnant intact native vegetation / endangered ecological communities;
- Retention of hollow bearing trees;
- Installation of protective fencing for retained vegetation;
- Retention and management of a 10 metre wide vegetation riparian corridor as a buffer "between the development and the watercourse which intersects the site in accordance with the Vegetation Management Plan prepared by Southern Habitat (2013);
- Revegetation of disturbed batters and landscape areas with native flora species;
- Removal of foreign vegetative matter from earth moving machinery prior to entering vegetated areas of the site;
- Rapid revegetation and/or stabilisation of disturbed areas;
- Diversion of stormwater and runoff from the processing and stockpile areas of the site to a water quality / recycling pond;
- Provision and use of chemical spill kits and compaction of the works area with road base and clay to prevent potential contamination of groundwater and aquatic areas;
- Maintenance of machinery to comply with exhaust noise and vibration standards;
- Adherence to approved hours of operation / works;
- Suppression of raised dust through installation and use of a sprinkler system; and
- Prevention and removal of wind-blown rubbish.
- Suppression of raised dust through installation and use of a sprinkler system; and
- Prevention and removal of wind-blown rubbish.

Significance Assessments

Conacher Environmental also confirm that "Significance assessments were undertaken for biodiversity listed within the EPBC Act (1999), the TSC Act (1995) and the FM Act (1994). These assessments determined that the proposal is not likely to have a significant impact on a Matter of National Environmental Significance according to the criteria provided in the AGDE (2013) Significant Impact Guidelines or a significant impact on threatened species, populations or ecological communities or their habitats in accordance with Section 5A of the EP&A Act (1979). Further assessments and/or approvals under State Environmental Planning Policies 14, 19, 26 or 44 are not required. It is considered that the proposal will maintain or improve biodiversity values within the site and locality with regard to native vegetation and habitats, aquatic habitats and groundwater dependant ecosystems."

10.14 Riparian Corridor Management

The Vegetation Management Plan (VMP) was prepared by Southern Habitat in June 2014 to provide the guiding documentation for the site's rehabilitation in accordance with the legislative framework and guidelines from the Office of Water and to provide the agreed basis for the restoration of the subject site. This report addresses conditions 2, 3, 4, 5, 6, 7 and 18 of DA 2009/1153 dated 29 April 2010, which required the preparation of a VMP to address the management of a riparian corridor consisting of a 20 metre wide treatment zone (ie. 10m from each bank). The riparian corridor consists of a surface area of 3700m² and

encompasses a 185 lineal metre section waterway extending from the interface of the zone boundary to the southern boundary of the property.

The VMP recommend the use of plant species to complement the existing assemblage of species on the site with reference to the noted vegetation communities. Southern Habitat anticipate that the overall planting composition density within the CRZ will be 0.7 units per m² and once combined with the existing native vegetation will increase to 1.5 units per m². Planting density within the CRZ will be concentrated throughout canopy breaks and throughout open grassy areas of the site with the aim being to reinstate coverage along the corridor.

Southern Habitat advise that a minimum of two (2) years is to apply to the maintenance of the subject site in order to meet Condition 6 of Development Consent 2009/1153 (Office of Water) requirements for the rehabilitation of the site. The maintenance period shall commence following completion of primary weed control and revegetation through the corridor. Maintenance activities will focus on the prevention of secondary weed invasion, the protection and consolidation of tubestock through the CRZ.

A monitoring program will provide an objective measurement of any changes to the site at a species, population and community level. Monitoring should provide both qualitative (visual) and quantitative (statistical) assessment of the site. Performance indicators were established for this project to ensure that the recommended performance of works and strategies are achieved. Both qualitative and quantitative assessment of the floristic value of the site would be assessed at the recommended intervals. Performance indicators for the subject site are described in Table 24 below:

Table 74: Performance Criteria

	Performance Indicator	How it is measured
Weed Control through CRZ	95% Eradication of all identified weeds within the subject area.	Using the weed species audit in this report as a baseline data, undertake a similar audit at the 1 month after completion of weed control throughout subject area to ensure performance indicator is met.
Successful installation of all revegetation tubestock.	Recommended plant material installed at prescribed densities and compositions.	Review of daily planting summaries. Random plot sampling (minimum of 6 samples consisting of 10 metres x 10 metres).
Successful establishment of revegetation material	95% survivorship across whole of site.	6 monthly inspections to determine percentage loss. Random plot sampling (minimum of 6 samples consisting of 10m x 10m).
Continued reduction and control of weeds throughout subject site.	Continued control and control of all weed species with CRZ to a maximum of 3% weed cover.	Using the weed species audit in this report as baseline data, undertake a similar weed species audit at the 12 month interval to ensure that the number of weed species has reduced to a maximum of 3% of weed cover.

Southern Habitat also recommend that the extent of the Illawarra Subtropical rainforest (EEC) which has been identified in the Biodiversity Assessment Report, and which is to be retained, be identified prior to works commencing and erection of a standard three strand wire fence around the extent of this vegetation be undertaken to indicate and protect this particular remnant. A buffer zone of 5m shall apply within this fencing of approx 140m².

Southern Habitat conclude that "if adopted, the recommendations made within this report will dramatically improve the health of vegetation along this remnant of bushland and contribute to the positive contribution for the operators of the industrial facility on the site".

Section 7.3.12 of this EIS details the works which have been undertaken to date in accordance with this VMP. The revised VMP also contains an updated Restoration Plan and costing.

10.15 Bush Fire Protection Assessment

A Bushfire Protection Assessment was prepared by Eco Logical Australia Pty Ltd in July 2014 (Appendix 18). This bushfire report outlines recommendations for subject buildings on the site, including the workshop, offices and OH&s training room, the location of which is shown in Figure 59.

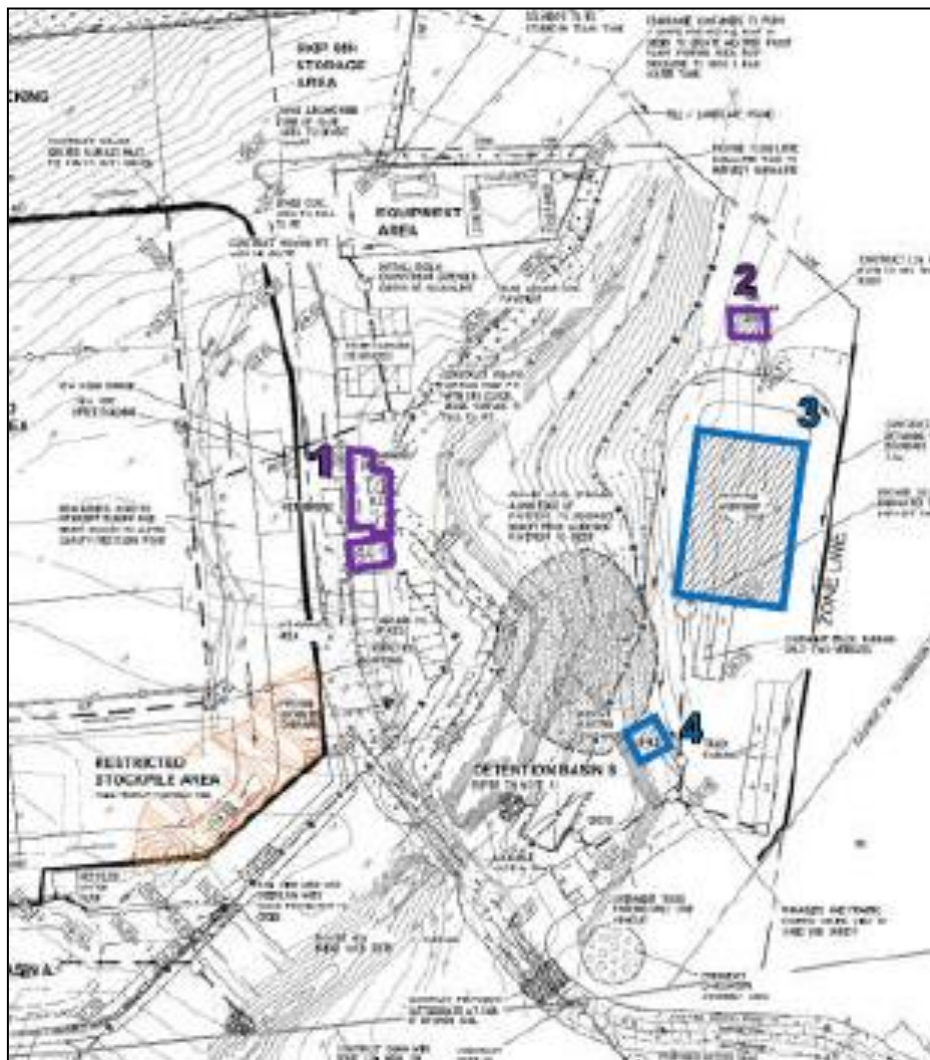


Figure 59: Layout of Proposed Development (showing building references as contained in Bushfire Protection Assessment)

Vegetation Type and Slope:

In accordance with the “*Planning for Bushfire Protection*” (RFS 2006), the predominant vegetation class has been calculated for a distance of at least 140m out from the development and the slope most significantly affecting the behaviour has been determined for a distance of 100m in all directions.

It has been identified that the bushfire prone vegetation influencing the development is a proposed riparian corridor and forest vegetation. The riparian corridor which runs between the existing building 1 and the existing building 2 and the proposed buildings 3 and 4, forms a 40m wide strip allowing it be categorised under PBP as “*Low hazard.*”

APZ and BAL Assessment:

Table 75 below lists the available APZ and corresponding BAL based on the vegetation and slope assessment contained in the Ecological report.

Table 75: Threat Assessment, APZ and Category of Bushfire Attack

Direction from envelope	Slope ¹	Vegetation ²	Proposed APZ	AS3959 Construction Standard ³	Comments
Building 1 East	Upslope/Flat	Low Hazard	16m	BAL-19	The proposed APZ will partially occur in the riparian corridor which will need to be offset elsewhere along the corridor.
Building 2 West	Downslope 0-5°	Low Hazard	15m	BAL-29	
Building 2 North	Upslope/Flat	Forest	20m	BAL-40	Some clearing required
Building 2 East	Upslope/Flat	Forest	20m	BAL-40	
Building 3 West	Downslope 0-5°	Low Hazard	15m	BAL-29	APZ in place no clearing required
Building 3 Southwest	Downslope 0-5°	Low Hazard	15m	BAL-29	
Building 3 East	Upslope/Flat	Forest	20m	BAL-40	Proposed earthworks and landscaped batter will provide APZ
Building 3 Northeast	Upslope/Flat	Forest	20m	BAL-40	
Building 4 Northwest	Downslope 0-5°	Low Hazard	2m	BAL-FZ	Defendable space can be achieved
Building 4 Southwest	Downslope 0-5°	Low Hazard	15m	As above	APZ in place no clearing required
Building 4 Northeast	Upslope/Flat	Forest	50m	BAL-40	Proposed earthworks & landscaped batter will provide APZ
All other directions	Managed Lands				

This table confirms that additional APZ establishment through clearing and offsetting of vegetation in the riparian corridor for 16m to the east of Building 1 and 15m to the west of Building 2 is proposed. Clearing is proposed as part of earthworks to the east of Buildings 3 and 4. Building 4 can provide minimal APZ due to its proximity to a tree protection zone and as such can provide a minimum defendable space of 2 metres. The report recommends:

Construction Standard:

- Building 1 is subjected to BAL-19 and should meet the requirements for windows, doors, screening, decks and stairs as per Section 6 of AS 3959-2009.
- Building 2 is subject to BAL-40 and should meet the requirements for windows, doors, screening, decks and stairs as per Section 8 of AS3959-2009.
- The proposed external construction materials for Building 3 are to withstand BAL-40 intensities, subject to the recommendations of the report to ensure building survival.
- The proposed external construction materials for Building 4 are such that they are expected to withstand flame zone intensities subject to the recommendations of the report to ensure building survival

Water Supply:

Ecological recommend that either a water supply main application to Sydney Water be accepted and fire hydrants installed to the development will need to be serviced by a static water supply to meet the PBP requirement for a minimum amount of 20,000 litres for fire fighting purposes. This supply does not need to be dedicated for fire fighting but can double as the potable water supply or other use such as irrigation.

Gas and Electrical Supplies:

Ecological confirm that electricity should be underground where feasible and any gas service should be installed and maintained in accordance with AS/NZS 1596:2008.

Access:

The proposed perimeter loop road leading from Wyllie Rd complies with PBP and no additional provisions are required.

10.16 Vehicle Movements

A revised Traffic Impact Statement was prepared by KF Williams and Associates Pty Ltd in September 2014 (Appendix 18).

Existing Roads:

The site has direct access onto Wyllie Rd. Wyllie Rd is a long cul- de-sac which connects West Dapto Road to the site, adjacent industrial land, recreational land and Wollongong Lawn Cemetery. Wyllie Rd has a 7m bitumen pavement with grass verges with the posted speed limit being 80km/hr. Wyllie Rd has been widened to a 12.8m pavement, whilst West Dapto Road is a main through road with 3.3m wide lanes in either direction and a 1.7m to 2.3m wide sealed shoulders.

A traffic count undertaken by Wollongong Council in July 2012 indicated an AADT (7 days) of 4189 vehicles. the Princes Highway, at the intersection with West Dapto Road has an approximate AADT of 14,000 vehicles, with the intersection currently being upgraded with traffic lights and right turn/left turn lanes being added.

Existing Traffic Generation

Given that the upgrading of the road network is unlikely to occur before 2036 the Traffic Impact Statement focuses on the impact of traffic flows on the existing road system. The report notes that the majority of land

served by Wyllie Rd is presently undeveloped. Present traffic generation is restricted to the existing recycling centre, Wollongong lawn cemetery/religious centre and small playing field.

The current re-cycling facility employs 8 people and caters for 30,000 tonnes per annum. The centre operating hours are 6am-6m Monday to Saturday. The majority of material is processed Monday to Friday, with Saturday only accounting for 25% of the daily production rate. Current deliveries/sales are estimated to be 80% from the north (Wollongong/Northern Suburbs) and 20% from the south (Dapto/Shellharbour). The report confirms that 10% of loads will be delivered via utilities or trailer (0.5t loads); 20% with single unit trucks (1.0t to 8t loads) and 70% via large trucks/truck/dog combinations/semi trailers (ie. 12t to 30t loads). Vehicle generation from the Wollongong Lawn Cemetery would be concentrated in platoons with average 10/15 vehicles at a time. The current estimated AADT for Wyllie Road is 500 vehicles which includes the current development.

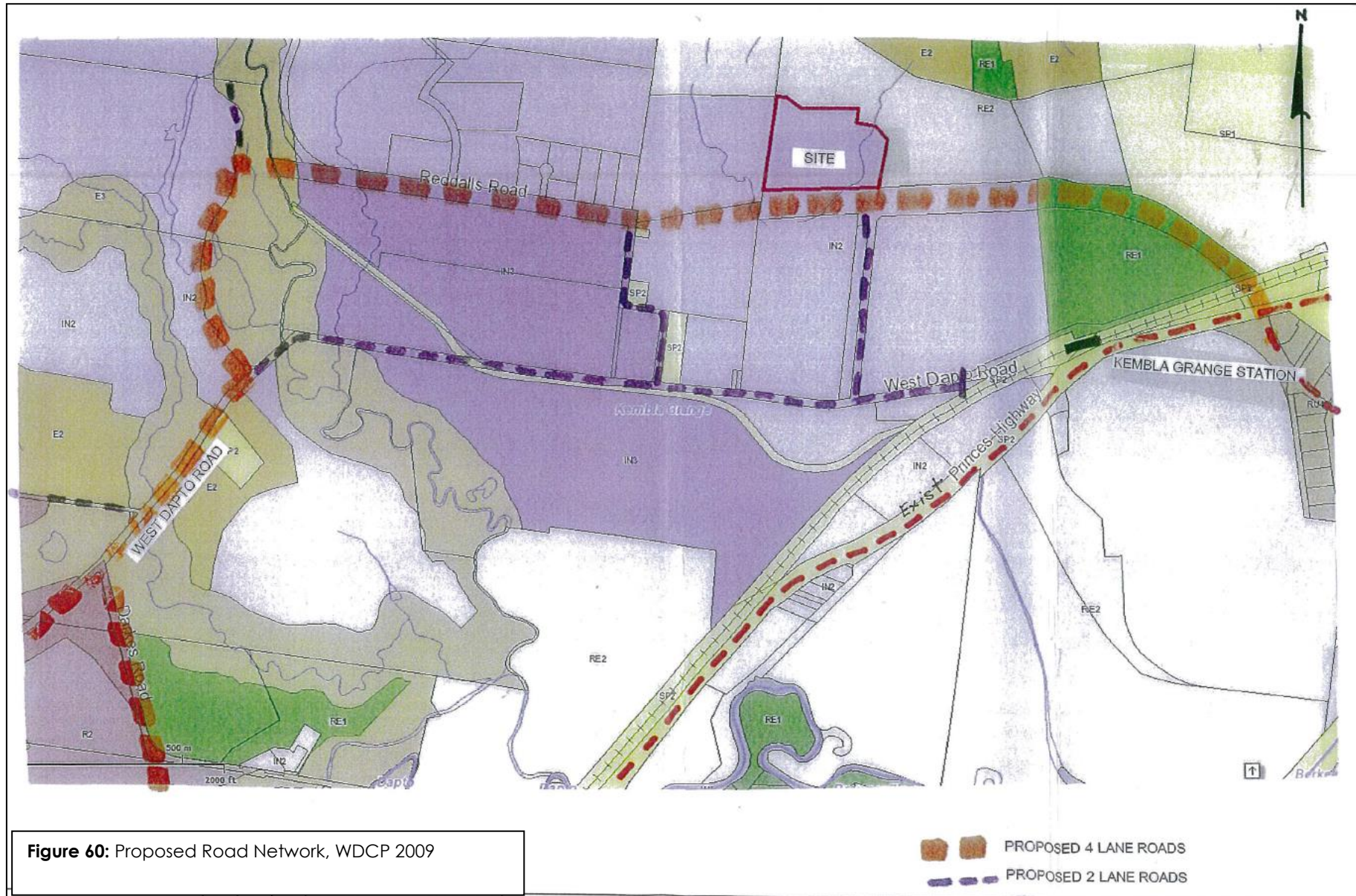
Table 76 sets out the existing traffic generation from the existing recycling facility.

Table 76: Existing Traffic Generation (30,000 tonnes per annum)

30,000/pa-Traffic Generation/Weekday ie. 120t/days			
Description General	Vehicle Types	Number	Total Equivalent Movements
Employees 8	Standard Car	4	8
Visitors 4	Standard car	4	8
Machinery/deliveries	Single unit Trucks	4	12
Material Delivery	Standard car/utes	24	48
		6	18
		6	48
Material Sales	Standard car/utes	24	48
	Single unit Trucks	6	18
	Trucks/Dogs	6	48
		Total	260/day

West Dapto Release Area - Future Road Upgrading

The Traffic Impact Statement prepared by KF Williams and Associates Pty Ltd in March 2014 addresses both the existing and future road network and infrastructure. The site is located at the northern edge of the West Dapto Release Area, with an extract of Wollongong Development Control Plan 2009 (Chapter D16) contained in Figure 60 .



The report notes that the intersection of West Dapto Road and the Princes Highway is currently being upgraded. Further, as the intersection becomes saturated and begins to impact on the adjacent railway crossing Wylie Road will be upgraded to 2 lanes in either direction and will be extended to meet Northcliffe Drive. The timing of this is unknown but is estimated to be in place by 2036. Council data predicts that Wylie Road at this time will have an AADT of 24,989 vehicles. Wylie Road will become the future northern link into the West Dapto release area.

Predicted Traffic Generation

KFW estimate that tonnage rates for Saturday are generally 25% of the Monday to Friday rates. Cartage volumes are based on the following distributions:

10% - 0.5t loads (ie utilities/trailers)

20% - 1.0 to 8tonne loads (single unit truck)

70% - 12t to 30t loads (large trucks/truck/dog combination/semi trailers).

Table 77 outlines the predicted traffic rates when production increases to 100,000 tonnes:

Table77: Predicted Traffic Generation (100,000 tonnes per annum)

100,000Tonnes/pa-Predicated Traffic Generation/Weekday i.e. 379t/day			
Description	Vehicle Type	Number	*Total Equivalent Movement
General			
Employees 18	Standard Cars	9	18
Visitors 8	Standard Cars	8	16
Deliveries	Single Unit Trucks	6	18
Material	Standard car/utes	76	76
Delivery	Single unit/truck	25	38
	Truck/Dogs	18	72
Material Sales	Standard car/utes	76	76
	Single unit Trucks	25	38
	Truck/dogs	18	72
		Total	424/day

*Total Standard vehicles equivalent numbers based on: Car/Utility/Car Trailer = 1, Single axel truck =1.5, Truck/Dog or semi =4

The total daily traffic generation in standard vehicle unit equivalents is 424t/day. Based on 10% peak hour rate this is 42 vehicles/peak hour. Table 78 outlines the predicted traffic rates when production increases to 150,000 tonnes:

Table78: Predicted Traffic Generation (150,000 tonnes per annum)

150,000Tonnes/pa-Predicated Traffic Generation/Weekday i.e. 595t/day			
Description	Vehicle Type	Number	8Total Equivalent Movement
General			
Employees 18	Standard Cars	13	26
Visitors 8	Standard Cars	12	24
Deliveries	Single Unit Trucks	8	24
Material	Standard car/utes	114	114
Delivery	Single axel/truck	38	57
	Truck/Dogs	26	104
Material Sales	Standard car/utes	114	114
	Single axel Trucks	38	57
	Truck/dogs	26	104
		Total	894/day

The total daily traffic generation in standard vehicle unit equivalents is 624/day. Based on 10% peak hour rate this is 62 vehicles/peak hour.

The predicated traffic generation rates are shown in Table 79 when production increases to 230,000 tonnes per annum.

Table 79: Predicted Traffic Generation (230,000 tonnes per annum)

230,000 t/pa- Predicted Traffic Generation/Weekday – i.e. 910t/day			
Description	Vehicle Type	Number	*Total movement equivalent
General Employees 40	Standard cars	20	40
Visitors 16	Standard cars	16	32
Deliveries	Single Unit Trucks	12	36
Material delivery	Standard car/utes	174	174
	Single unit truck	58	87
	Truck/Dogs	40	160
Material sales	Standard car/Utes	174	174
	Single unit trucks	58	87
	Truck/dogs	40	160
		Total	950/day

*Total Standard vehicles equivalent numbers based on: Car/Utility/Car Trailer = 1, Single axel truck =1.5, Truck/Dog or semi =4

The total daily traffic generation in standard vehicle unit equivalents is 950/day. Based on 10% peak hour rate this is 95 vehicles/peak hour.

Site Internal Traffic Movements:

Vehicle access to the main production area will be restricted at the site office/weighbridge. A car park will be provided prior to this location. Based on a maximum of 40 employees and 16 visitors the recommended number of car parking spaces is 24 based on 1 space per 2 employees and 4 visitors spaces (for a max 2 hour stay). The Site Plan contained in Appendix 2 shows the provision of 24 spaces.

Access Routes - Road Infrastructure

KFW estimate that 80% of vehicle generation movements will be from the north and 20% from the south, with the development of the site to 230,000 tonnes to occur over 5 years. This will be prior to the construction of the Wylie Road extension to Northcliffe Drive and is considered to be the worst case scenario for traffic impacts. Figure 61 shows the predicated transport routes

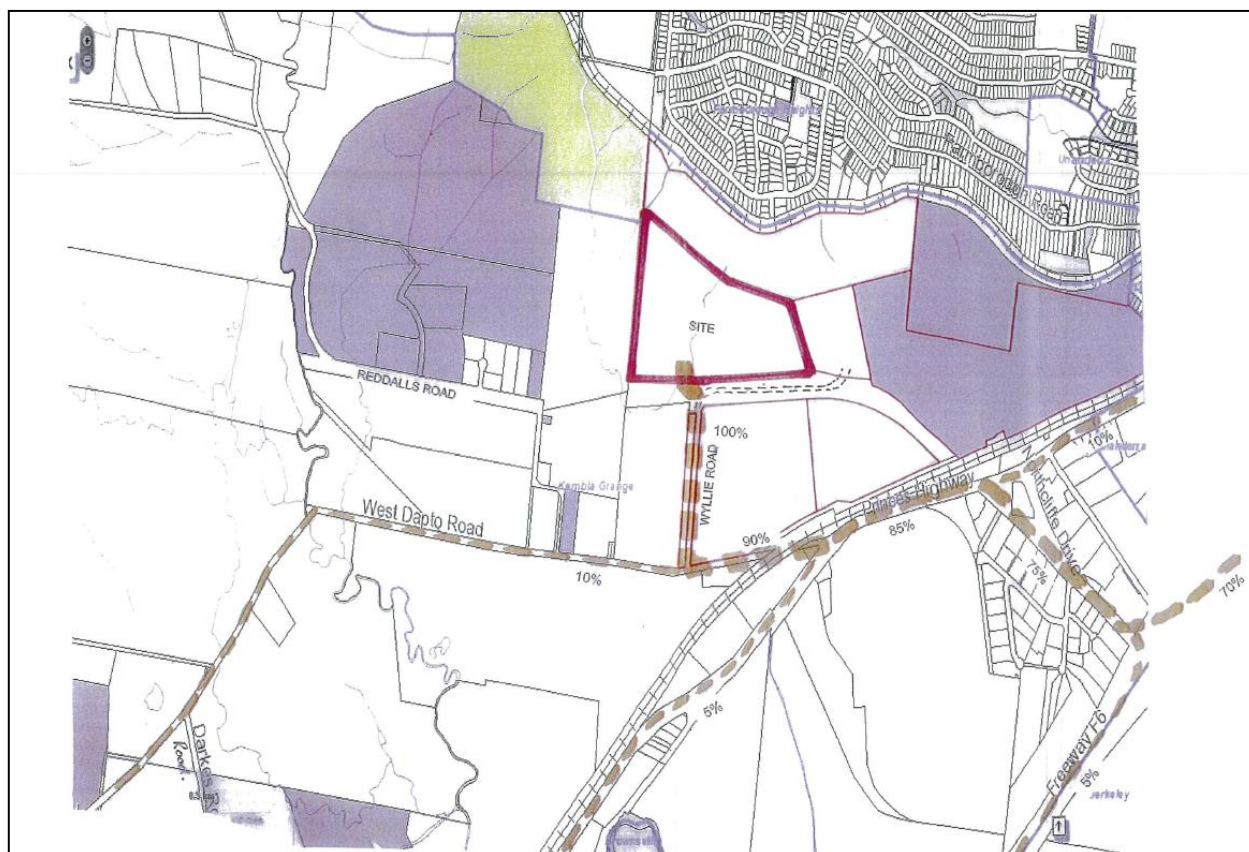


Figure 61: Predicted Transport Routes prior to Wylie Rd Intersection

Future Road Network

Discussion with Council engineers confirm they would only support one access point from the development onto the future north/south link which would be two lanes in either direction. Due to site constraints the site entry is proposed to be offset from the present Wylie Road reserve by 70m.

Impact on Existing Road Network

In relation to the impact on the existing road network KFW note that "the impact on the intersection of West Dapto Road/Princes Highway intersection has been extensively modelled by Wollongong City Council as part of the West Dapto re-zoning process. A report (November 2011) was prepared by Council & lodged with the RTA, which recommended upgrading of the intersection, as a result the intersection is presently being upgraded.....The report details to predicted traffic increase, Council proposes to monitor the intersections performance, this will define when the Northcliffe Drive extension will be implemented the report concludes.

'The actual timeframe for this work is largely dependent on market forces driving demand for new development with resultant increase in traffic volumes'.

It cannot be estimated when the impact of this sole development will impact on the intersection, the current upgrading will be more than adequate to cater for the generation from the development for the next 10 years."

Site Entry off Wylie Road: The predicted traffic volumes together with a 1% pa increase in the existing traffic in Wylie Road were analysed in the SIDRA intersection program, with the results shown in Table 80:

Table 80: Intersection Level of Service - Site Entry/Wylie Rd

Intersection-Level of Service (Degree of Saturation) Site Entry/Wylie Road			
Scenario	Site Entry	Wyllie Road North	Wyllie Road South
Existing	A(0.01)	A(0.01)	A(0.01)
100,00t/pa	A(0.03)	A(0.01)	A(0.02)
150,000t/pa	A(0.04)	A(0.01)	A(0.03)
230,000t/pa	A(0.06)	A(0.01)	A(0.05)

KFW confirm that all legs of the intersection operate at a level of service of A for the existing and proposed traffic volumes. KFW also note that the intersection is located at the northern tangent of a curve in Wylie Road which has a comfortable speed of 40kmph. The Safe Intersection Site Distance (SISD) for this speed is 66m and the SISD for the posted speed of 80km/h is 170m. The report confirms that a sight distance of 80m is available to the north and in excess of 170m to the south. KFW recommend that vegetation be removed from the existing verge and the curve speed limit be posted at 40kmh.



Figure 62: Wylie Road - Sight Distance Looking South (Left Photo) and North (Right Photo)

Wylie Rd/West Dapto Road Intersection:

Existing traffic volumes in West Dapto Road were provided by Wollongong City Council. The intersection was analysed for both the AM and PM peak periods with the predicted traffic generation by the development added. Table 80A below outlines the results.

Table 80A: Intersection Level of Service - Wylie Rd/West Dapto Rd

Intersection- Wylie Road/West Dapto Road - Level of Service (Degree of Saturation)			
AM Peak			
Scenario	Wyllie Road	West Dapto Rd East	West Dapto Rd West
Existing	A(0.00)	A(0.08)	A(0.13)
100,000t/pa	A(0.04)	A(0.10)	A(0.13)
150,000t/pa	A(0.05)	A(0.11)	A(0.13)
230,000t/pa	A(0.08)	A(0.13)	A(0.13)
PM Peak			
Existing	A(0.02)	A(0.14)	A(0.11)
100,000t/pa	A(0.04)	A(0.15)	A(0.12)
150,000t/pa	A(0.05)	A(0.16)	A(0.12)
230,000t/pa	A(0.07)	A(0.18)	A(0.12)

All legs of the intersection operate at a level of service of A.

KFW also note that Wollongong City Council in their letter 14th May 2014 have also requested the capacity of this intersection be reviewed just prior to the Northcliffe Drive extension being completed. Council provided their TRACKS model data for 2031 which models this situation. The council data did not include Wyllie Road traffic volume increase, the existing traffic volumes in Wyllie Road was estimated to be 500VPD in the absence of any definitive information it has been assumed this value could increase by 100% to 1000VPD.

The intersection was again analysed by KFW for both the AM & PM peak periods, with the results shown in Table 80B.

Table 80B: Intersection Level of Service - Wylie Rd/West Dapto Rd

Intersection- Wylie Road/West Dapto Road Level of Service (Degree of Saturation)			
Scenario	Wyllie Road	West Dapto Rd North	West Dapto Rd South
2031-AM Peak	A(0.18)	A(0.41)	A(0.32)
2031-PM Peak	A(0.18)	A(0.32)	A(0.48)

KFW conclude that All legs of the intersection still operate at a level of service of A, the degree of saturation rises from (0.18) to (0.48), i.e. the intersection is still satisfactory.

Future Road Network: KFW advise that Council plans "show the Northcliffe Drive extension traverses the site along its southern boundary, this road will have 2 lanes in either direction, the site entry will have to be re-designed to gain access to this road. Council currently support the construction of a roundabout at this location. This roundabout would need to be designed to take this and the other adjacent developments into consideration."

Construction Impact: The report confirms that construction activities in order to upgrade the existing facility would include:

- Civil Works
 - Cut/fill earthworks
 - Stormwater drainage construction
- Structural Works - Building footings/concrete slab

- Building steelwork erection
 - Building cladding and final fitout.
- Services
- Upgrade existing water/sewer infrastructure
 - upgrade electrical infrastructure

The following traffic generation is predicted for a 4 month construction period:

Table 81: Traffic Generation - Construction

Traffic Generation-Construction			
Activity	Description	Vehicle Types	Frequency
A-Civil Works	Excavation/earthworks Including pipe trench Excavations	All machines currently on-site	Nil
B-Building Construction	Concrete works	HRV/Concrete deliveries	8/ pour total 4 pours
	Steel Works	HRV/Crane	1/ day over 2 months
	Construction Workers 4/6 Workers per day	Standard Vehicles	6 per day for 2 months
C- Services	Services/personnel 2/4 work	2 SRV	2SRV/day for 1 month

This table confirms that an average of 4/6 workmen will attend the site during the construction period. All large earthmoving machines are presently on-site and will remain so. Hence, the major traffic impact will be the delivery of concrete, steelwork, pipes and building cladding and erection. The largest impact will be during a concrete pour with approx 8 HRV delivery trucks over a 4 hour period, with a frequency of 4 times in the second month of construction. However, as heavy vehicles presently frequent the site this will have little effect on the surrounding road system.

Conclusion

It is anticipated that the development will occur the next 5 years and the future upgrading of the adjacent road system is not anticipated to occur in this timeframe. Hence KFW investigated the impact on the existing road system. The SIDRA modelling which was undertaken indicates that the predicted traffic generation will have little effect on the existing road system. It is recommended that minor vegetation clearing of verges is required to better facilitate the existing safety of the present road system (for eg. sight visibility).

10.17 Sediment and Erosion Control

KFW have prepared Soil and Erosion Control plans and measures to be implemented during the construction of the proposed building (refer plans prepared by KFW, job no KF109450, drawing no C05, rev A, dated 15/07/09 – Appendix 2). The sediment and erosion control measures include the implementation of sediment fencing along the boundaries, the construction of sediment basins and catch drains, restricting the distance between stockpiles and kerb and gutter systems, and adequate drainage measures to be constructed early in the sequence of operations to prevent site erosion during storm periods.

KFW confirm that the following measures will be implemented during construction and operation to prevent impacts from erosion and sedimentation.

Sequence of Operations

Step 1:

- Provide temporary construction entry/exist shaker pad and silt stop fencing along boundary.
- Install strawbale check dams in the watercourse below the bridge.
- Install strawbale barriers on the eastern side of the watercourse adjacent to the bridge.

Step 2:

- Construct clean water diversion drain at the northern end of the site above the proposed batter.
- Drain to the nearest section of the watercourse

Step 3:

- Construct the proposed osd, water quality pond, shredding area runoff pond and landscaping mound.
- The ponds will be temporary sediment ponds during construction, until site is stabilised, and the mound will divert dirty water to the ponds

Step 4:

- Excavate for bulk earthworks and revegetate batters

Step 5

- Construct buildings, roads and drainage lines

Step 6

- Construct bridge works (now deleted, no additional bridge proposed)

Step 7

- Maintain soil and water management features throughout the construction period.

Step 8

- Dust suppression to be conducted throughout construction phase.
- A water cart to be on site and available at all times, approx. 40,000 litres/day.

Step 9

- Clear out all pipework prior to removal of soil and water management devices.

Step 10

- Clear out osd basin and complete construction of basin infrastructure.

Sediment Control Measures:

- No work to occur in the riparian zone other than as approved by Controlled Activity Approval No. ERM 2009/1008 (ie OSD basin B and plantings).
- Sediment and erosion controls shall retain on site all sediment generated during construction
- All topsoil is to be stockpiled in areas designated on plan.
- All formed embankments (cut & fill) are to be landscaped within 7 days.
- All disturbed areas, including any controlled fill are to be topsoiled & seeded prior to completion of works. All disturbed areas that will not be stabilized within 2 months must be temporarily revegetated within 7 days of clearing. Areas that fail to establish must be resown immediately.
- The ground shall be tined / scarified to a min depth 100mm prior to seeding.
- Any seeded areas which fail to germinate or where germination is sparse after 21 days from initial seeding area must be reseeded.

- For temporary revegetation purposes, the revegetation mixture should include the following species for both autumn & spring sowings - duraturf park blend (wright stephenson seed mix) thoroughbred turf tall fescue (15kg/ha) unhulled couch (4kg/ha) perennial ryegrass (37kg/ha) chewings fescue (5kg/ha) multigrow / enrich fertilizer at 500kg/ha.
- Revegetation and stabilization will not be considered satisfactory unless a min 70% ground cover, at least 100mm high is achieved over all disturbed areas
- All gully pits are to be provided with sediment filter barriers such as sandbags or filter socks.
- Trenches for drainage lines are to be reinstated with topsoil following pipe installation & backfilling & immediately seeded/fertilized.
- Designated plant and machinery accessways to be defined onsite by the installation of parawebbing fencing to minimize unnecessary site disturbance.

Maintenance during Construction

- All erosion control measures are to be maintained at all times so that those measures are fully functional / operational during the currency of works. All such controls must also be fully functional / operational should work operations cease temporarily, (e.g weekends, rostered days off, etc.)
- Resread material gained during maintenance operation or alternatively place on stockpiles.

10.18 Visual Impact

A Visual Impact Assessment was prepared by TCG Planning in July 2014. This analysis confirms that the site contains a level platform, which accommodates the current area of workings, rising to the north towards the ridgeline which provides visual separation from the suburb of Farmborough Heights. The site is bisected by a natural watercourse which flows in a north south direction through the central portion of the site. The two easements which traverse the site are located parallel to the western boundary (easement for gas pipeline 20m wide and variable) and adjacent to the south-western corner of the site (easement for transition line 45.72m wide). A description of the landscape of the subject site and surrounds is contained in Table 82.

Table 82: Landscape Description of the Site and Surrounds

Landscape Feature	Description of Site
Landscape Description and Vegetation	<p>An environmental conservation area, consisting of moderately dense sclerophyll forest, separates the closest residences to the north from the proposed development site.</p> <p>A Biodiversity Assessment Report which was prepared by Conacher Environmental Group in August 2013 identified that the following vegetation communities were observed within the subject site during surveys:</p> <ul style="list-style-type: none"> ▪ Disturbed Subtropical rainforest ▪ Disturbed Red Gum Forest ▪ Regrowth Acacia and exotic shrubs; and ▪ Cleared land <p>Weed invasion is low throughout the community with the exception of edge trees with intergrade with the cleared land and regrowth acacia and exotic shrub communities which contain high levels of lantana.</p> <p>The natural extent of this community across the site appears to be reduced, through historical clearing and high levels of weed invasion, to three small remnant patches. Disturbance is generally limited to clearing and weed invasion of edge trees.</p> <p>The remnant patch of the community within the southern section of the site contains one large canopy tree (<i>Ficus macrophylla</i>) over a small remnant patch of rainforest type shrubs.</p>

Landscape Feature	Description of Site
Boundaries and Edges	The split zoning of the land reflects this variation in land use, with the area of workings being in the IN2 Light Industrial and the vegetated areas principally zoned RE2 Private Recreation pursuant to Wollongong LEP 2009. The site is bounded to the north by an existing ridgeline. The western portion of the site is bounded by industrial facilities and the south and east of the site is bordered by vacant land. There are residences located to the north of the site that are located on an elevated rock shelf that is approximately 15-30 metres up slope above the proposed development site. An environmental conservation area consisting of moderately dense sclerophyll forest separates the closest residences to the north from the proposed development site.
Landform	The ground slopes from the south-eastern entrance from Wyllie Rd at approximately RL 44.0 AHD to a level platform located at the western part of the site at + RL 21.0 AHD. Within the site the Gwynneville soil landscape comprises the areas on the foot slopes of the Illawarra escarpment, local relief is approximately 30-100m and slope gradients are up to 25%. The underlying geology consists of the Illawarra Coal Measures and occasional rock outcropping is present along the drainage line which intersects the site.
Drainage System	The site is traversed by an unnamed tributary of Gibson's Creek which flows in a north-east to south-west direction in the eastern part of the workings. A designated 10m wide riparian corridor either side of this creek with provides visual and physical separation from the workings.
Focal Attractions	The site is effectively sited in a basin surrounded by vegetated ridgelines to the north and north-east. The existing workings on the site contrast against the relatively undisturbed vegetation buffering the lands.
Existing Land Use & Built Environment	The land is currently operating as a Resource Recovery Facility, with the facilities on site including storage areas, processing area, parking area and administration buildings. The site is accessed from Wylie Road via a bridge which extends over the watercourse. The existing buildings on the site are limited to one storey in height.

Wollongong Development Control Plan 2009

Section 6.3.3 of Chapter D16 - West Dapto Release Area of Wollongong Development Control Plan 2009 identifies primary view corridors and provides matters to be considered within a visual analysis dependent on the visual quality of the site and locality.

Section 6.3.3. confirms that land within the release area has been accessed for visual quality. Land falls into three categories of visual sensitivity. These include:

ZONE A (High Concern for Visual Resource) –Development within areas of high scenic quality must be sympathetic to that visual quality as the ability of the area to absorb change is low.

ZONE B (Moderate concern for visual resource) - Changes to landforms, final contouring and revegetation programs will significantly contribute to reduce the visual impact and therefore must be minimised wherever possible.

Zone C (Low concern for Visual Resource) - Proposed development within this zone should remain virtually subordinate the existing landscape.

The controls contained within the section require a visual impact assessment is to be prepared by the applicant and submitted with any Development Application. The visual impact assessment is to demonstrate how retention of the visual quality of the area in which development has been proposed has been considered in the design of the proposal particularly having regard to the visual zone in which land is located.

Application to the proposed development:

As shown in Figure 63 the subject site is located at the northern extent of the West Dapto release area and is located predominantly in the Landscape Management Zone B, with part of the site located in the Landscape

Management Zone A. However, it is noted that the area of the site on which the development is to be located is sited within Landscape Management Zone B, whilst the vegetated buffers, which are to be retained are located in Zone A.

Within **Zone B** the development includes the expanded working area, a number of additional buildings, perimeter road and drainage works. The works are contained on the periphery of an area that is currently highly degraded and hence it is not considered that the additional works will further significantly contribute to a loss of scenic quality, as discussed in the following sections of this report.

Within **Zone A** development is required to have a maximum height of 2 storeys and a maximum site coverage of 50%. No works are proposed within Zone A.

Visual Analysis

The visibility of the Kembla Grange Waste Recovery Facility site from immediately adjacent viewpoints and from long distance vantage points is impacted by local topography, distance, vegetation and the visual impacts of the existing waste management facilities. Such waste management facilities provide an indicator of the level of visibility of the expanded facility by confirming the level of site disturbance and general siting of works.

The following factors contribute to the visibility or the limited visibility of the subject site:

- Views from the Princes Highway to the east of the site are limited as the facility is located off Wyllie Road which services only a small number of allotments and extends in a northern direction from West Dapto Road. The facility does not have direct frontage to West Dapto Road.
- The site is not visible from the M1 Princes Motorway which is located to the west of the highway (and the east of the site) due to the separation distance provided and the siting of other developments between the road and development site.
- Views of the site from residential properties in Farmborough Heights are limited due to the existence of the vegetated buffer which separates the development from residential properties.
- Short distance views of the site are available from industrial lands to the west and south-west, however views of the existing recycling facility are also currently available from such positions and hence the expanded workings on the site, whilst extending the disturbed area, will not alter the current form of the view.
- Medium distance views from surrounding vantage points will continue to be of an industrial development, with the impact reduced due to the single storey nature of any buildings on the site.
- The immediate area surrounding the site is highly disturbed, particularly by the Wollongong Waste and Recovery Park located to the west of the site.

Figure 64 provides a visual representation of view corridors towards the site, noting that in a number of instances the site is not visible.

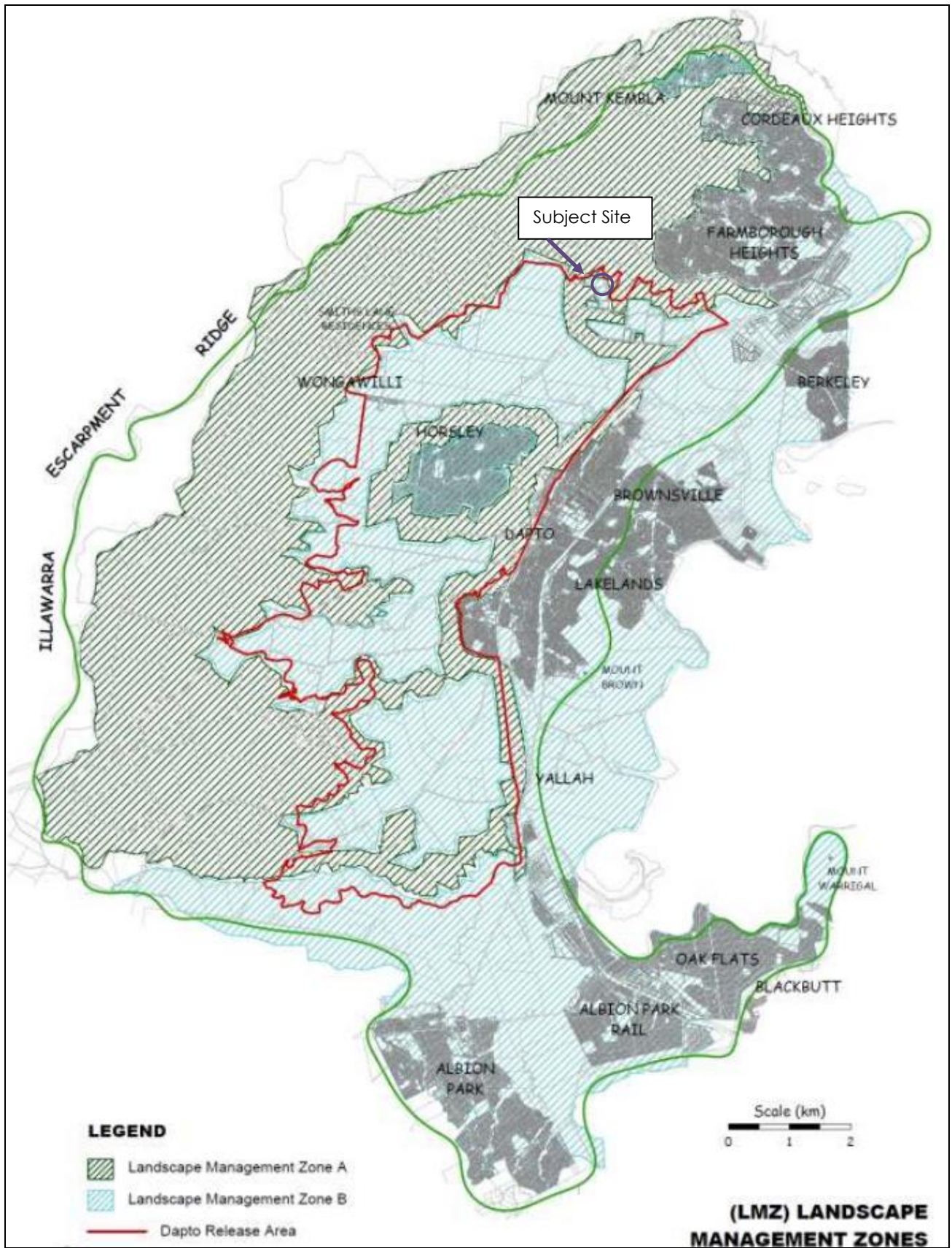


Figure 63: Location of Landscape Management Zones and relevance to the Subject Site

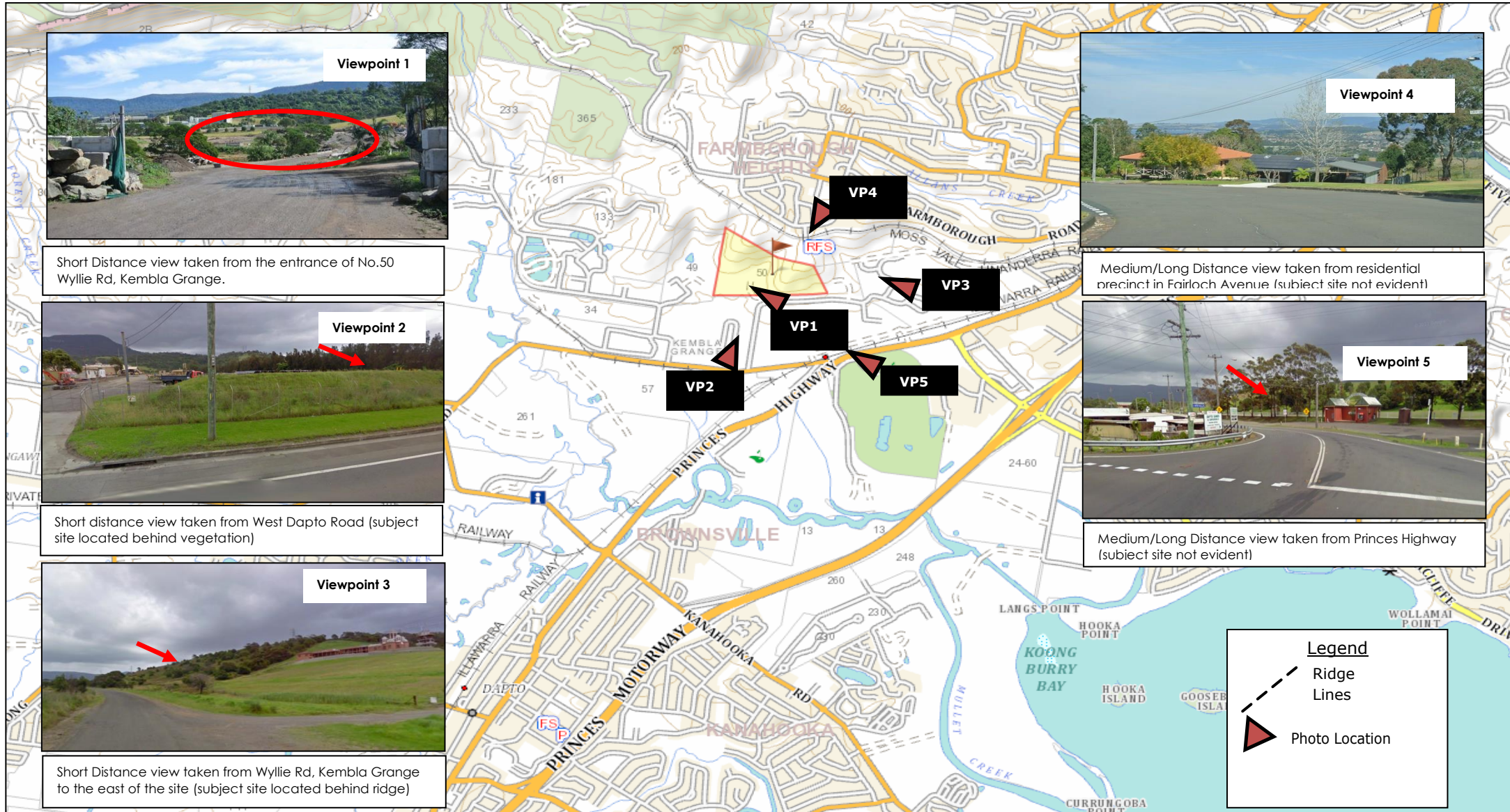


Figure 64 - View Analysis of the Proposed Development

Short Distance Views

Viewpoint 1:

This photo demonstrates the visual impact of the development from a position adjacent to the entrance of No.50 Wyllie Rd, Kembla Grange. This photo confirms that whilst development on the site is visible, it will be sited in front of a backdrop of industrial development, which contains buildings at a greater height than that evident within the waste recovery facility. Further, it is noted that the number of properties accessed via Wyllie Road is limited and hence views from this position will not be evident to the wider public.

Viewpoint 2:

This photo demonstrates the view from West Dapto Road looking north towards the development site, which is located behind industrial development which fronts West Dapto Road. This photo demonstrates that from the road the development is not visible, although the development will be visible from a number of industrial sites in this vicinity. Further to the east on new Dapto Road the development is also not visible, due to the siting of a high grassed embankment which runs parallel to the road.

Viewpoint 3:

This photo demonstrates short distance views towards the site from the road adjacent to the Orthodox Church. This photo demonstrates that the ridgeline which extends in a north-south direction at this point will effectively screen the development site.

Medium to Long Distance Views

Viewpoint 4:

This photo demonstrates that the visual impact of the development from residential properties in Farmborough Heights will be limited due to the existence of the vegetated buffer which separates the development from residential properties. Further, the majority of the residential development is set back from the edge of the ridgeline and hence dwellings are generally provided with views which extend further to the south. Views of the site are not available from Farmborough Road and the surrounding road network.

Viewpoint 5:

This photo shows the view looking north-east from the Princes Highway/New Dapto Road intersection. It is apparent that the development is not visible from this location, again due to the siting of a high grassed embankment, which effectively results in the development site being sited in a basin surrounded by mounding and ridgelines.

Outcomes of Visual Analysis

The Visual Analysis prepared by TCG Planning in October 2013 confirmed that the visual impact will be minimal due to the siting of the development in a location surrounded by vegetated ridgelines and batters. Whilst short distance views to the main processing area, stockpiling area (including storage bins) and the buildings will be available from adjacent industrial properties to the west and south-west, the development is currently situated on disturbed land within a visual catchment containing similar industrial uses. Further, the site is located in a 'basin' surrounded by higher topographical features to the east and north and hence the view of the storage bins and associated working will be limited. To minimise visibility the height of stockpiles will be limited to 5m for inert material and 3m for organic material, well below the permissible height of 9m for

development in this zone. The visibility from residences in Farmborough Heights will also be limited due to the existence of separating vegetation; the siting of the railway line; and the setback of dwellings from the edge of the ridgeline.

10.19 Heritage Impacts

In order to assess both Aboriginal and European Heritage Impacts a 'Preliminary Heritage Assessment' was prepared by Artefact Heritage in March 2014. This preliminary heritage assessment was produced according to the Office of Environment and Heritage (OEH) Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005, and the relevant NSW Heritage Council guidelines. This report confirms the following:

Aboriginal Heritage Information Management System Register

A search of the OEH AHIMS site register was conducted on 26 February 2014 for recorded Aboriginal sites within a 2 kilometre x 2 kilometre radius of the study site (GDA 1994 MGA 56 Easting from 298004E to 300219E, northing from 6183033N to 6185124N, with a 1000 metre buffer). A total of 13 recorded Aboriginal sites were located within the AHIMS site register in the vicinity of the site (as shown in Figure 65). No recorded Aboriginal sites listed on the AHIMS site register were located within the study area.

Site Inspection and Methodology

A site inspection of the study area was conducted on 27 February 2014 to establish the level of disturbance to the site in order to further inform the archaeological predictive model. The report notes that *"a large portion of the study area has undergone extensive landscape disturbance in recent years. Sections of the escarpment slopes have been dug-out to level off land needed for on-site activities such as construction waste storage and roadways".* *"According to on-site sources, the property was originally used as a waste storage facility by BHP Billiton at which time the site was filled with slag and other unwanted materials associated with mining activity in the greater Illawarra region. This activity resulted in extensive land remediation in the mid-1990s".*

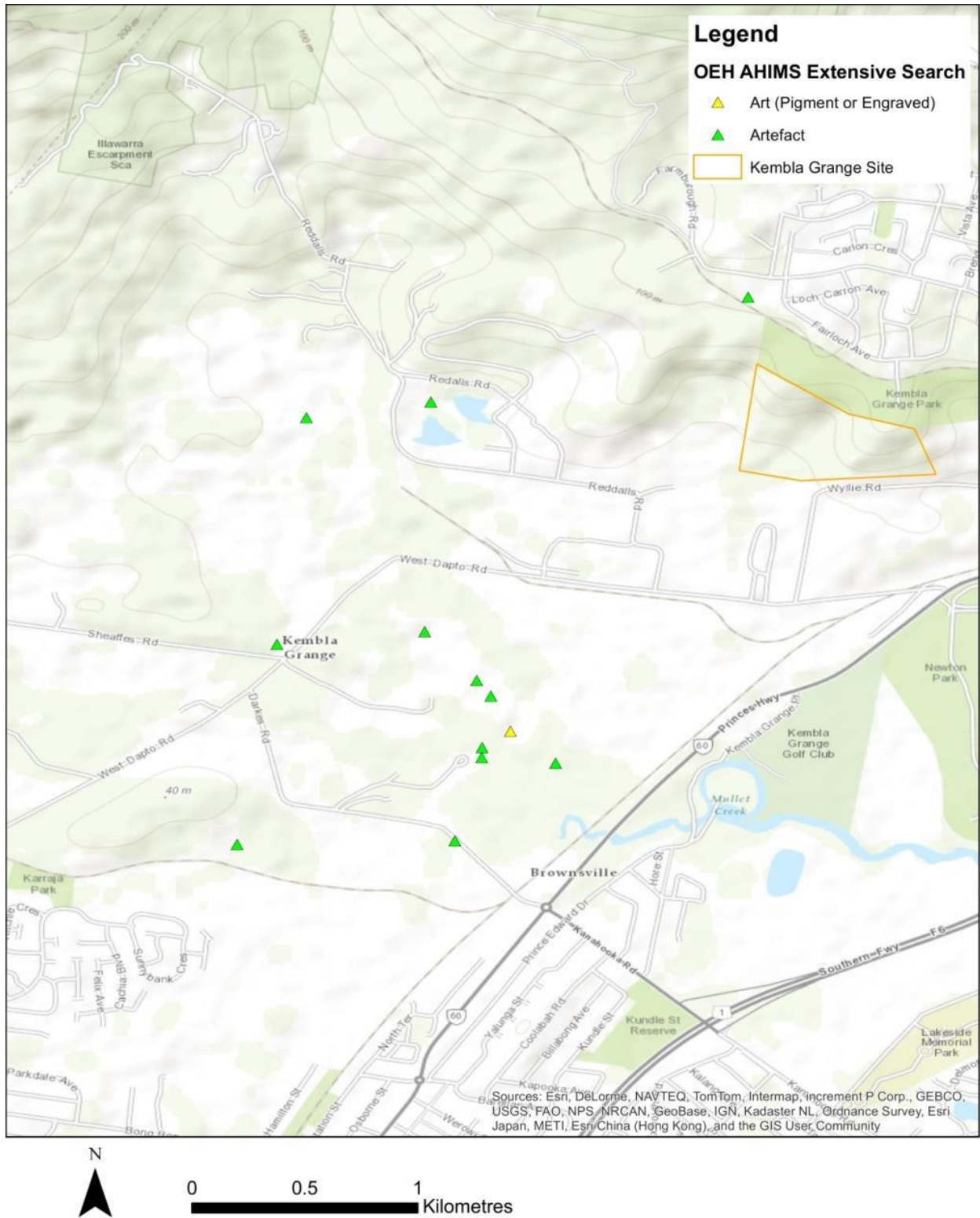


Figure 65: Sites registered on AHIMS within 2km of the study area. Data from AHIMS.

Non-Aboriginal Heritage Register Searches

No items in or near the study area are included on the SHR. No items within the study area were listed on relevant s170 registers. No items in or near the study area are listed on the Commonwealth Heritage List.

The Wollongong LEP 2009, includes a list of sites / items of heritage significance within the local government area. Preliminary Heritage Assessment, 50 Wyllie Road, Kembla Grange. A total of four heritage items within the vicinity of the study area are listed on the LEP, shown in Table 83 and Figure 66.

Table 83: Items listed on the Wollongong LEP 2009 in the vicinity of the study area.

Suburb	Item	Address	Lot/DP	Description
Kembla Grange	61061-Kembla Grange Racecourse Railway Station	Corner West Dapto Road & Princes Highway (on South Coast Rail Line)	-	An example of a late 19 th century single platform railway station used to transport coke and dairy produce to Sydney
Kembla Grange	5989-Settlers' Cemetery and Wold War II Cemetery	Reddalls Road	Lot 7002, DP 1055632	An example of an early cemetery which contains the graves of many of the early settlers of the Dapto region.
Kembla Grange	6327-Cemetery	West Dapto Road	Lot 113, DP 771098	An example of an early cemetery which contains the graves of many of the early settlers of the Dapto Region
Kembla Grange	6432-"Glengarry" Homestead	107 Reddalls Road	Lot 53, DP 1022266	A large and significant homestead and gardens representing the late Victorian Georgian style and the vernacular homestead in its setting.

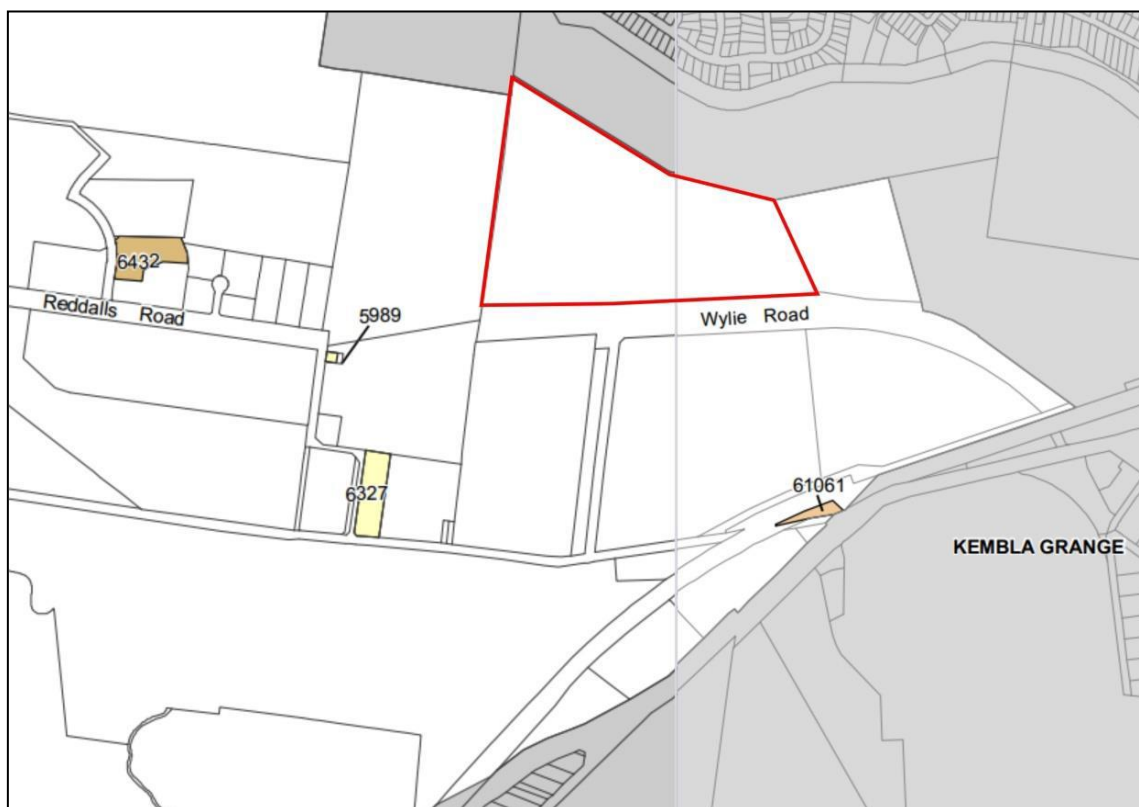


Figure 66: Items listed on the Wollongong LEP 2009 in the vicinity of the study area.

Aboriginal Archaeological Potential

Artefact confirmed that "an AHIMS search did not locate any recorded Aboriginal sites in the study area. However, thirteen Aboriginal sites were recorded within a two kilometre radius. Stone artefacts would be the most likely Aboriginal site type within the study area and densities may vary. Rock art may also be present at certain locations within the study area. There is a low potential that proposed area of development will contain Aboriginal archaeological material due to disturbance associated with industrial activities that have taken place over the past sixty years. However, there is a low to moderate potential that areas to the north and east, within the Illawarra escarpment slopes and foothills which have not been affected by recent developments, may contain Aboriginal objects". Figure 67 shows the zones of archaeological potential as assessed by this study.

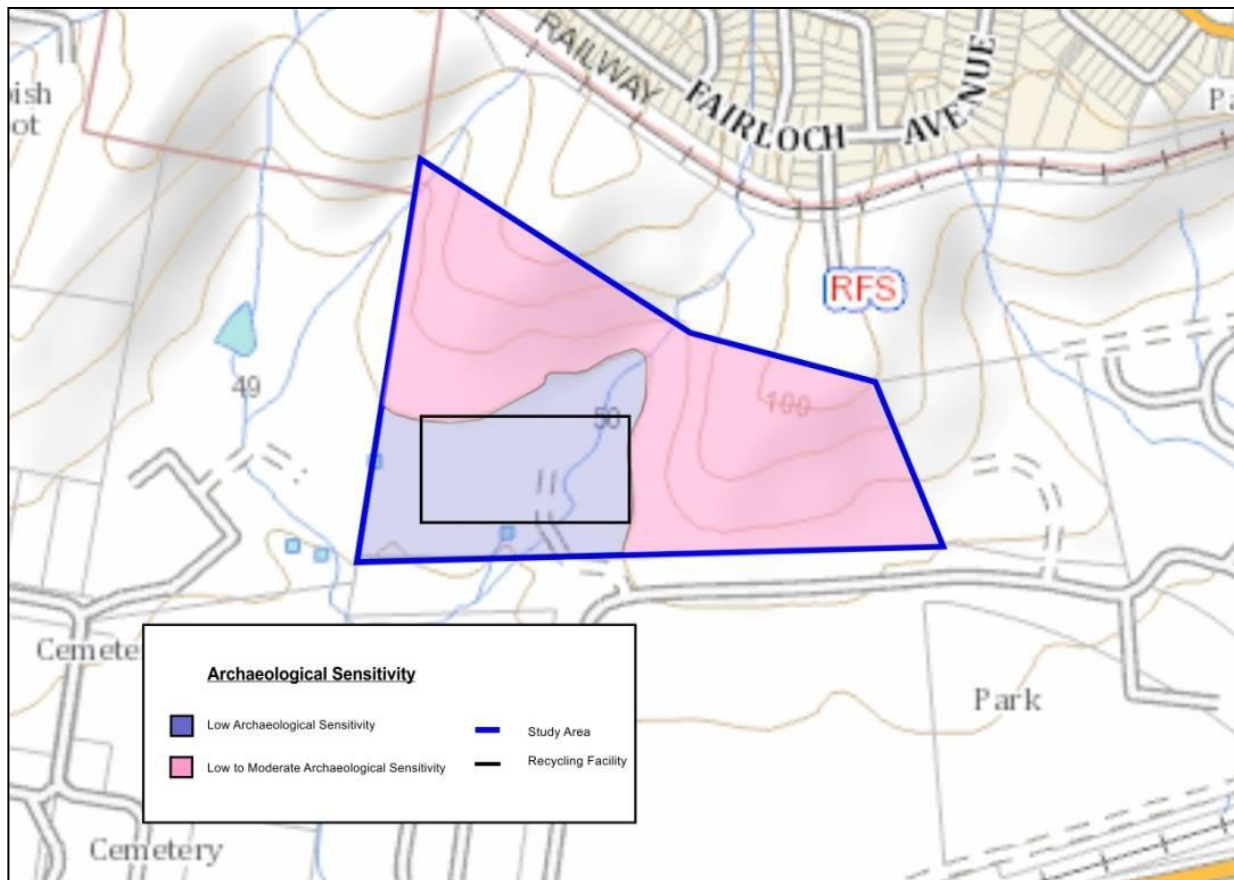


Figure 67: Aboriginal archaeological potential within the study area.

Non-Aboriginal Archaeological Potential

Artefact confirm that "the study area was originally sold to Messrs Andrew Land and Gerard Gerrard as a smaller portion of a larger 2000 acre land grant. This land grant was then divided and subleased into smaller holdings. The dominant land use in the vicinity was dairying in the nineteenth century and mining and waste recycling in the twentieth century. Historical evidence indicates that the study area remained undeveloped during this period with vegetated slopes of the Illawarra escarpment to the north of the study area retained as a public reserve. It is likely that lower slopes of the study area were subject to land clearing during this period. As there are no known former structures recorded within the study area it has been assessed as having a low archaeological potential" (Figure 68).

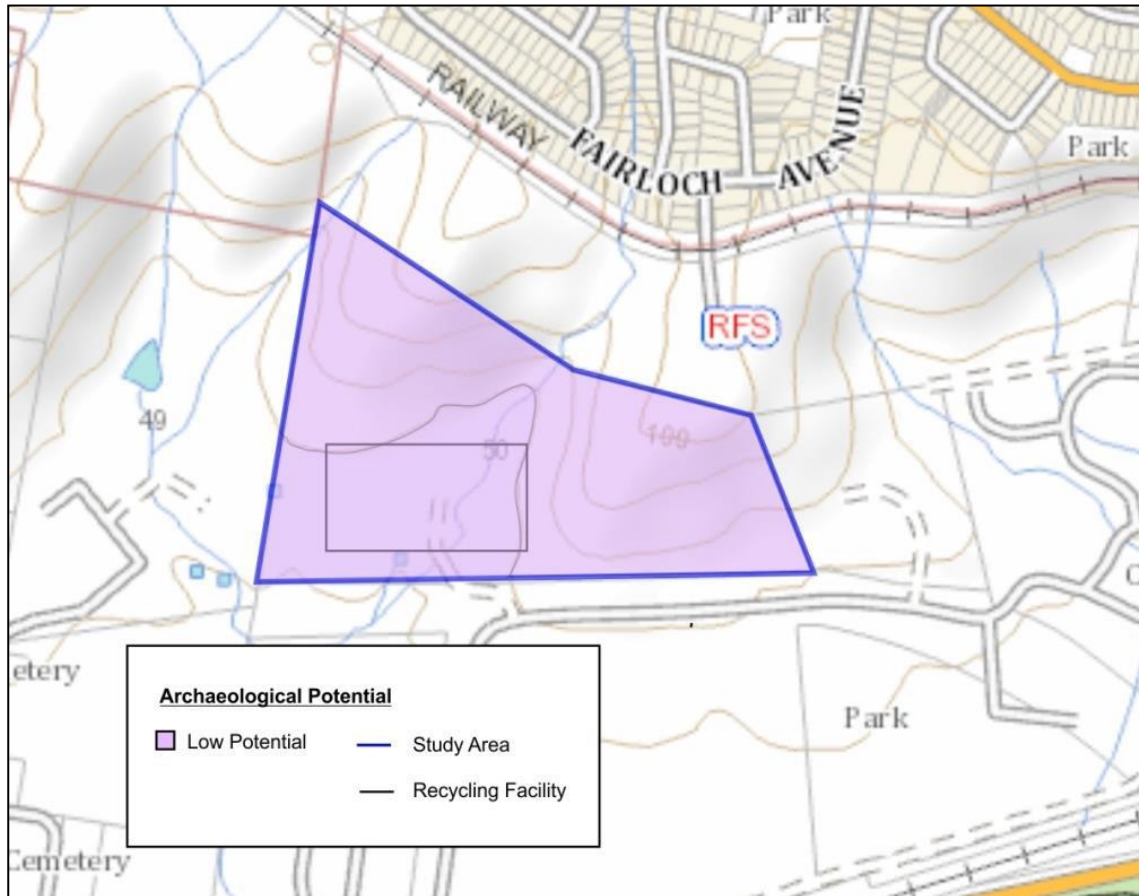


Figure 68: Non-Indigenous Archaeological potential within the study area.

Assessment of the non-Aboriginal heritage significance of the study area

Artefact note that "the study area does embody some of those characteristics identified in the Australia ICOMOS Burra Charter important for assigning heritage value. The study area represents a small part of the original 2000 acre land grant of Messrs Andrew Lang and Gerard Gerrard. The historical use and subdivision of the land are linked to the growth and establishment of dairy industries in the region, activities in which Lang and Gerrard played an important role. However, the land within the study area does not contain any structures or the remains of any known structures associated with these historical developments or persons. The study area does not provide good research potential as there were no areas of non-Aboriginal archaeological potential to be investigated. The study area is not rare in the local context. As a part of the Illawarra escarpment, the study area is considered to be representative of a class of the local area's natural places. However, industrial development in the area means that its significance under this criterion has been substantially compromised. The study area does not meet the threshold for an assessment of Local or State significance."

Impacts on Aboriginal heritage

With respect to Aboriginal heritage the report concludes that "there are no previously registered Aboriginal sites within the study area and there were no Aboriginal sites recorded within the study area during the site survey. The section of the study area which is proposed for development has previously been disturbed and has been

assessed as having a low Aboriginal archaeological potential. There would therefore be no known impacts to Aboriginal heritage as a result of the proposal. If the area of low-moderate archaeological potential were to be impacted by future development, further assessment would be required in the form of an Aboriginal Heritage Impact Assessment"

Impacts on non- Aboriginal heritage

Further, with respect to non-Aboriginal heritage Artefact conclude "four items listed on the Wollongong Council LEP are located within the vicinity of the site. The study area sits within an industrial development in Kembla Grange, south of the Farmborough Heights suburban development. There will be no impacts to the four locally listed items within the vicinity of the study area as a result of the proposal. All items are located at least 300 m from the study area. The study area has been found to have a low non-Aboriginal archaeological potential, so it is unlikely that there would be impacts to relics within the study area".

Conclusion

This preliminary heritage assessment therefore concludes:

- There were no registered Aboriginal objects or listed heritage items within the study area, or in the immediate vicinity of the study area. Four locally listed heritage items were located within 700 metres of the study area but would not be impacted by the proposal.
- A portion of the study area has been impacted by previous development associated with the establishment of the waste recovery facility. The northern and eastern sections of the study area which would not be impacted by the current proposal were less disturbed.
- The northern and eastern section of the study area which would not be impacted by the proposal has been assessed as having low-moderate Aboriginal archaeological potential. The remainder of the study area, including the area of proposed impacts was found to have a low Aboriginal archaeological potential. The entire study area was found to have a low non-Aboriginal archaeological potential.
- There are no heritage constraints on the current proposal. If impacts are proposed outside the current development footprint in areas of low-moderate Aboriginal archaeological potential further investigations would be required.

10.20 Landscaping and Tree Protection

A Landscape Plan (Dwg No. 1442-LC01A) was prepared by Ochre Landscape architects in July 2014. The plans show the planting within the riparian corridor, consistent with the recommendations of the Vegetation Management Plan prepared by Southern Habitat and also show perimeter planting around the western and southern boundaries of the site. Where a lower density of planting is required to accommodate the Asset Protection Zone for bushfire purposes adjacent to the site buildings, an additional landscaped area has been provided to offset this APZ. The additional offset area of planting is 506m², which is equivalent in size to the area with reduced planting for APZ purposes. The offset area includes an additional landscaped area in the northern section of the site adjacent to the equipment area and a further widened landscaped area to the south, adjacent to the watercourse.

Plant species referenced on the Landscape Plan are consistent with those contained within the Vegetation Management Plan prepared by Southern Habitat.

An Arborist Assessment (Appendix 21) was carried out by David Potts in December 2012, which assessed trees proposed for removal and retention. Trees in the vicinity of the development area include two groups of Wattles, a large Moreton Bay Fig tree with two other small trees (a juvenile Fig and a Whalebone Tree) close to the larger Fig. The trees surveyed within the Arborist Report are identified for removal, with the exception of the Moreton Bay Fig (Tree 3) which is to be retained. The report provides recommendations to protect the tree which will be implemented by Bicorp, including the retention of the small Whalebone Tree east of the Fig, and the young Moreton Bay Fig about 7m south; the provision of fencing; and a works exclusion areas.

10.21 Impact on Mineral Resources

The Mineral Review Assessment conducted by Benviron in April 2014 confirms that:

- Based on a search of the resources within the area undertaken using Minview no current Coal or Mineral titles have been identified within the area.
- A current petroleum title (PEL 442) for the area (including the site) was noted and was owned by APEX Energy due to expire the 26/2/2016.
- Exploration activities have been undertaken by Apex Energy within the licenced area between 2003-2012. The majority of these reports area confidential and cannot be accessed, however it is noted anecdotally that no exploration activities have been undertaken within the site within this timeframe. The 2003 report was accessible indicates that coal seam gas exploration activities may have been undertaken in the area.
- The proposed development is an open recycling yard with a large warehouse shed for processing. It is not expected that this will prevent any future access to the site for exploration activities should they arise.

Hence, Benviron conclude that *"based on the scale of the proposed development, the minor impact to the soils (<2m BGL) on site and the fact that the site will remain mostly open and accessible it is not expected that this will impact any mineral/petroleum resources that may be present within the site and impede any future potential for extraction should it arise"*.

11 Socio Economic Impacts

The Director General's requirements for the project outlined the need for a socio economic assessment to address the economic and social impacts of the development, demonstrating whether it would have a net benefit for the community.

11.1 Economic Benefits of the Recovery Facility

Under an issued Construction Certificate (CC) the company commenced site preparation works on the 10 April 2012 which included access road(s), and bridge/culvert construction, installing site security fencing, removal of weeds infestation from the site, re-establishment and remediation of a creek drainage line riparian zone, removal of subsurface clays and construction of hard stand working pads, surface water and drainage infrastructure, landscaping and visual amenity works, installation of a weigh bridge and amenity/office facilities, connection of utilities and installation of a septic system and other various works.

The company has recently purchased significant additional plants in April - May 2012 at a cost of \$1.3 million to establish a source separated concrete, dirt (VENM & ENM), rock, garden and untreated wood waste and metals processing and recycling operation. The plant that was purchased included a front end loader, two (2) excavators, bobcat, concrete crusher and screens, 4WD dump truck, two (2) concrete agitator/ mixer trucks, a soil screening unit, a weighbridge and office/amenity buildings.

The additional operations will include screening mixed construction and demolition (C&D) materials at the weighbridge; unloading supervision and materials inspection, separation of any bulk wood/ metals/concrete e.t.c; shredding waste for volume /length reduction for effective manual sorting; mechanical and manual positive and negative sorting of various materials for recovery through a manual picking station; and subsequent further processing and value adding activities to manufacture recycled products. The initial plant will process 30,000 tonnes in 2012-13 (under its current approval) and increase its processing capacity up to the plant design capacity of approximately 60,000 tonnes a year.

The Kembla Grange Resource Recovery Facility will result in the establishment of an expanded innovative mixed construction and demolition waste sorting, processing and recycled product manufacturing facility, which currently does not exist elsewhere within the region. The project will create sustainable jobs, divert waste from landfill, recover valuable resources and produce a range of recycled materials to be sold back to the Illawarra and surrounding markets adding value to the local economy. Customers will include companies and individuals who undertake projects involving earthworks and demolition, together with customers and individuals who purchase recycled landscaping and building materials.

The company Director Adam Blackwell has over 10 years expertise in the acceptance and processing of construction and demolition of waste materials and the manufacturing of saleable recycled products.

The Blackwell family business has evolved from:

- A landscape supplies business (1995- Ongoing) Helensburgh;
- Established and steadily grown earthworks and demolition business (1998- ongoing) Helensburgh;

- Established and steadily grown building and landscape supplies business (2005-ongoing) Helens burgh (Northern Illawarra facility);
- The existing Wollongong recycling and building supplies business established in 2012 at Kembla Grange (Southern Illawarra facility).

The company has the required project planning and management skills to deliver this project having demonstrated experience in operating waste processing facilities.

The company will also employ a full time environmental and quality control officer to ensure all standards are met.

11.2 Recovery and Recycling Benefits

The site is located adjacent to the already well established Whytes Gully Landfill facility, which is faced with significant landfill life/capacity pressures. The Clearly Brothers Builders Tip located at Port Kembla previously accepted approximately 350,000 tonnes per annum but closed in early October 2013. The Whyte's Gully landfill facility currently does not accept construction and demolition waste and it has banned this material from the landfill cell. As a result the Illawarra will be at significant environmental and social risks from high levels of illegal dumping should new alternative landfill or preferably construction and demolition recycling facilities, not be established urgently. Under the federal government's current waste policy and the NSW Waste and Resource Recovery Act the recovery and reuse of resources is preferable, particularly where local positive economic benefits and job opportunities can be realized.

The plant development will consist of contracted services, such as industrial shed/building design and construction, purchase of specific plant including shredder, trimmer, conveyor system, and also a range of onsite fabrication works and activities associated with construction of fit out items such as raised work platforms, guards, chutes, hoppers and material storage silos and bays and the purchase of storage and transfer bins. The lead time on large plant items is 3-4 months. A number of project activities will be staggered to facilitate timely delivery within a 12 month time frame.

The mixed C & D operation will produce a range of construction, building and landscape supply products including soils, composts/mulches (to the current approved limits only), aggregates, and rock derived materials, along with any other recyclable materials readily sold into available recycling markets (e.g. ferrous and non ferrous metals).

The location of the Kembla Grange plant also has a major geographical and transport distance advantage over the existing sites at Port Kembla and Dunmore. The Kembla Grange site is also located near the population centroid for Wollongong and Shellharbour with nearby with major residential and commercial development to occur in the West Dapto precinct and Shell Cove area.

11.3 Job Creation

The Number of full time equivalent jobs (FTE) expected to be created following completion of the project are as follows:

- 1 Operations Supervisor;
- 0.7 Weighbridge Attendant (50%55 hrs/week);
- 1 material Screener/Inspector
- 1 Excavator Operator (Bulk Removals/ Shredder processing);
- 1 Loader Operator
- 12 Picking Station Recovery Operator(s)
- 4 Truck Drivers
- 1 Recycled product Sampling/Testing/Validation and specification QA Officer
- 1 Administration Support Officer
- 1 Market Development and Growth Manager
- 1 Mechanic and Boil maker.

Details of the expected FTE jobs created during the construction /preparation phase are as follows:

- 5 Earthworks
- 6 Industrial building construction
- 1 Mechanical / Process Design Engineer
- 4 -10 Processing Plant manufacturers and/or installers.

The additional mixed use C & D waste recycling operation will generate a further additional 27.7 full time equivalent jobs at the site on an ongoing long term basis. It will also generate significant local employment during the construction phases. If, after a competitive procurement process, one of the local C& D plant and equipment manufacturing companies is assessed as having the successful offer for the provision of plant, the additional jobs generation and secondary investment funds would further benefit the Illawarra region.

The workforce for the project will be from the Wollongong area. The additional ongoing operational positions will be advertised and recruited from Wollongong /Illawarra area. The industrial building and plant fit out labour force will also be from the Wollongong area.

There will be a short term (6 months) positive employment impact (estimated to be approximately 16 FTE's) on the shed construction and possibly local plant manufacturing companies (depending on the outcome of a competitive procurement process).

A range of ancillary contracts and services (estimated to be approximately 3 FTE's) will also be required to support these new operations, such as hydraulic services , accountancy and book keeping services. The project will allow the diversification of an existing business, using new waste processing technology to develop a plant that will manufacture recycled products from C&D waste currently going to landfill(s).The company's existing source separated C&D operations, which include processing separated products will also provide value adding manufacturing for the separated materials from the mixed C&D sorting plant.

Mixed C &D waste is readily generated from the residential and commercial housing and development industries within the Illawarra. The EPA has estimated the current disposal rate of C&D waste disposal in the Wollongong area to be between 300-350,000 tonnes a year.

The project will result in a significant increase in revenues generated by Wollongong Recycling and Building Supplier Pty Ltd and its ongoing ability to reinvest funds back into the Illawarra region through further planned business diversification related to adding value down the recycled product supply line. There are significant additional business opportunities for the company to increase processing tonnage rates and/or to value add to products manufactured and generating further local investment in the process.

12 Statement of Commitments

Section 12 contains an outline of the proposed environmental management and monitoring measures which are recommended for the waste recycling facility. Specifically, this section contains a description of the measures that should be considered for implementation to avoid, minimise, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the project. Where appropriate, detailed contingency plans for managing any potential significant risks to the environment are provided.

12.1 Geotechnical Design Solutions, Works and Investigations

The following recommendations of the Geotechnical Investigation Report dated May 2014 prepared by Benviron Group will be implemented:

- Additional site investigations (confirmatory holes and pits) will be undertaken, if required by the supervising geotechnical consultant at critical locations (eg on steeply sloping ground) to ensure that the local and regional stability are assessed with respect to the proposed engineering elements and design performances.
- As part of site preparation prior to construction works, all vegetation, topsoil and any uncontrolled fill will be removed;
- All footings will be founded on same bearing stratum;
- The base of all footing excavations will be inspected by a qualified geotechnical engineer to ensure footing will be founded in competent materials as designed;
- Should variation in descriptions in soil types, colour or depths be discovered during construction, a geotechnical engineer will be notified so that the potential influence on the footing as it may be affect surrounding engineering elements may be assessed;
- During design consideration will be given to the CSIRO sheet BFT-18 '*foundation maintenance and footing performance*'.
- Groundwater presence or levels will be confirmed if construction is undertaken during or following adverse weather or if a significant time period elapses between this investigation and construction.
- Temporary surface protection against erosion shall be provided in accordance with the requirements of the supervising geotechnical engineer.
- In the long term, the excavation faces must be retained by engineered retaining structure in particularly along the eastern hilly section of the site. These structures should be designed to withstand the applied lateral pressures of the soil/rock layers, the existing surcharges in their zone of influence; including existing structures, and construction related activities, and also hydrostatic pressures (if it is appropriate).
- Preliminary pavement design for a flexible pavement option shall be in accordance with Figure 8.4 of the Austroad Design Guide (2012). The pavement will comprise the following layers:
 - 40 mm thick dense grade asphalt AC14 on 7-10mm primer seal coat,
 - 120 mm thick DGB20 Base Course compacted to 98% Standard Compaction Ratio, and
 - 330 mm thick DGS40 Sub-base Course in two equal layers compacted to 98% Standard Compaction Ratio.

12.2 Hazards

The Preliminary Hazard Assessment prepared by Benviron Group addressed hazards associated with transport, construction, on site storage of fuels and hydrocarbons, site operation in relation to dust, bushfire and theft. The following measures and plans are to be implemented to address this range of hazards:

- Preparation of an Emergency Management/Response Plan;
- Preparation of an Environmental Management Plan;
- Preparation of a Work Health and Safety Plan;
- Preparation of a Hazardous Material Management Plan;
- The implementation of operator training;
- The purchase of spill response equipment and the implementation of spill response training;
- Contact emergency services (police, fire brigade) when required;
- The implementation of site security to limit public access, as required;
- Procurement of fire fighting equipment adequate for the level of risk and regular maintenance and testing of such equipment;
- Preparation of a Bushfire Management Plan;
- Regular maintenance inspections of equipment;
- The preparation of a Traffic Management Plan;
- Implementation of procedures to ensure that handling and storage of flammable and combustible liquids is in accordance with Australian Standards;
- Storage and handling of all substances, including waste, under conditions that minimise the risk of fire, explosion or toxic emissions, with implementation of specific measures that address the use of solvent-extraction reagents;
- Implementation of specific procedures for high risk tasks;
- Appropriate induction and training of personnel in emergency response (internal and external) procedures;
- Ongoing communication with agencies such as Rural Fire Services and monitoring of risk levels in relation to fire danger ratings;
- Vacuuming and sweeping of site, as required;

12.3 Groundwater

The results of the Groundwater Assessment conducted by Benviron Group (June 2014) reveal that the risks associated with soil and groundwater contamination are low, and the site therefore is suitable for development subject to the following recommendations which will be implemented by Bicorp:

- Development of a Soil and Water Management Plan to minimise the amount of surface runoff and potential migration of contamination.
- Engineering of the development working platform to minimise the infiltration of any contaminants into the underlying soils.
- Quarterly Testing of the groundwater on site to identify any future trends and characterise the groundwater within the local area.

Furthermore, if during any works, odours or evidence of contamination are encountered, site works will cease immediately in that area, temporarily, until an environmental consultant is notified and the recommendations of the consultant are implemented. The Office of Water will be notified and an accurate quantification of the likely take of groundwater will be provided to allow for authorisation from the Office of Water.

12.4 Biodiversity

The Biodiversity Assessment Report has concluded that the facility would maintain or improve biodiversity values through the avoidance of impacts to areas of high biodiversity value, the retention and management of the riparian corridor. Bicorp commit to the implementation of the following amelioration measures:

- Retention of remnant intact native vegetation / endangered ecological communities.
- Retention of identified hollow bearing trees.
- Installation of protective fencing for retained vegetation.
- Retention of a 10m wide vegetated riparian corridor to protect aquatic habitats.
- Retention of identified hollow bearing tree.
- Revegetation of disturbed batters and landscape areas with native flora species.
- Undertaking of weed management in accordance with the requirements of the Noxious Weeds Act (1993).
- Removal of vegetative matter from earth moving machinery prior to entering and leaving the site.
- Undertaking of weed management of the vegetated riparian buffer area in accordance with the Vegetation Management Plan prepared by Southern Habitat (2013).
- Rapid revegetation and/or stabilisation of disturbed areas.
- Divert stormwater and runoff from the processing and stockpile areas of the site to a water quality / recycling pond.
- Provide chemical spill kits on site.
- Retain and manage a vegetation riparian corridor which is generally 10m in width as a buffer between the development and the watercourse which intersects the site.
- Prevent potential infiltration of groundwater with contaminants, by constructing the works area with a base of compacted road base over compacted clay.
- Maintain machinery to comply with noise and/or vibration standards.
- Adhere to approved hours of operation / works.
- Suppress raised dust through dampening.
- Provide hard stand surfaces where appropriate.
- Maintain all machinery to meet emission standards.
- Remove windblown rubbish.

12.5 Vegetation

An Arborist Assessment was carried out by David Potts in December 2012, which assessed trees proposed for removal and retention. A Moreton Bay Fig (Tree 3) is to be retained and therefore the following will be implemented by Bicorp to protect this tree:

- Retention of a reserve as shown on the Landscape Plan dated July 2014;

- Removal of the Hickory Wattles 4 & 5 (simply by cutting out with a chainsaw, not heavy machinery) which will disrupt the Fig's roots.
- Removal of the Lantana infestation.
- Retention of the small Whalebone Tree east of the Fig, and the young Moreton Bay Fig about 7m south - west of the Fig. The young, very healthy Fig is good insurance if something happens to the large Fig, such as extreme storm damage.
- Secure quarantining of the Fig's reserve on the works (i.e. east) side with a steel picket and ribbon fence (known as a Tree Protection Zone/TPZ exclusion fence).
- No works (apart from Lantana & Hickory removal) to be undertaken within this zone.

The Restoration Plan of Action, as contained in the Vegetation Management Plan, updated by Southern Habitat in June 2014, will be implemented and will encompass the following scope of works:

- Protection of existing vegetation around the extent of the Illawarra Subtropical rainforest (EEC) which has been identified in the Biodiversity Assessment Report, to indicate and protect this particular remnant. A buffer zone of 5m shall apply within this fencing of approx 140m².
- Implementation of a minimum two (2) year maintenance programme, which shall commence following completion of primary weed control and revegetation throughout the corridor.

12.6 Bushfire

The following recommendations made within the 'Bushfire Assessment' prepared by EcoLogical Australia will be adhered to by Bicorp:

- Clearing and offsetting of vegetation in the riparian corridor for 16 metre to the east of Building 1 and 15 metres to the west of Building 2.
- Building 1 is subject to BAL-19 and will meet the requirements for windows, doors, screening, decks and stairs as per Section 6 of AS 3959-2009. Documentation prepared for the Construction Certificate will demonstrate this and be reviewed and signed off by a suitably qualified bushfire consultant to confirm that the objectives of BAL-19 have been met.
- Building 2 is subject to BAL-40 and will meet the requirements for windows, doors, screening, decks and stairs as per Section 8 of AS 3959-2009. Documentation prepared for the Construction Certificate will demonstrate this and be reviewed and signed off by a suitably qualified bushfire consultant to confirm that the objectives of BAL-40 have been met.
- The proposed external construction materials for Building 3 will withstand BAL-40 intensities. To ensure building survival, the following recommendations will be implemented by Bicorp:
 - Any glazing on the north and east facades to be able to withstand BAL-40 intensities as described in Clause 8.5.2 of AS 3959-2009 or by the use of a BAL-40 related window product;
 - Any glazing on the south and west facades to be able to withstand BAL-29 intensities as described in Clause 7.5.2 of AS 3959-2009;
 - Weepholes, vents and openable portions of windows be screened against the entry of embers with steel mesh with maximum aperture of 2 mm;
 - Weather strips to external doors;
 - Preventing or sealing gaps at joins of metal sheeting for walls and roof to prevent the entry of embers; and

- Roof mounted ventilators be screened against embers with steel mesh with a maximum aperture of 2mm
- The proposed external construction materials for Building 4 are such that they are expected to withstand flame zone intensities. To ensure building survival, the following recommendations will be implemented by Bicorp:
 - Any glazing on the north, west and south facades to be able to withstand flame zone intensities as described in Clause 9.5.2 of AS 3959-2009 or by the use of a BAL-40 related window product, metal mesh screens, and standard bushfire shutters as per Clause 3.7 of AS3959-2009;
 - Any glazing on the east facade to be able to withstand BAL-40 intensities as described in Clause 8.5.2 of AS 3959-2009 or by the use of a BAL-40 related window product;
 - Weepholes, vents and openable portions of windows be screened against the entry of embers with steel mesh with maximum aperture of 2 mm;
 - Weather strips to external doors;
 - Preventing or sealing gaps at joins of metal sheeting for walls and roof to prevent the entry of embers; and
 - Roof mounted ventilators be screened against embers with steel mesh with a maximum aperture of 2mm.
- The development will be serviced by a static water supply to meet the PBP requirement for a minimum amount of 20,000 litres for fire fighting purposes.. The water supply will be visible and readily accessible to fire fighting vehicles and a suitable connection for Rural Fire Service purposes will be made available (65 mm Storz fitting). The supply will be accessible to within 3 m by fire fighting appliances
- Electricity will be underground wherever practicable. Where overhead electrical transmission lines are installed, they will be installed to the following requirements:
 - lines are to be installed with short pole spacing, unless crossing gullies, and
 - no part of a tree should be closer to a powerline than the distance specified in "Vegetation Safety Clearances" issued by Ausgrid (NS179, December 2010).
- Any gas services will be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia, 2008).

12.7 Acoustic Measures

The following general noise mitigation measures as recommended by GHD in the Noise Assessment dated March 2014 will be implemented to mitigate construction noise impacts:

- All engine covers will be kept closed while equipment is operating.
- As far as possible, materials dropping heights into or out of trucks will be minimised.
- Vehicles will be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes will be eliminated, where practicable.
- Machines found to produce excessive noise compared to industry best practice will be removed from the site or stood down until repairs or modifications can be made.
- All equipment will be selected to minimise noise emissions. Equipment will be fitted with appropriate silencers and be in good working order. Machines found to produce excessive noise compared to normal industry expectations will be removed from the site or stood down until repairs or modifications can be made.

- The constructor will provide a phone number at the site entrance detailing the site contact so that noise complaints can be received and addressed in a timely manner.
- Upon receipt of a noise complaint, monitoring will be undertaken and reported as soon as possible. If exceedances are detected, the situation will be reviewed in order to identify means to attempt to reduce the impact to acceptable levels.
- All site workers will 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 will include:
 - Avoid the use of loud radios.
 - Avoid shouting and slamming doors.
 - Where practical, machines will be operated at low speed or power and switched off when not being used rather than left idling for prolonged periods.
 - Keep truck drivers informed of designated vehicle routes, parking locations and delivery hours.
 - Minimise reversing.
 - Avoid dropping materials from height and avoid metal to metal contact on material.
 - All engine covers would be kept closed while equipment is operating.
- Once the facility is operational a review will be undertaken to check that noise levels do not exceed the assumed levels in this assessment

12.8 Environmental and Amenity Impacts

A WSUD and Flood Analysis Report prepared by KFW includes the following measures which will be implemented by Bicorp:

- Up to three 100,000L rainwater tanks in addition to a permanent pool to provide for dust suppression.
- Use of recycled crushed concrete in road pavements and hardstand areas to promote infiltration and reduce the volume of surface runoff.
- Provision of two OSD basins, one on either side of the watercourse.
- Capture of hydrocarbons, including two Rocla downstream defenders to capture hydrocarbons in oil and grease from runoff. A Humeceptor is also to be installed upstream.
- Implementation of a Operation and Maintenance Plan for WSUD in regard to weekly and monthly inspection and maintenance, as well as after every rainfall event >25mm, in addition to six monthly inspections and maintenance.

12.9 Dust and Odour Management

The following **general dust mitigation** as recommended by GHD in the Air Quality Assessment will be implemented:

- Dust dispersion modelling identified trucks operating on unsealed surfaces are the primary source of dust. In order to control the primary source of dust, and to meet the project criteria, Level 2 (>2L/m²/hr) water spraying should be undertaken on the unsealed access road from the site office into the site. This should be undertaken during daytime weather conditions that assist dust dispersion (dry and windy) towards receivers.
- Water material prior to it being loaded for haulage, where appropriate.

- Aim to minimise the size of storage piles where possible.
- Limit cleared areas of land and clear only when necessary to reduce fugitive dust emissions.
- Control on-site traffic by designating specific routes for haulage and access and limiting vehicle speeds to below 25 km/hr.
- All trucks hauling material should be covered before exiting the site and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer.
- Material spillage on sealed roads should be cleaned up as soon as practicable.
- A rumble-strip at the interface of the sealed road and the unsealed access road should be considered.
- Excavating operations conducted in areas of low moisture content material should be suspended during high wind speed events or water sprays should be used.

The following odour mitigation as recommended by GHD in the Air Quality Assessment will be implemented:

- Design and installation of an appropriate building ventilation system at negative pressure at all times during operation.
- A site odour management plan be developed prior to commissioning the facility with the increased capacity.
- Validation sampling of odour from any key odour discharge points will be undertaken after commissioning.

12.10 Energy Efficiency

The recommendations of the Greenhouse Gas Assessment prepared by Pacific Environment Limited pertaining to energy efficiency will be implemented being:

- Diesel usage in on site generator during construction and operation to provide all power to the site.
- Diesel usage in on site vehicles.
- Diesel usage to transport construction materials, operation raw materials and waste to the site and to transport site outputs to end- use/disposal location.

12.11 Waste Management

The following will be adhered to in relation to the acceptance, processing, storage and disposal of waste:

- The proposed development will operate at a maximum capacity of 230,000 tonnes of waste per annum;
- A maximum storage capacity of 45,000 tonnes of waste at any one time;
- Processing capacity of up to 871 tonnes per day;
- Processing of up to 30,000 tonnes of non putrescible organics per annum (of which 6,300 tonnes per annum will be composted and 23,700 tonnes per annum will be mulched or sold as firewood);
- Storage of no more than 2500m³ of organic matter on the site at any time (which includes timber , tree stumps etc). Of the 2500m³ of organics, no more than 500m³ tonnes of this will comprise compost.

12.12 Heritage Conservation

If impacts are proposed outside the current development footprint in conjunction with a future development application in areas of low-moderate Aboriginal archaeological potential further investigations will be undertaken at that time.

13 Conclusion

The Kembla Grange Resource Recovery Centre seeks consent for the processing of up to 230,000 tonnes per annum of building and demolition waste including brick, concrete, soils, timber, general/solid waste, and non putrescible organic waste. The Waste Management Plan which was prepared by Benviron as part of this EIS identifies, classifies and quantifies the likely waste streams that would be handled and concludes that less than 20% of material would be unable to be recycled. Overall, the facility will facilitate the secondary use of materials, encouraging the prevention and avoidance of waste.

The proposed use is defined as 'resource recovery facility', which is a type of 'waste or resource management facility' and, as outlined in the preceding analysis, is permissible with consent in the IN2 Light Industrial zone on which the development is to be sited. The proposal meets the relevant national, state and local statutory requirements that apply to the subject site and the proposed use.

The proposal is separated from adjacent residential development due to the topography of the land and vegetative buffers, including the residential suburb of Farmborough Heights to the north of the site. To the west and immediate south of the site is industrial development which includes the Wollongong Waste and Resource Recovery Centre (which does not accept building and demolition waste) and Soilco, whilst to the east the Lawn Cemetery and open space provides separation to other more sensitive landuses. Accordingly, the site is suitably located to accommodate an expansion of the existing facility and is centrally located to provide waste recycling facilities for the Illawarra region. The project, upon completion, will provide a net community benefit, through the provision of 40 employment positions; will divert waste from landfill; and will recover valuable resources and produce a range of recycled materials to be sold back to the Illawarra and surrounding markets adding value to the local economy.

A range of consultant's reports have been prepared in accordance with the Director General's requirements. The consultant reports have considered any changes that would be required to ensure minimal amenity and environmental impacts as a result of the proposed operations at Kembla Grange.

The Noise Assessment prepared by GHD concluded that the proposal will be acceptable from an acoustic perspective assuming the recommended mitigation measures are implemented. Construction activities during recommended standard hours are not predicted to exceed the noise affected construction noise management levels at nearby sensitive receivers. Recommended noise mitigation measures would be implemented where feasible and reasonable. Operational noise from the WRF is predicted to comply with the INP at the surrounding sensitive receivers during daytime and night time operations.

The Traffic Impact Statement prepared by KFW considers the existing and proposed traffic and parking conditions and the impact that the proposed development is likely to have on not only the existing conditions of the surrounding road network but also the future conditions. The investigation revealed that the predicted traffic generation both during operation and construction will have little effect on the existing road system.

The Greenhouse Gas assessment prepared by Pacific Environment Limited considered the potential impacts of these emissions on the environment and included a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient. The report concluded that when taking the reporting boundaries into account, the emissions associated with this project would likely be more comparable with those of other facilities.

The Bushfire Protection Assessment prepared by Eco Logical Australia Pty Ltd noted that the bushfire prone vegetation influencing the development is riparian corridor and forest vegetation, which is categorised as low hazard. An additional APZ can be established by clearing and offsetting of vegetation in the riparian corridor to the proposed site buildings in accordance with the requirements of 'Planning for Bush Fire Protection' (RF 2006).

The Geotechnical Investigation Report which was prepared by Benviron Group to assess the existing site and subsurface conditions from a geotechnical viewpoint determined that the proposed development is feasible, subject to recommendations presented within the report.

The Acid Sulphate Soil Assessment was prepared by Benviron indicates that the existing acid trail is greater than the relevant action criteria. However, the observed soil profile, local geology and topography and the results of samples (chromium test suite) indicates the potential for naturally occurring acidity. Therefore Benviron Group determined that the site is not impacted by acid sulphate soils in samples taken from the maximum depths tested.

The Air Quality Assessment which was undertaken by GHD confirms that predicted odour levels from proposed green waste composting will not comply with the 2 OU criteria at all nearby sensitive receivers without mitigation. However, predicted odour levels from the proposed green waste composting will comply with the criteria if the building is kept at negative pressure and all air is released into the atmosphere via a stack. Further, the report confirms that based on the assumptions made in the assessment, 24-hour PM10 concentration levels from site operations are expected not to comply with the adopted criteria at Private Receivers R1. Annual average PM10 and TSP concentration levels, as well as monthly deposition rates are expected to readily comply with the adopted dust criteria. GHD advise that dust suppression measures in the form of Level 1 water sprays on the access road and wet suppression systems for crushing are predicted to reduce dust emissions resulting in compliance with the adopted criterion at all private receivers.

The report also identifies that the weather conditions that cause maximum dust impact are generally consistent winds in the direction of the nearest sensitive receivers throughout the daytime period outside of rain events. Further, trucks on unsealed surfaces were identified as the most significant source of dust emissions on the site and provide the greatest contribution to off-site dust impact. Accordingly, GHD recommend that during times of consistent adverse weather conditions (dry and winds), operations of these items should be reduced, or water sprays should be used in order to minimise potential impacts.

The Biodiversity Assessment Report prepared by Conacher Environmental concludes that the proposed development would maintain or improve biodiversity values within the site and locality through the avoidance of impacts to areas of high biodiversity value, the retention and management of the riparian corridor which intersects the site and the implementation of the amelioration measures proposed.

The Preliminary Hazard Analysis which was prepared by Benviron Group identifies the main hazards as diesel, petrol, hydrocarbons, bush fire risks and vehicle collision and roll over. A range of hazard treatment measures are proposed to produce a low level of risk in accordance with the risk acceptance criteria.

The Groundwater Assessment prepared by Benviron Group determined that the risks to human health and the environment associated with soil and groundwater contamination is low in the context of the proposed use of the site.

A Flood Analysis Review which was undertaken by KFW determined that climate change will have insignificant effects on the overall peak after surface elevation during the 100 year ARI flood. The site has safe access during the 100 year ARI flood in both the blocked and unblocked scenarios and provides safe refuge for employees during the PMF. KFW conclude that the proposed development is not affected by flooding up to an including the 100 year ARI as flooding is contained within the existing watercourse in the culvert unblocked condition. Minor overtopping occurs during the culvert blocked condition however KFW confirm that flood waters are within safe limits for pedestrians and vehicles in accordance with the NSW Floodplain Development Manual.

The Preliminary Heritage Assessment undertaken by Artefact concludes the area of proposed impacts was found to have a low Aboriginal archaeological potential. Hence, Artefact conclude that there are no heritage constraints on the current proposal. If impacts are proposed outside the current development footprint in areas of low-moderate Aboriginal archaeological potential further investigations would be required.

The Visual Analysis prepared by TCG Planning in April 2014 confirms that the visual impact will be minimal due to the siting of the development in a location surrounded by vegetated ridgelines and batters; separation from adjacent landuses; and the setback of dwellings in Farmborough Heights from the edge of the ridgeline.

The investigations which have been conducted as part of this Environmental Impact Assessment conclude that the proposed Kembla Grange Waste Recovery Facility, which is proposed to process up to 230,000 tonnes per annum, will have minimal environmental impacts, subject to the implementation the recommended mitigation strategies. On this basis it is concluded that the site is suitable for the proposed development and the facility will result in positive social and economic outcomes, including the creation/retention of approximately 40 jobs. Further the project will assist the EPA in meeting its recycling targets, with minimal impacts on surrounding residents, the watercourse, flora and fauna, air quality and traffic movements.